The Convergence Process

A public participatory pathway for societies to sustainability and social equity

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Abstract

This dissertation describes a transdisciplinary research project undertaken at the University of Iceland in 2009 to 2013, that focused upon the creation and testing of a public participatory process through which individual communities can take steps towards sustainability and social equity within Earth's boundaries.

If the United Nations' prediction of more than nine billion people in 2050 is realized, and if a large number of those people aspire to today's Western lifestyles with larger than sustainable ecological footprints, then humanity as a whole faces an enormous dilemma. Earth cannot support that many people living unsustainably, and the growing pressure on current mechanisms for the allocation and management of resources leads to an increasingly 'unfair' planet. As we only have one Earth, a possible solution to this dilemma might be to change the way resources are divided between nations, communities and individuals, towards new processes of management and allocation that are fair and within biological planetary limits. This dissertation describes the creation and testing of the Convergence Process; a collection of principles, tools and methods meant to aid communities in moving down the path to sustainability and social equity, while keeping in mind our planet's biophysical boundaries.

The process consists of a systems approach and organized public participatory World Café-style workshops, where systems analysis is applied when carefully selected local citizens draw causal loop diagrams of a chosen system. The idea is that those who live with the system collectively know it better than others, and can therefore draw forth solutions unpredictable to outsiders. By using the Convergence Process, communities can identify changes necessary within their systems – for example within policies or lifestyle choices – that may increase convergence and contraction of resource use in their communities and bring them to a more sustainable and socially equal way of living. The intention is that different communities can apply the methodology themselves, without the intervention of academic researchers or other specialists.

The process was tested with action research eight times in three countries in the years 2011 and 2012 – on the island of Iceland, in Bristol City in the United Kingdom, and in Tamil Nadu in India. During the testing, the World Café, systems approach and causal loop diagrams functioned well together within this public participatory process, resulting in the citizens identifying necessary changes that can bring their community towards greater sustainability and social equity on both a local and a global level. However, this research could not conclude the process' full effects as it was not brought to conclusion in any of the communities due to financial and time restraints, in addition to being outside the scope of this research. Further hindrance was that the study was researcher-driven, as opposed to community-driven, so the full effects of the process in a community could not be interpreted.

The Convergence Process is a promising contribution to public participatory democracy meant to bring the world towards greater sustainability and social equity, but more research and in particular, a community-driven full run of the process is needed to be able to gauge its full effects upon a community.

The Convergence Process was created as a part of the FP7 funded four-year Converge Project, which was a transdisciplinary international research project.

Ágrip

Ritgerð þessi fjallar um þverfræðilega rannsókn er gerð var við Háskóla Íslands árin 2009 til 2013 og snérist um að skapa og prófa íbúaþátttökuferli sem samfélög geta notað til að færast nær sjálfbærni og félagslegu jafnrétti innan þeirra marka sem jörðin setur.

Rætist spár Sameinuðu þjóðanna um að mannkynið verði meira en níu milljarðar árið 2050, og ef stór hluti þess sækist eftir þeim ósjálfbæra lífsstíl sem Vesturlandabúar lifa í dag, þá stendur mannkynið í heild sinni frammi fyrir gríðarlegu vandamáli. Jörðin getur ekki viðhaldið slíku fjölmenni við ósjálfbærar kringumstæður, og vaxandi þrýsingur á kerfin sem við notum nú til að skipta og stýra auðlindum hennar leiðir til sífellt meiri ójöfnuðar. Möguleg lausn gæti falist í breytingum á skiptingu auðlinda milli þjóða, samfélaga og einstaklinga, með því að útbúa ný stjórnunar- og úthlutunarferli sem eru bæði sanngjarnari en þau sem nú ríkja, og rúmast jafnframt innan líffræðilegra marka jarðarinnar. Í þessari ritgerð er fjallað um um gerð og prófun Samleiðniferlisins, en það er samansafn af grundvallaratriðum, áhöldum og aðferðum sem ætlað er að aðstoða samfélög í því að færast nær sjálfbærni og félagslegu réttlæti með mörk jarðarinnar í huga.

Samleiðniferlinu er beitt á vinnufundum íbúa, þar sem útfærslu af Heimskaffi (World Café) aðferðinni er fylgt. Þar notast handvaldir þátttakendur við markvissa kerfishugsun og teikna myndir af orsakatengslum í fyrirfram ákveðnu kerfi. Hugmyndin er sú að þeir sem búa við kerfið sem skoða á, þekki það sameiginlega betur en aðrir og geti því fundið lausnir sem utanaðkomandi fá ekki séð. Með ferlinu geta íbúarnir því bent á nauðsynlegar breytingar innan kerfisins – til dæmis í stefnu stjórnvalda eða lifnaðarháttum sínum – sem dregið geta úr notkun auðlinda og fært samfélögin nær sjálfbærni og félagslegu jafnrétti. Ætlunin er að mismunandi samfélög geti beitt aðferðinni sjálf án íhlutunar vísindamanna eða annarra sérfræðinga.

Ferlið var prófað með starfendarannsókn átta sinnum á árunum 2011 til 2012 – á Íslandi, í Bristol borg á Bretlandi, og í Tamil Nadu á Indlandi. Heimskaffi vinnufundirnir, kerfishugsunin og orsakatengslamyndirnar virkuðu vel saman með þátttöku íbúanna, og skilgreindu þeir nauðsynlegar breytingar sem samfélög þeirra verða að gera að veruleika, vilji

þau ná fram meiri sjálfbærni og félagslegu réttlæti bæði heima fyrir sem og á alþjóðlegum vettvangi. Sú niðurstaða gefur góða von um að Samleiðniferlið geti stuðlað að aukinni sjálfbærni og jafnrétti í framtíðinni.

Aftur á móti var ferlinu hvergi fylgt til fullnustu í rannsókn þessari bæði vegna þess að sú var ekki ætlunin en einnig vegna fjár- og tímaskorts. Annar tálmi reyndist sá að rannsóknin var unnin fyrir tilstuðlan fræðimanna en ekki samfélaganna sjálfra, svo enn er ekki unnt að túlka fyllilega áhrif ferlisins á neitt eitt samfélag.

Samleiðniferlið er heillavænlegt framlag til þátttökulýðræðis sem ætlað er að færa heiminn frekar í átt að sjálfbærni og félagslegu jafnrétti, en meiri rannsókna er þörf og einkum er nauðsyn á að eitthvert ákveðið samfélag standi að því að prófa ferlið innan sinna vébanda, svo hægt verði að meta full áhrif þess.

Verkefnið var hluti af stærri alþjóðlegri rannsókn sem kallast Samleiðniverkefnið (the Converge Project) og var kostuð af sjöundu rammaáætlun Evrópusambandsins.

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I thank the European Commission's Seventh Framework Programme for funding my three years of Ph.D. studies, and the University of Iceland's Environment and Natural Resources for supporting me financially so that I was able to attend the research team's last meeting in the spring of 2013.

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My father also deserves great thanks for all his help with the children, but more than that, for instilling in me the belief that I can do what I desire and for teaching me the values I honour most; honesty, open-mindedness, humour and resilience.

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To all of you whom I have recounted here, as well as others I have not named, I quote William Shakespeare: “I can no other answer make, but, thanks/ And thanks” (Twelfth night, Act III, Scene III).

Table of contents

List of figures

List of tables

Foreword – On the Converge Project

This dissertation, *The Convergence Process*, is born out of a European Commission Framework Seven-funded project, and gets its name from the same source. The research project, entitled *Converge – Rethinking Globalization in the light of Contraction and Convergence* – hereafter the *Converge Project*[1] – is meant to find possible solutions to various sustainability issues the world now faces. It is both transdisciplinary and international in nature; meaning that its nine partners are from various academic and social practice fields in five countries. The research partners come from four European universities, and four European and one Indian non-governmental organizations (NGOs): the University of Iceland; the University of Bristol, UK; the University of Lund, Sweden; Szent Istvan University, Hungary; The Schumacher Society, UK; The Schumacher Centre, UK; Greendependent – Sustainable Solutions Association, Hungary; The Natural Step International, Sweden; and Social Change and Development, India.

The Converge Project is inspired by the concept of Aubrey Meyer's initiative *Contraction and Convergence*^{TM} (2000), one of the methods that prompted the Kyoto Protocol by suggesting a way to reduce atmospheric concentrations of greenhouse gasses, to avoid catastrophic climate change, while at the same time promoting social equity with regards to climate change and greenhouse gas emissions. Contraction and Convergence^{TM} was originally developed in the 1990s under the name *Equity and Survival*, and at its core are a number of moral principles – equity, equality, and a movement to commonly held goals at local and global scales. The Converge Project research team goes a step further than the Contraction and Convergence^{TM} process. The team members recognize that Earth's resources are not equally distributed between and within nations, that humankind is growing rapidly at the same time as consumption rises, and that our annual use of many natural resources exceeds the capacity of the planet to supply them (Ehrlich1968; Meadows et al. 1972; Meadows, Meadows and Randers 2004; Victor 2008; Jackson

[1] For more information, please see www.convergeproject.org.

2009; Rockström et al. 2009; Ragnarsdóttir, Sverdrup and Koca 2012). Unchecked, the outcome could be disastrous. Therefore, the Converge Project team decided to explore the idea of equity in the light of planetary limits with regard to the various sustainability challenges and positive sustainability initiatives the world now witnesses.

The question asked at the beginning of the project was this: How, given the current situation, do we today manage and allocate Earth's resources so the projected global population of nine billion people in 2050, and their offspring, can flourish – indefinitely? This question reverberated throughout the Converge Project's four-year-research (2009-2013), during which the team explored whether the core principles of Contraction and Convergence™ can be transferred or widened to account for a fuller spectrum of sustainability issues. The team wondered whether contraction and convergence beyond greenhouse gases (termed simply *convergence* in the Converge Project) might be an important pathway within sustainable development bringing us closer to the goal of sustainability. The team considered whether such an approach might encourage communities to consider changes to their behaviour, policies, plans and actions in order to reach the common goal of sustainability.

As human society is bound within a complex socio-ecological system where changes in one part affect other system parts (Meadows 2008; Fortnam et al. 2010a), systems approach is vital within the Converge Project, and though the project works at a local level with communities, the global picture was always kept at hand.

Within the Converge Project: The Convergence Process

The team realized that communities truly interested in reaching lasting sustainability may feel lost in the search of a methodology that can bring about the convergence and contraction necessary for humans to continue flourishing on Earth. Therefore, one of the Converge Project's main aims was to create and test a methodology, the *Convergence Process*, which uses systems thinking and public participatory approaches to influence a fundamental change in communities that wish to move towards sustainability and social equity.

In this dissertation, I describe and evaluate the University of Iceland's main objective within the Converge Project, namely the development and design of the public participatory Convergence Process and the testing of

it with action research. This Ph.D. project therefore constitutes a core University of Iceland contribution to the Converge Project.

Each partner's contribution

Other partners' contribution in the project was such: The University of Bristol identified relevant sustainability frameworks and set the theoretical background to the study; the University of Lund created a model-based indicator framework and tested it along with the University of Iceland; Szent Istvan University focused upon the policy field, evaluated and identified how European Union and international policies and agreements conflicted or supported the processes of convergence; The Natural Step identified processes of convergence through existing case studies; Greendependent investigated how different methods of community engagement contribute towards contraction and convergence in various parts of the world; Social Change and Development, or SCAD, in India helped facilitate the workshops in India and provided a developing-world insight into the project; and finally, The Schumacher Society and the Schumacher Centre coordinated the project, disseminated the Converge findings, and recommended how to integrate convergence into internal and external policies of the European Union.

The Converge Project concluded in August 2013.

1 Introduction

Academic research is needed to inform sustainability, but translating knowledge about sustainability problems, especially global ones, to local action is a persistent and often intractable problem. The intention of this dissertation is to create a link between science and local action, where both parties benefit from each other's knowledge and experience. Furthermore, to create a public participatory sustainable development process that can bring humankind to both actual and increasing sustainability and social equity on the ground.

The aim with this first chapter is to give an overview of this dissertation. I begin with a discussion on my motivations for engaging in this project and Ph.D. studies and the writing style of this dissertation – the deliberate choice of a first person point-of-view. This is followed by a chapter on my conviction that jargon should be avoided in any field and especially when it comes to transdisciplinary and community action-oriented research, such as described in this dissertation.

I then introduce the dissertation's research goals along with an explanation of the Convergence Process – that is, it is meant to be a methodology that communities can use to reach increased sustainability and social justice through contraction and convergence, without the intervention of academics or other specialists. This is followed by a short overview of the methodology applied. The Convergence Process toolkit is then introduced and the research questions established.

The chapter concludes with an overview of the dissertation's structure.

1.1 Why this dissertation was written

During my four-year Ph.D. studies, I, with the aid of other members of the Converge team, have selected and assembled methodological pieces that are used within individual social practices and various approaches around the world, and congregated them into one cohesive unit, the Convergence Process. This process could lead to a community-based convergence (a pathway to sustainability where ecological limits to growth are recognised and equity at a global scale is valued) within the societies that adopt it, and thereby to a greater sustainability and social

equity. In layman's terms, this is an approach to get people together to impact the world.

But the origins of this dissertation go much further back.

I have always been curious about life and people, and this curiosity is probably what caused me to choose journalism as my main profession, principally focusing upon crime, science and human-interest stories. Asking people why they act as they do, and pondering upon their answers, is something I enjoy, along with being able to form their answers into text that arouses other people's interest, but the latter is a skill I have spent twenty years or more developing. In addition, nature has been imperative in my life ever since I was a child, along with curiosity about the past – how people survived in a bygone world.

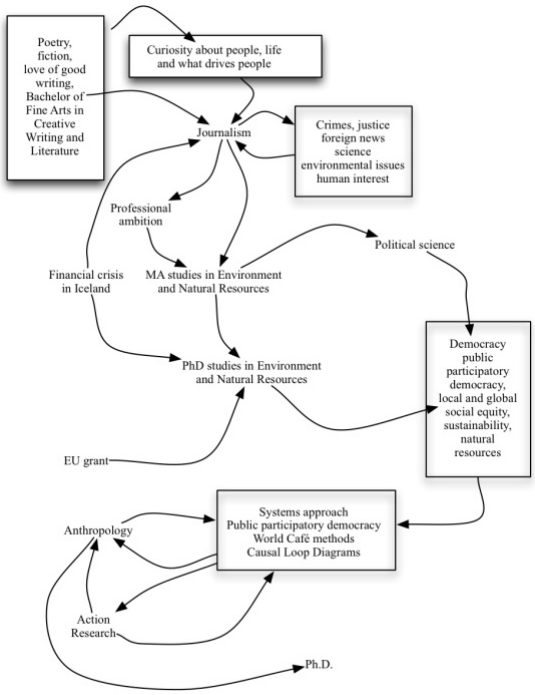

Figure 1 A flow chart depicting this Ph.D. candidate's journey

In the flow chart presented in figure 1, the line appears rather straight – I went into journalism and from there into MA studies, with the intention to get a better understanding of the science and environmental

dispute stories I was assigned at the various newspapers and magazines I worked at in Canada, where I lived for nearly a decade, and in my native Iceland. While in Canada, I completed with honours in 2004 a four-year Bachelor of Fine Arts degree in Creative Writing, focusing on poetry, and a Bachelor of Arts in English literature. My poetry has always focused upon nature, and during my literature studies, I chose varied courses, covering gender studies, colonialism, nature studies, theory and more.

Doubtless, I was also shaped by a close relationship with several of my older family members (aunts, great-aunts and grandparents), by spending five summers as a child on farms both in Iceland and Denmark, and by the stories elderly First Nation women told me during my first winters in Northern Canada. I asked about the past and how people used to cope with nature, and searched for methods and tools now forgotten in today's technology.

I wrote my first science news articles in Canada's North when working as a reporter for the Whitehorse Star and later for the Yukon News. I first understood the impact of climate change while working at the Yukon News shortly after the turn of this century. At that time, I was lucky enough to be sent by my editors to the Kluane National Park with a biologist, archaeologist and a group of native people to an archaeological dig at melting north-facing ice patches. These patches have existed for thousands of years, and the caribou seek the ice to cool down on warm summer days. The species that hunt the caribou – humans and wolves – have followed as the caribou is an easy prey on the patches. Now, to the delight and alarm of archaeologists, biologists and the hunters' direct descendents, the warming climate melts the patches fast, exposing ancient hunting paraphernalia from underneath the ice. This trip, along with other science and climate change stories I wrote, awoke in me a great curiosity about sustainability and the effects that we humans have had upon nature and vice versa.

My MA studies, commenced in 2007, took me down a new path – a research project on the local public opinions on the infrastructure of massive environmental impact (aluminium smelters), that brought employment to three small communities in Iceland. It opened doors to political science, in particular public participatory democracy. During this time, I also took a seat on the board of Iceland's largest environmental non-governmental organization, Landvernd, where I participated in a public participatory

project meant to assess social and sustainability impacts of a proposed aluminum smelter in one of my MA research communities.

In 2009, when I was about to complete my MA studies, I was encouraged to apply for a four-year international and transdisciplinary research Ph.D. position, focusing upon sustainability, societies and systems thinking. The position was funded and I realized that after Iceland's economic crash, I might not have an easy time finding a job as a journalist despite my experience and education. The topic charmed me, and I believe that my mix of professional, personal and academic experience prepared me well for this research. In particular, I believe I was adequately transdisciplinary in my background for this Ph.D. dissertation. In addition, the self-discipline and the training in writing in a simple, well-flowing manner has been invaluable, plus the skill of writing so that laypeople understand even the most complex matters.

1.1.1 Why this dissertation is written as it is

The dissertation is written from a first person singular point-of-view because it is the result of action research, where the researcher, I, involve myself in the research. I, the researcher, am a part of the research, and therefore it is appropriate that I write this dissertation from my point of view. This approach was needed for a real, meaningful engagement in the case study communities, and leads to a more personal tone than is the custom in Ph.D. dissertations, but it may be considered helpful, given the transdisciplinary and international nature of the project – with academics from many different fields and social practice specialists participating in the project and influencing my work. Furthermore, given the goal of writing so people from various levels of society can understand the text – rather than only a small group of academics – the first person point-of-view offers a greater chance to reach the reader on a personal level.

The dissertation is a transdisciplinary study that takes root in Environment and Natural Resource sciences, and weaves its branches through environmental anthropology, systems approach, ecological economics, public participatory democracy, practices in use in the field (social practices), and more.

Environmental anthropology serves as a bridge between science and humans. As a transdisciplinary Environment and Natural Resources Ph.D. student at the University of Iceland, an appropriate school had to be

chosen for me to graduate from. After some discussion with my advisors, it seemed clear that environmental anthropology within the School of Social and Human Sciences was most appropriate. It also gives a human element to what could become overly technical, given the systems science approach chosen for the overall project. Environmental anthropology focuses upon the relationship of humans with their environment; the effect humans have upon their environment as well as vice versa. As people are at the heart of the Convergence Process, as well as people's management of local food systems – which includes management of the environment – environmental anthropology is even more appropriate a starting point for this research and dissertation.

Ecological economics, public participatory democracy and the social practices in use in the field are connected – all seek to find a better way to manage our human reality. Ecological economists seek a way to ensure the environment and environmental costs are illuminated in traditional accounting; public participatory democracy is intended to include the public in governmental decisions (more often than not in environment-related issues); and the social practices used in the field offer the insight that the public, and not only authorities or academia, may have solutions to complex problems.

Finally, the systems approach is necessary to get an overview of the whole picture, which must be illuminated before a solution can be sought.

The mixture of these schools of thought and approaches, along with a few others, results in a transdisciplinary approach – the borders of several schools of thought are crossed, intermingling science and citizens working locally intending to better their and others' lives.

1.1.2 A few words on jargon

Austrian philosopher Ludwig Wittgenstein wrote: "What can be said at all can be said clearly; and whereof one cannot speak thereof one must be silent" (1922 pp. 23). These words serve as a guiding light in this dissertation; text must be written clearly if it is to be of use. Given my background, Jane Kepp's poem on jargon seems most appropriate, simply to underscore that my goal as an experienced journalist and an editor is always to avoid jargon whenever possible:

The Hermeneut's Dilemma, or, A Jargon Poem

by Jane Kepp – published in *Writing Culture: The Poetics and Politics of Ethnography* (1986 pp. ix)

Twas prelapsarian, and the hermeneut
Sat huddled with his faithful trope,
Sunk in thaumasmus, idly strumming his lute,
Lost in subversion with nary a hope.

Then with heartfelt apoplanesis he cried,
O come, interlocutor, give me your ear!
In my pathopoeia, I've slandered and lied;
Now of my grim project this discourse you'll hear.

I've dappled in vile phenomenological rites,
And joined in a secret synecdoche,
Squandered my received knowledge in bibulous nights,
And embraced epistemological heresy.

O, but now my metonymy is too great to bear!
This ecphonesis has become too deictic to hide!
I've lost all the poesis I once held so dear
And, with typical hypotyposia, he died.

The poem is of course tongue in cheek, written by a copy editor of one of the first books of postmodern anthropological text, *Writing Culture*. Appropriately, it is reminiscent of Lewis Carrol's better known poem, *Jabberwocky*, from *Through the Looking Glass* (Carroll 1872). The editors state that Kepp wrote it "in mock despair […], dictionary in hand" (Clifford and Marcus 1986 pp. ix). Kepp's message is clear; jargon, or specialized lingo used within and about a certain subject, does not appeal to readers not educated in that subject and when writing for a general public, it should be avoided. Jargon exists everywhere; truck drivers, doctors, lawyers, divers, engineers, social scientists and other groups use words that most people would not understand. Within academia, each discipline has its own jargon. It is even specialized within disciplines' subfields, so that a biological anthropologist may not understand all the words used by a feminist anthropologist and vice versa. In some instances, a single word may mean

two different things within different disciplines. By poking fun at the jargon used by the anthropologists she edited, Kepp underlined the fact that in order for the book to be useful, they had to write so that more people than only the initiated would understand the text.

In a dissertation where many disciplines and schools of thought meet and where the three advisors come from different academic fields, it is crucial that more people than those educated in sustainability matters understand the written text. The reason is simple. A reader must be able to understand the text – otherwise he or she is unable to learn from it. In other words, given the nature of the Convergence Process – namely that communities are able to use the process without outside help – it is imperative to use fewest possible technical words understood only by a certain group of people.

Those jargon-related words that must be used within this dissertation are explained in the text and/or in the glossary appendix at the end.

1.2 Goals and the Convergence Process explained

As a representative of the University of Iceland, my goal within the Converge Project was to create a methodology that communities can use to reach increased sustainability and social justice through contraction and convergence. Though an anthropocentric goal, at its heart is sustainability, where the assumption is that the stock of natural resources and ecological functions are irreplaceable and therefore Earth should be protected at all cost if humans are to be able to flourish on Earth. This work resulted in the creation of the Convergence Process described in this dissertation. The intention with the Convergence Process is that communities will be able to apply the methodology themselves, without the intervention of academic researchers or other specialists. In addition, that it be a functional method to all communities interested in reaching increased local and global sustainability and social justice.

1.2.1 Short overview of the methodology applied

The research progression is described in detail in later chapters, but here is a short overview of how the Convergence Process was developed and by which methods the Converge team tested the process. This is empirical research, where both indirect and direct observations and experiences have been documented. I gathered the data in the years 2009

to 2012, and included literature review, action research methods, and mixed quantitative and qualitative research in the form of questionnaires, in addition to several informal interviews and information gathered at Converge team meetings that were of value.

The literature review and research focused upon systems science, environmental anthropology, ecological economics, public participatory democracy, social practises in use in the field and more. In line with action research and public participatory democracy theory, I invented an invitation process for the group workshops, where participants were carefully selected from a system value chain. We, the Converge team, tested the process with volunteers during eight community-based workshops in three countries from September 2011 to October 2012.

During the workshops, we used action research, where the researchers were a part of the process and deliberately drew out the participants' knowledge of the system at hand. We, the researchers, then continued on with the work in between the workshops by creating systems diagrams and I wrote narratives and sent to the participants, encouraging them to respond. I included the responses received in continued development of the process. Furthermore, I gave mixed quantitative and qualitative questionnaires to the workshop participants during each workshop and used the results to inform and adjust the creation of the Convergence Process, presented in this dissertation.

1.2.2 The Convergence Process toolkit

The goal with the Convergence Process testing workshops was to map the whole food system of a particular area with people who live in that system and have first-hand experience of it – that is to say, to get a broad spectrum of local people to map their system in order to find solutions to critical problems facing the community. The mapping demonstrates how causes and effects are connected in sometimes surprising ways; illustrates how different activities can and do affect each other; and can ultimately suggest realistic solutions to foreseeable problems.

The Convergence Process is based upon several methods and approaches that have in other circumstances proved successful in capturing complex issues: the World Café method, systems approach, causal loop diagrams and the Group Modelling method. In addition, the Convergence Process relies upon approaches created and/or used by The

Natural Step (TNS) organization. These tools are described in more detail later but a short clarification follows here.

A systems approach recognizes that systems never occur in a vacuum – most things are a part of a system and systems are interconnected in sometimes surprising ways, where feedback loops and time lags can have unforeseen effects, and causal loop diagrams are a method to map out a system, depicting feedback loops and connections within and between different systems.

The public participatory World Café approach uses democratic modes to draw out the wisdom lying within those who live within the system being discussed. This method is especially created to draw out the voices of people who otherwise are often are silenced (Brown and Isaacs 2005).

The Group Modelling method is a public participatory process that uses both systems approach and causal loop diagrams to map a system as a preparation for a computerized systems dynamics model (Haraldsson et al. 2007; Sverdrup et al. 2010).

TNS is a non-governmental organization that works with businesses and communities attempting to reach greater sustainability in their operations. TNS, a partner to the Converge Project, uses visioning, where the participants are asked to envision a desirable future that encompasses their goals, and then this vision functions as a landmark in the group's later work (Cook 2004; James and Lahti 2004).

1.2.3 Research questions

The aim of this research was to set up a public participatory process for communities that wish to reach increased sustainability and social equity both locally and globally without the intervention of specially trained consultants. To do that, I, along with other team members, looked to other sustainability frameworks and processes, along with academic fields and theories. Several academic theories and fields of thought, along with social processes were chosen and braided together both to create the Convergence Process as well as to throw light on how it functions as a public participatory process within the three communities it was tested in.

The theories were chosen to explain how the process works in reality, and are essential to understand what occurred. Many of the overall contemplations and reflections on what occurred could not be phrased in questions prior to the testing because they took form as the process

developed and the testing progressed. These include contemplations on cultural context, meditations on the Convergence Process in light of the academic theory, how convergence can better be brought into the process, and a discussion on the importance of a simple presentation.

However, a few practical research questions were of course asked at the start of my studies and kept in mind during the creating and testing of the Convergence Process. These are:

1. How can systems approach, causal loop diagrams and the World Café method be combined into a single participatory tool that creates pathways to sustainability within a community?
2. In what manner does the Convergence Process function within the three different communities: The island of Iceland; the city of Bristol, UK; and the districts of Tirunelveli and Tuticorin in Tamil Nadu, India?
    a. Does the introductory presentation, partly based upon The Natural Step's approach, captivate and inspire audiences from many different backgrounds?
    b. Does the systems approach, along with setting a strong vision at the beginning of the participant workshops, work in the communities chosen? (Keep in mind that some participants are illiterate.)
3. How can participatory mapping of a system provide a useful methodology for creating scenarios that stakeholders can realistically follow to move their community towards sustainability?

These questions are meant to answer how useful the Convergence Process is and whether it reaches the goals it is meant to – namely to create a methodology communities can use to move closer to the goal of sustainability and social justice via contraction and convergence.

1.3 The dissertation's structure

This dissertation outlines the research I undertook at the University of Iceland within the Converge Project. Because this work was part of a larger effort, the preface introduces the Converge Project and shows how the Convergence Process relates to the other activities of the team.

This first chapter has summarized my own motivations and professional path, given a short introduction to the Convergence Process

and the related research goal and questions, and provided a short overview of the methodology used.

The second chapter sets the premises of resent research on the state the planet is in and discusses the discourse of survivalism, focusing on Earth's boundaries, population, overconsumption and resources, and explains the Ecological Footprint, a method to measure the load of human demand upon Earth's ecosystems. In addition, the second chapter offers a social perspective on the state of the world, defining sustainability, sustainable development and social justice.

The third chapter is an overview of the theoretical frameworks and key approaches and fields that inspired the project. This includes a discussion on transdisciplinary research for sustainability and introduces systems theory. The next section describes essential academic schools of studies and theories, such as environmental anthropology, public participatory democracy and ecological economics, followed by a discussion on the theory inspiring the social practice frameworks relied upon, such as the Natural Step's. The third chapter concludes with a discussion on how the theories and approaches selected have inspired the creation and testing of the Convergence Process.

The fourth chapter discusses the specific methods used and gives examples of their use in other contexts and studies. Here, the focus is first on the academic research methods and tools that have been of use during the creation and testing of the Convergence Process, and second, on social practice methods and tools applied in this research.

The fifth chapter sets the case study scenario boundaries, first the communities selected to test in, and second the system chosen as the workshops' focus – the food system of the three communities.

The sixth chapter is an overview of the testing and the developing of the Convergence Process. It begins with an analysis of the research questions in context of the theory applied, goes on to discussing how I developed the Convergence Principles, and then discusses the creation of the invitation process – how the workshop stakeholders were identified and invited. An overview is given of a pilot test done early in 2011, followed by an overview of the workshops and a summary of the eight workshops held in the three communities. The chapter concludes with a discussion of the follow-up necessary to a public participatory process

such as the Convergence Process, but which was out of this research's scope.

The seventh chapter offers the Convergence Process as it stands at the end of my four-year Ph.D. studies, and as it is presented to communities that wish to adopt it to reach their desired goals of a more sustainable and socially just future.

The eighth chapter contains the discussion, where issues that have emerged during the course of the creation and testing of the Convergence Process are discussed and the research questions answered. It also contains a few words on necessary further research.

The ninth and ultimate chapter concludes this dissertation with a discussion on its contribution to academic literature and closes it with a few carefully chosen final words.

The dissertation contains a number of pictures and diagrams used to inform the text, and unless otherwise indicated, I am responsible for their existence. Furthermore, Appendix A contains a glossary, where the jargonized terms I was obliged to use are explained. The questionnaires given at each workshop are presented in Appendix B, and the stakeholder invitation forms in Appendix C. Appendixes D and E present two articles written by me and published in Icelandic; the first a scholarly article published in a University of Iceland journal and the second a features article, introducing the project in Iceland's agricultural newspaper.

2 Setting the stage – humankind's predicament

In this chapter, a short overview is given of the state of the world and the enormous challenges humankind now faces. The chapter consists of a synopsis of facts and research that attempt to predict the future, and is divided into two sections – the first gives an overview of Earth's predicament, relying on the survivalism discourse; and the second discusses the social aspect of living in a limited world (including defining sustainability, sustainable development and social justice).

2.1 The state of the world – a planetary perspective

In the first half of chapter 2, a look is taken at the state humans have brought Earth into, following a discourse called survivalism as outlined by the Club of Rome in the 1970s (Meadows et al 1972; Dryzek 2013). At its core is the growing scientific evidence that humankind needs to change its course if we are to be able to continue to flourish on Earth. Urgent issues are touched upon, such as how humans have overstepped planetary boundaries, how rapidly growing population and overconsumption affects the planet's resources, and the Ecological Footprint is introduced, a mathematical model used to calculate the load of human consumption upon the planet's ecosystems, that offers an opportunity to compare different nations' footprints.

Discourses are methods of talking, thinking and representing a particular topic. They produce meaning and knowledge about that subject, and this knowledge then influences social practices and therefore has real consequences (Hall 2007; Dryzek 2013). Discourses are not directly linked to class-interests, but they

> always operate in relation to power – they are part of the way power circulates and is contested. The question of whether a discourse is true or false is less important than whether it is effective in practice

writes cultural theorist Stuart Hall (2007 pp. 58). The survivalism discourse began in the 1970s, and focuses upon biological limits

(Meadows et al. 1972), the planet's carrying capacity (Hardin 1968), exponential population growth (Ehrlich 1968) and more (Dryzek 2013).

It is worth mentioning that survivalism discourse is not the only way to discuss environmental limits and other discourses exist that do not focus so narrowly on stocks, capacities and population – such as the Promethean response discourse, which gives the individual more room to manipulate and puts less emphasis on top-down hierarchy and control by focusing upon human ingenuity and people's capacity to develop a substitute for natural resources that run out (Dryzek 2013). Still other discourses exist, not recounted here (Dryzek 2013).

However, as the Converge Project's grand narrative began from the survivalism discourse, this is the approach taken in the Convergence Process.

2.1.1 Planetary boundaries

We only have one planet to live on. Earth, with its bounty, has until now provided both food and shelter for the human race. However, if we do not change our course, evidence points to the fact that Earth may soon no longer be able to support our lifestyles. In his 1968 book *The population bomb*, biologist Paul R. Ehrlich warned that the human population was acting just as any other population does in too much comfort; growing out of bounds. In 1972, the authors of the book *Limits to growth* predicted that humans would overshoot Earth's biophysical limits in the 1980s (Meadows et al. 1972). A year later, British economist Ernst Friedrich Schumacher (1973) warned in his book *Small is beautiful* that the economic structure of Western countries had spun out of control and unbridled, this pattern would lead humans into dire straits. He cautioned that resources were diminishing, the environment was being polluted, the economy was mismanaged, and people were forced to work and live in inhumane situations. He encouraged his readers to seek better solutions in the form of communal ownership and regional workplaces that used local resources and labour. In 1990, Ehrlich and Anne Ehrlich, accentuated their earlier message in a new book, *The population explosion*, stating that unchecked, the human population would procreate out of control and out of Earth's boundaries, thereby creating grounds for starvation, disease, warfare, environmental degradation and more. The authors called for awareness, human action and a quick and successful lowering of the

human increase rate below the death rate, because if humans did nothing, the authors warned, nature would solve the population problem.

A 1997 study shows the economic value of a few of our life support systems, indicating that they are indeed an important portion of Earth's total economic value though they have often not been thought of as such in governmental decision. People have taken these life support systems for granted, but when they fail, the cost can be astronomical to the society in question. Robert Costanza and his co-authors pointed out that these systems must be accounted for in human economic models, because if not, the outcome can be disastrous (1997).

These warnings still ring true and it becomes increasingly evident that humans must change course. The human race reached seven billion in 2011 and is still growing, thereby increasing the consumption demands. Furthermore, current environmental problems are of a greater scale than people have faced in the past, as can be seen in reports of humans having overstepped planetary limits (Rockström et al. 2009). In addition, cumulative (local) environmental changes can accelerate planetary-level problems through interactions, further underscoring the need to consider global dynamics at the same time as local responses.

In essence, Earth's bounty has limits and we humans, who like to think of ourselves as stewards of Earth, must find better ways of managing our demands upon it if we want to continue to flourish (Malthus 1798; Meadows et al. 1972, 1992; Meadows, Meadows and Randers 2004; Daly 1996; Jackson 2009; Rockström et al. 2009; Ehrlich and Ehrlich 2013).

2.1.2 Population, overconsumption and resources

The human race counted two billion people during the Second World War, whereas in 2011, the number rose above seven billion. The species' growth rate is about 1.3 per cent per year (Ehrlich, Ehrlich and Daily 1992; CIA 2011) and though it may sound like a small number, it means that each hour more than 10,000 people are added to the planet – about 90 million people per year. Or, to put it another way, the human population grows by another City of London each month (Office for National Statistics 2011). The United Nations has estimated that in fewer than 40 years, in 2050, the human population will have reached 9.3 billion people (UNDESA 2011), but many assessments of sustainable population

suggest that as we run things today, Earth can house a significantly lower estimated population than nine billion (Ehrlich, Ehrlich and Daily 1992; Daily, Ehrlich and Ehrlich 1994; Cohen 1995; Brown 2009).

Though Earth still has bountiful resources, they are not divided equally, or even fairly, between the human habitants. About half of these seven billion people now in existence live in poverty, and in 2010, about 900 million were severely undernourished (FAO 2010a). Meanwhile, a study done by the World Institute for Development Economics Research at the United Nations University showed that in the year 2000, the richest two per cent of adults owned more than 50 per cent of global household wealth. In contrast, the poorest half of human adults owned less than one per cent of global assets (Davies et al. 2006). One could hardly ask for clearer evidence of the unequal division of the planet's resources and wealth. In addition, it is worth pointing out that household wealth is not only unevenly distributed between Western countries and developing countries; great inequality also exists within individual countries, and often, that inequality gap is widening (Davies et al. 2009).

As for Earth's resources, recent research has given alarming information on the state of the planet. Several authoritative global assessments, produced by leading scientists, have reported on the loss and deterioration of natural systems that are essential for human well-being. Research such as represented in the Millennium Ecosystem Assessment (Reid et al. 2005), the Stern Review (Stern 2006), the Intergovernmental Panel on Climate Change's Fourth Assessment Report (IPCC 2007), the fifth Global Environmental Outlook (UNEP 2012), the Human Development Reports (UNDP 2007, 2009) and the WWF Living Planet Report 2010 (Pollard et al. 2010) clearly underline the need for action and change in the way humans have approached the planet and its resources in the past.

Other notable research has shown how anthropogenic influences on the planet have overstepped the limits and thresholds of natural systems, now threatening the well-being of humanity (e.g. Haines-Young, Potschin and Cheshire 2006; Rockström et al. 2009; Carpenter and Bennett 2011; Ragnarsdóttir, Sverdrup and Koca 2011). In 2009, a group of researchers led by Johan Rockström, director of the Stockholm Resilience Centre, developed the concept of planetary boundaries. They outlined nine essential thresholds of global Earth system processes, and found that three of those have already been crossed because of human activity –

namely climate change, or CO_2 concentration in the atmosphere; biodiversity loss; and the nitrogen cycle. The other half of the nitrogen cycle boundary is the phosphorus cycle, which a 2011 study claims humans have exceeded (Carpenter and Bennet). Three other thresholds are near the exceeding limits, namely ocean acidification, global freshwater use and change in land use (Rockström et al. 2009). Rockström and his co-authors had no reliable way to assess the safe limits for chemical pollution and atmospheric aerosol loading (or concentration of particulates in the atmosphere), so those boundaries are undefined. That leaves only stratospheric ozone depletion now returned to known safe operation limits. Furthermore, the authors also warn that because many of the boundaries are linked in sometimes unforeseen ways, crossing one boundary may affect another in ways we are currently unable to understand (Rockström et al. 2009).

These findings are more serious than people might realize. To explain in simple terms just how serious matters are, it is helpful to look at phosphorous. A study published in 2011 demonstrates the dire need to reconsider human use of phosphorus, in line with Rockström's findings. Phosphorus is essential to all plants and animals, is used as a fertilizer for food production, and there is no readily available substitute. Due to the anthropogenic use over the past several hundred years, along with an increasing world-wide demand for food production following exponential global population growth, the planet's phosphorus resource is at a dangerously low level, threatening food production worldwide possibly within only a few decades (Ragnarsdóttir, Sverdrup and Koca 2011; Sverdrup and Ragnarsdóttir 2011). The risk under these circumstances is that as the quality of Earth-derived resources decreases, access to available resources becomes increasingly skewed towards the rich and politically powerful and away from financially less fortunate people.

To sum up, human impacts on global life have reached an extent unprecedented in history, and science can now provide strong foresight about future risks, finding that the future of our well-being is endangered. If the United Nations' prediction of more than nine billion people in 2050 is realized, and if a large quantity of those people aspire to today's Western lifestyles with larger than sustainable ecological footprints, then humanity as a whole faces an enormous dilemma. Earth simply cannot support that many people living unsustainably, and the growing pressure

on current mechanisms for the allocation and management of resources leads to an increasingly unfair planet.

2.1.3 Ecological Footprint

Human demands on Earth's limited resources, on which our lives depend, are increasing. Moreover, the planet's capacity to regenerate ecosystem services, which we likewise depend on, is threatened due to our demands. The combined effects of the rate of population growth, the rapidly rising standard of living of the emerging economies (such as China and India), and the high standard of living already enjoyed in the developed world, increase the pressure upon the planet's resources. But how can this pressure be measured?

In 1998, Mathis Wackernagel and his fellow researchers, Williams E. Rees and Phil Testemale, published their findings on the Ecological Footprint. The footprint is meant to measure the load of human demand upon Earth's ecosystems by assessing the biological capacity needed to support human consumption. It can be used to calculate the amount of biologically productive land and sea area needed to create and renew the resources humans currently consume, along with the area needed to sequester greenhouse gas emissions. The footprint then assesses how much area of Earth it would take to support humanity if everyone had the same lifestyle as individuals within each given nation, community, institution, business or enterprise calculated (Wackernagel 1994; Wackernagel, Rees and Testemale 1998).

According to the Global Footprint Network, the world average biocapacity is 1.8 global hectares (gha) per person (GFN 2010). However, a large part of the Western world uses many more global footprint hectares per person, while poorer nations often use less (GFN 2010). Not surprisingly, as the human population becomes more numerous and as larger portions of the world's nations move into a higher standard of living, the less room there is to manoeuvre.

Each year, the Global Footprint Network calculates the footprints of countries, using statistics from the United Nations. A three-year-lag occurs due to the time it takes the United Nations to collect and publish all the underlying statistics, which means that numbers published in 2012 reflect the state of matters in 2009 (GFN 2010).

Table 1 The Ecological Footprints of the Converge Project's communities

Country	Ecological Footprint	Planets needed
Iceland (2005)	12.77 gha per person, fisheries sector excluded[a]	7.1
United Kingdom (2007)	4.89 gha per person[b]	2.7
India (2007)	0.91 gha per person[b]	0.5
([a]: Jóhannesson 2010; [b]: GFN 2010)		

The Convergence Process was tested in three communities – Iceland, Bristol City in the UK, and in Tirunelveli and Tuticorin districts in southern India. Table 1 shows the very different use individuals in the three different Converge study communities make of the planet's resources. The planets needed to support each nation's consumption are calculated by dividing the world average biocapacity of 1.8 gha per person (GFN 2010) into each nation's footprint per capita. Iceland's numbers were calculated in 2010 by a graduate student at the University of Iceland and show an astoundingly higher footprint per capita than the rest of the world's nations, 12.77 global hectares per person, excluding fisheries (as including them skews the number and therefore, questions rose on whether the methodology used to calculate fisheries may still need more development to capture the footprint correctly) – the highest number of any nation in the world. This means that if everyone lived as Icelanders, the world would need seven[2] planets (Jóhannesson 2010). The very large Ecological Footprint of Icelanders is explained by Iceland's island isolation, whose nation's Western life style includes much import of high-impact consumer goods such as electronics, automobiles and oil, and the CO_2 emitted during the production of these goods is likewise included in Iceland's footprint (Jóhannesson 2010).

Older European Union countries use more resources than newer entrants to the EU – the UK for example uses 4.89 gha per person while Hungary uses 2.99 gha per person (GFN 2010). All the European countries use more resources than non-industrialised developing

[2] When Jóhannesson did his research, the world average biocapacity was at 2.1, which resulted in him calculating that the world would need six planets if everyone lived as Icelanders (Jóhannesson 2010). Newer numbers do not exist for Iceland when this is written in the spring of 2013.

countries. India, the only emerging economy included in the testing of the Convergence Process, is likewise the only country in this study within the limits of the planet's average biocapacity of 1.8 global hectares per person, at 0.91 global hectares per person (GFN 2010).

2.2 The state of the world – a social perspective

The facts outlined in chapter 2.1 depict a dire outlook for humanity. But as John Dryzek (2013) has pointed out, this discourse of survivalism is not the only way to discuss the grim predicament humankind has pushed planet Earth into. The challenge of linking community-level responses to sustainable development is of great importance, but not a simple task to accomplish. The grand narrative outlined in chapter 2.1 has made little room for individual persons and their personal and communal acts. This is where the Convergence Process enters, offering power to individual communities and people.

The Convergence Process explores *convergence* – the progress towards an equitable and fair future that operates within biological planetary limits. Convergence is a quality or condition of sustainable development and a socially just and equal future within biological planetary limits. Three key concepts within the creation of the Convergence Process are sustainability, sustainable development, and social justice (including equity). This chapter provides a definition of these concepts, all of whom are influential in other theories and social practice that affected the process' creation.

2.2.1 Sustainability and sustainable development

In current times, the phrases sustainability and sustainable development are frequently used at all levels of society, but sometimes their meaning is not made explicitly clear. In a work like the Convergence Process, the meaning of these terms must be spelled out. A useful definition of the former is that it is a set of conditions and trends in a given system that can continue indefinitely (AtKisson 2008). It is variously defined as being a destination or a pathway, a task in progress in the sense of being a call to action or a political process. The Convergence Process uses a broad definition of socio-ecological sustainability to be able to reach a wider audience, which enables the twin aim of reaching harmony among people as well as between people and nature.

Sustainable development has been described as a directed process of continuous innovation and systemic change towards sustainability (AtKisson 2008). Within this dissertation, the understanding of the term starts from the Brundtland definition: "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (WCED 1987). In addition, the ecological limits to growth (Meadows et al. 1972; Meadows, Meadows and Randers 2004) are realized, along with that natural capital cannot fully be substituted by man-made capital (Neumayer 2003), and that what occurs in one section of a system will affect other parts of the system (Meadows 2008). Furthermore, at the Convergence Process' core is the understanding that according to the United Nations' *Universal Declaration of Human Rights*, every living person has the right to a fulfilling life within ecological limits (UNHRD 1948), and that to reach such a goal is fundamental to sustainable development.

2.2.2 Social justice and social equity

Along with sustainability, social justice is becoming a buzz phrase in international developmental discussions. The term refers to justice exercised within and between societies, in particular how various social classes and nations use their power over other classes and nations.

Social justice is of course far from being a new idea; it is for example at the core of most world religions, as well as the *Universal Declaration of Human Rights* (UNHRD 1948). Other international agreements focus upon social justice such as the United Nations' *Millennium Development Goals* (United Nations 2010) that seek to eradicate poverty and child mortality and increase social justice. In addition, the 2012 Earth Summit in Rio de Janeiro agreed that the United Nations create a new set of social justice goals all nations should aspire to, the *Sustainable Development Goals* (UNCSD 2012).

Key to social justice is the term equity. One does not have to look far to see that the world's resources are not equally shared between and within nations (Davies et al. 2006, 2009; Wilkinson and Pickett 2009). Though the United Nations' *Universal Declaration of Human Rights* does not state that the world's resources should be shared equally, it does affirm the equal rights of all men and women and lists numerous rights – civil, political, social, economical and cultural – which people

everywhere are entitled to. Article 1 states that "all human beings are born free and equal in dignity and rights," and Article 3 says: "Everyone has the right to life, liberty and security of person" (UNHRD 1948.) Furthermore, Article 25 begins: "Everyone has the right to a standard of living adequate for the health and well-being of himself and his family, including food, clothing, housing and medical care and necessary social services" (UNHRD 1948). The Declaration gives human rights precedence over the power of the state, and though states can regulate rights, they may not violate them.

However, when it comes to global exchange of ecological resources, these fundamental human rights are often violated. Ecological economist Joan Martínez-Alier (2002) has pointed out that the environmental burden of our economy, driven by consumption and population growth, is on a constant rise, especially in poorer countries. Therefore, ecological distribution conflicts arise and include both conflicts of interests and conflicts of value. He points out that when poor non-Western people fight for their near-environment, they are often driven by the need to make a living; their concern goes beyond economic security in the market and includes simple access to environmental resources and services. This attitude is much less often seen in Western environmentalism, and seldom in traditional Western economies.

Furthermore, the ecological and carbon debts which the developed countries owe to emerging economies and developing countries have been widely discussed, and researchers have pointed out that the Western countries would never have been able to reach their current standard of living without the aid of slavery, colonization and resource exploitation in the southern part of the world (Martínez-Alier 2002; Rice 2009).

A third source in this non-exhaustive list of unequal distribution of the world's resources are the historic levels of CO_2 – advanced industrialised countries have until very recently emitted a large percentage of the total world carbon emissions, though they contain only about a quarter of the world's population (Martínez-Alier 2002). Though of late, developing countries have begun to emit more than the advanced industrialized countries (Peters et al. 2012), the industrialized countries' footprints are still much larger than those of the developing world, even though considerably fewer people live in the former (Peters et al. 2012).

The intention with the Convergence Process is not to expect equity based upon exact per-capita resource distribution in the world. Such an expectation would neither be realistic nor possible. The process is, however, meant to suggest that a more socially just distribution might contribute to a more sustainable way of life globally (Schumacher 1973).

3 Theoretical frameworks

In this third chapter, I introduce the theoretical framework that inspired the Convergence Process. As Gabriele Bammer (2005) has outlined, the integration of several frameworks into a single coherent form is a key research challenge in its own right, but often necessary to solve complex societal issues.

I begin with a discussion of transdisciplinary studies when it comes to sustainability, and how this approach is increasingly recognized. Second, I provide an overview of systems science theory, including why systems approach is useful when viewing a holistic global picture. This is followed by a discussion on essential academic theories, concepts, fields and approaches that have been most influential in the creation of the Convergence Process. The umbrella term environmentalism is discussed and postmodernism explained. Also introduced are the social science and anthropological theories and schools of thought that underline and illuminate the Convergence Process' theoretical background, in addition to the fairly recent tendency to include the public in environmental decisions, which until the 1990s were largely made solely by bureaucrats or politicians. Then a look is taken at ecological economics, in particular discussions within that field on contraction and convergence.

Then I give an overview of the most influential theories from the field, social practice that is in use by the public and which are relied upon and adapted to the Convergence Process. I conclude the chapter with a discussion on how the theories and approaches chosen are combined within the Convergence Process.

3.1 On transdisciplinary research for sustainability

Transdisciplinary research draws upon a) the knowledge and experience of various academic disciplines and b) social practise at the government level as well as at the grassroots level (for example non-governmental organizations, various stakeholders or the general public) (Bruce et al. 2004).

The origins of the idea of combining scientific research from various academic disciplines with the reality of concrete problem situations in order to gain holistic view of a research topic can be traced back to the

1970s (Hoffmann-riem et al. 2008). Basarab Nicolescu (2005) states the word *transdisciplinarity* was first coined in 1970 by Swiss developmental psychologist and philosopher Jean Piaget, and explains that as the prefix "trans" indicates, the word refers to that which moves between, across and beyond different disciplines. This idea appears to have begun simultaneously within several academic disciplines, perhaps mostly within the social sciences. In the mid-1980s, anthropologist Sherry Ortner (1984) wrote a much-cited article reflecting upon then-occurring changes in social sciences. She recounts how scientists have begun to revert from the theory of a grand narrative – the practice of adhering only to a single group of theories or a particular theorist – and instead, have begun to realize that mixing of different theorists and schools of thought might be beneficial to their field of study. This idea has developed over the years and spilled into traditional research as well. For example, in 2010, the British anthropologist and human ecologist Roy Ellen wrote that theory should be useful. "Theories," he writes, "[…] serve many purposes, and certainly do more than help us make sense of truculent data: they define us as scientists, scholars, researchers, and individuals, and in terms of the perceived quality of our work" (pp. 387). He goes on to say that he believes that "theory should not be something that constraints and terrorizes, but rather something that serves and liberates us" (pp. 387-388). In other words, Ellen says theory should aid the scientist in her research. Though Ellen is not discussing transdisciplinary studies per se in this work, his words define clearly how transdisciplinary research, where by definition theories and practises from different academic disciplines and social practice are combined, can be used to reach a more holistic outcome than otherwise could be found. By marrying many different theories and schools of thought into a single research, transdisciplinary studies can offer a more holistic view of both the individual research as well as of the world at large.

At the same time, transdisciplinary studies put weighted responsibility on the researcher's shoulders, who needs to be aware of more theories and fields of study than may be needed in traditional single-discipline research (Pohl and Hirsch Hadorn 2008). The onus is on the transdisciplinary scholar to select relevant and useful theories that can aid her research, and leave out those which add little to the transdisciplinary field, regardless of how intriguing those theories are (Pohl and Hirsch Hadorn 2008).

One reason for the need for transdisciplinary approach within the Convergence Process – both theoretically and within the methodology itself – is the evident fact that new approaches are needed to solve the enormous problems the world faces; namely the problems of how the human race will continue to flourish in a world plagued by climate change, rising consumerism, declining resources and a rapidly increasing population. If conventional methods were adequate, it is likely that a solution would already have been found. But perhaps the traditional methods are simply unable to cope with the problem. In fact, there are tangible risks involved in treating Earth and its human inhabitants in a modernist way. This is because the world is not ordered, and therefore narrow management and single-discipline knowledge approaches to solving complex socio-ecological problems are bound to fail. Hence, transdisciplinary approach may be the answer, one that draws upon many fields of knowledge, both from different academic disciplines as well as from social practise in use.

Within the approach of transdisciplinary research for sustainability, the researcher is free to seek the most practical theories from many different discourses and social practices, and carefully sift out only those she knows will further the research. She needs to consider that the theories and approaches she chooses fulfil four fundamental requirements, outlined by Christian Pohl and Gertrude Hirsch Hadorn (2007):

a) grasp the complexity of problems,
b) take into account the diversity of life-world and scientific perceptions of problems,
c) link abstract and case-specific knowledge, and
d) develop knowledge and practices that promote what is perceived to be the common good (pp. 20).

That is to say, transdisciplinary research is far from being random – it is a carefully constructed assortment of possible insights into and solutions to complex and socially relevant real-world problems.

Another important viewpoint here comes from feminist philosopher Sandra Harding's book *Sciences from below* (2008). She suggests that academic research projects be linked closer with social justice projects in order to get more comprehensive results. Harding says that if scientists are aware of the fact that Western sciences are not the only ones existing

in the world, if they step out of their discourses' comfort zone, then a better social justice might be achieved. As the Convergence Process is a social justice project, her theory is applicable here.

Within the Convergence Process, environmental anthropology and feminist anthropology add the human perspective to the more calculated systems science approach, and aid with describing the world explicitly as a joint social-environmental system, while the political science (public participatory democracy) and ecological economics aspects bring the necessary practical approaches on how to tackle the issues at hand. Meanwhile, social practices that have already proved their worth in the real world offer tangible solutions real people can use in their communities to bring them closer to sustainability and social equity.

In conclusion, it is essential in transdisciplinary research, as well as in any other research, to keep in mind that there is no such thing as a non-biased knowledge (Wolf 1992). Scientists are always, and cannot help being, tainted by their origins, educational background, life experiences and current situation in life – or their habitus (Bourdieu 1977) as discussed in chapter 3.3.4. The awareness of this fact can be crucial to a study's outcome, be that traditional single-discipline research, interdisciplinary or transdisciplinary research.

3.2 On systems science theory

It is difficult for an English literature graduate not to think of Douglas Adams' (1987) fictional private detective Dirk Gently when discussing systems theory. Gently describes himself as a "holistic detective" (pp. 140) who solves the whole crime, rather than simply the evident symptom of the crime, by making use of the "fundamental interconnectedness of all things" (pp. 144). Though Gently's reasons for his enormous bills are not always connected to the cases he solves (or does not solve), the character's insistence that all things are connected in the system we live in, whether we see it or not, rings true for a systems thinker. A person applying systems theory sees phenomena as a part of a system and realizes that interconnectedness exists both within the system itself as well as between different systems, along with the possible effects of hidden time lags and feedback loops.

The term system is commonly used in daily language, referring to any complex matter that operates together and interacts. In 1968 Austrian-born biologist Ludwig von Bertalanffy wrote:

> If someone were to analyse current notions and fashionable catch-words, they would find 'systems' high on the list. The concept has pervaded all fields of science and penetrated into popular thinking, jargon and mass media (pp. 3).

Still today, the term is used for phenomena as different as the solar system, health care systems and computer operating systems, to name but a few. However, for a systems thinker, a system is not, as detective Gently might want it, a random collection of items; an order must be to it if it is to be called a system. Systems thinker Kenneth E. Boulding (1985) stated:

> The broadest possible definition of a system is that it is anything that is not chaos. We could turn the pattern around and define a system as any structure that exhibits order and pattern (pp. 9).

Systems thinker Donella Meadows (2008) defined a system as "an interconnected set of elements that is coherently organized in a way that achieves something" (pp. 12). She added that it must consist of three things: "*elements*, *interconnections*, and a *function* or *purpose*" (pp. 12, italics original). In other words, a system is a set of organized components that interconnect and result in a particular outcome.

Though it can be argued that scholars have always endeavoured to think in holistic systems, systems theory as a discipline is less than a century old. Systems theory is, broadly speaking, the study of systems. It is a study of the design of the whole, rather than upon an individual part of the system. It emerged as a discipline in the mid-20th century in the work of von Bertalanffy, who is named the father of modern systems theory by some (Davidson 1983; Halsall 2008), though other scholars such as Alfred North Whitehead and Paul A. Weiss thought along the same lines during the first half of the twentieth century – that is, attempted to create a single discipline that would cover organized complexity (Laszlo and Krippner 1998). Von Bertalanffy began outlining systems theory in the interwar period and in 1950, he published a paper where he stated that general systems theory was applicable to all sciences

that relate to systems. He argued this theory could only be applied to closed systems (von Bertalanffy 1968), but later scholars applied it to open or half-open systems, such as living organisms (animals and humans) and schools (Meadows 2008).

In 1954, von Bertalanffy, economist Kenneth Boulding and others founded the International Society for the Systems Science (then called Society for the Advancement of General Systems Theory) (Davidson 1983), and in the 1960s, systems thinking began to be seen as a field for transdisciplinary science, touching upon only the hard sciences at first, but later also social sciences and humanities (Lazslo and Krippner 1998). Since then the theory has been widely used within many different disciplines, including but not limited to anthropology, ecology, engineering, and political science, where it is considered of much use since the world we live in is in fact an interconnected socio-environmental system. As a result, systems science is considered a conceptual basis of transdisciplinary research (Jantsch 1970, 1972; Bammer 2005; Robinson 2008), because it ensures that scholars look to the whole system along with interconnections within and between systems (Bammer 2005).

Systems approach can include several different methodological steps, including systems analysis, causal loop diagrams, stock and flow diagrams, flow charts and systems modelling or systems dynamics. The Convergence Process uses the first two, as described in chapters 4 and 6.

3.3 On essential academic theories, concepts and approaches

This subchapter contains several anthropological and social science theories, fields and approaches essential to the creation of the Convergence Process, as they relate to the study of change with a human and social perspective, a necessary counterbalance to the dehumanized systems approach. This chapter does not claim to be all-encompassing, but these approaches and fields have been influential and essential to the creation of the Convergence Process and the writing of this dissertation.

3.3.1 Environmentalism

Environmentalism is an umbrella term that covers academic studies and social movements aimed at conserving nature. It is not an academic field

per se, though several academic fields do influence it and are in turn influenced by it. Here, the origins of environmentalism are lightly touched upon. The discussion is not meant to be exhaustive, but rather give an impression of the origins of this movement that has been influential in the creation of the Convergence Process.

The birth of environmentalism can be traced back to the 19th century and goes hand in hand with the industrialisation of the Western world and certain individuals' concern of the effects of industrialisation upon nature and humans. In 1854, Henri David Thoreau published his book *Walden; or, life in the woods*, where he recounts his experience of becoming fed up with contemporary life and moving to a small cabin in a secluded woodland at the edge of town. There, for two years and two months, he immersed himself in nature, focusing upon simple living and self-sufficiency. *Walden* was very influential in the coming decades. Thoreau was not alone in his thoughts about nature at that time, and other writers spoke in severe terms about the human-nature relationship. For example, in 1864, American philologist George Perkins Marsh wrote that: "Earth is fast becoming an unfit home for its noblest inhabitant" (pp. 44), presumably referring to humans.

Other writers followed in the footsteps of Thoreau and Marsh, such as nature writer Aldo Leopold (1949), who, in an attempt to encourage nature preservation, wrote: "To those devoid of imagination, a blank place on the map is a useless waste; to others, the most valuable part" (pp. 294) and "I am glad I shall never be young without wild country to be young in. Of what avail are forty freedoms without a blank spot on the map?" (pp. 158). Leopold was leading in the development of environmental ethics on both sides of the Atlantic during the middle and latter half of the 20th century, and his writing is still influential. His words: "A thing is right when it tends to preserve the integrity, stability, and beauty of the biotic community. It is wrong when it tends otherwise" (pp. 262) are the axiom of the interdisciplinary Aldo Leopold Wilderness Research Institute in North America's Rocky Mountains.

Environmentalism gained flight in the 1960s, during a general awakening with regard to social and environmental issues. In 1962, American marine biologist and nature writer Rachel Carson published her book, *Silent spring*, that focused on the negative effects of synthetic pesticides on nature. Her writings were influential within many different

disciplines, and were for example a prominent factor in the founding of the US Environmental Protection Agency (Lewis 1985). Her work doubtless had effects upon the development of ecological and environmental anthropology, along with general awakening among the public on both sides of the Atlantic on issues related to social equity and the environment. Eventually, this awakening gave rise to large multi-national conferences such as the United Nations Conference on the Human Environment in Stockholm in 1972, after which the United Nations Environment Programme (UNEP) was founded.

Since then, numerous international conferences have been held on the interaction of humans and their environment, the West has become more environmentally friendly and less focused upon growth alone – at least in words – and environmentally focused non-governmental organizations have sprung up more in most countries around the globe, though some have more impact than others. Many universities now contain departments that focus upon socio-environmental issues, ecological economics or natural resources. Furthermore, research and awareness of human impact upon climate change has been on the rise for the past few decades, as can be seen both within governmental offices, universities and non-governmental organizations.

In recent years, discussion has risen on the Anthropocene. This informal chronological geological term refers to the scale and extent of the influence people have had upon Earth's ecosystems (Crutzen and Stoermer 2000). Despite the short time people have had to change Earth's ecosystem, the results are vast and sometimes disastrous, resulting in Nobel Prize winning chemist Paul Crutzen to suggest the changes warrant a new geological era which he terms Anthropocene (Zalasiewicz et al. 2010), and which has grown into a transdisciplinary research field. Research that falls within this rapidly growing field focuses upon nature and modern times, attempting to find ways to turn about some of the effects involved in the environmental crises we now face (Pálsson et al. 2013). The Convergence Process is an input into that discussion.

3.3.2 Postmodernism

A brief overview of postmodernism is needed in this dissertation, simply because it appears impossible to avoid using the term in a transdisciplinary Ph.D. dissertation written early in the 21st century. The

term postmodernism, which has been debated by academics for decades, refers to the cultural era that followed modernism, referring to changes, developments and tendencies that took place at and around the middle of last century within literature, architecture, philosophy, art and more. The term is somewhat controversial, but in general alludes to a non-traditional approach and a rebellion against older values, such as authority, items and ideas of significance, and what was deemed of value in previous times, and the deconstruction of those values (Lyotard 1986; Cuddon 1999). Postmodernism eased the way for the social equity battles of the 1970s, and set the ground for the mushrooming of Marxist, feminist and psychoanalytic literary criticism since the 1970s (Cuddon 1999), also felt in other academic fields.

But though postmodernism has proven difficult to define, theorists are even more at odds over what they should call the cultural era that has come after postmodernism, and no one term has yet gained a wide acceptance, though performatism (Eshelman 2008), critical realism (Potter and Lopez 2001) and even post-postmodernism (Kirby 2006; Lindstrom 2013) are sometimes heard. But in fact, scholars are not in agreement on whether we truly have left the postmodern era yet (Kirby 2006; Eshelman 2008).

3.3.3 Environmental anthropology

The Convergence Process is an anthropogenic pathway with humans facing the environmental challenges of today at its core. Transdisciplinary by nature, the best suited theories and social practice have been chosen. One of these is environmental anthropology, because this anthropological sub-discipline can serve as a bridge between social and natural sciences, to paraphrase one of those who defined the field, Tim Ingold. In his book *The perceptions of the environment* (2000), Ingold recounts his start in anthropology:

> Concerned about the widening gap between the arts and the humanities on the one hand, and the natural sciences on the other, I was looking for a discipline that would somehow close the gap, or enable us to rise above it, while still remaining close to the realities of lived experience. Anthropology, for me, has been that discipline (pp. 1).

Though other fields of studies, such as geography, might be able to offer this bridge between social and natural sciences, environmental anthropology, along with selected social science theories, features prominently in this dissertation. One reason for this is that environmental anthropology locates humans within ecosystems and studies how humans influence their environmental surroundings and lends itself well to transdisciplinary research, or as stated by Melissa A. Johnson (2013), "anthropology of the environment tends toward interdisciplinarity, bringing into anthropology insights from other disciplines and stretching the discipline of anthropology itself" (pp. 345-346). Environmental anthropology is the study of current and historic human-environmental interactions. This is a fairly new field of study, tracing its roots to ecological anthropology and cultural ecology but drawing upon various other discourses, including humanities, social sciences and natural sciences. Its postmodern origins stem from the 1960s, when a plethora of ideas related to social and environmental issues emerged.

Ecological anthropologists study how people affect their environment and how this shapes the society's social, political and economic life. Furthermore, they investigate the socio-cultural aspects of environmental problems (Salzman and Attwood 1996; Kopnina and Shoreman-Oimet 2011). This school of thought began to be acknowledged as early as around the middle of last century, influenced partly by Aldo Leopold's *Sand County almanac* (1949). Julian Steward is thought of as one of the originators of ecological anthropology with his work on how human labour adjusted to accessible natural resources, and in 1955, was one of the first scientists to theorize on cultural ecology, namely the two-way relation between culture and environment (Steward 1955; Kopnina and Shoreman-Oimet 2011). Roy Rappaport was likewise influential in the creation of the field, when he made a distinction between the environment people perceive versus the environment the anthropologist sees them operate within (Rappaport 1968; McGee and Warms 2004).

American anthropologist Clifford Geertz has also been effective with his theories on the role of ecology in culture (Kopnina and Shoreman-Oimet 2011). Geertz (1963) studied systems theory and applied it to his idea that ecosystems are a logical outcome of the interchange between culture, biology and the environment. Anthropologist Gregory Bateson, who like Geertz studied systems theory and was among those who extended it into social sciences, was also prominent in the shaping of the

field of environmental anthropology (Lipset 1982). Bateson (1972) argued the world was a series of systems including individuals, societies and ecosystems, and that these systems interacted.

Several environmental anthropologists, including Emilio Moran (2006), have pointed out how in the past half a century, Westerners' connection to nature has changed drastically while their way of life threatens the planets' ability to offer humanity sustainable living conditions. At the same time as Westerners (and increasingly, other inhabitants of the world) distance themselves from nature, they act ever more as if Earth's resources are boundless – which of course they are not. Ironically, at the same time, more and more Westerners consider themselves environmentalists (Árnason 2005; Moran 2006).

This seemingly absurd contradiction in people's minds and behaviour may be clarified by Tim Ingold's theory on the dwelling perspective. Ingold, one of the trailblazers in ecological anthropology, has written that his goal as an ecological anthropologist is to bring social and cultural anthropology together with biological and physical anthropology (2000), which is one way to explain the current trends in environmental anthropology. Ingold points out that nature is of course a political term because there is no actual divide or boundary between human society and nature. He argues that humans dwell "in the same world that is inhabited by creatures of all kinds, human and non-human" (2005 pp. 501), and names this concept *dwelling*, as it includes putting an effort into living (2000). "Dwelling encompasses building just as producing life encompasses the production of the material means by which it is carried on" (2005 pp. 504), he says and warns against taking too seriously this imagined boundary between humans and nature. "No-one yet has made the crossing from nature to society, or vice versa, and no-one ever will. There is no such boundary to be crossed," he states (2005 pp. 508). As the distinction between human society and nature is only in people's minds, this fictional division should be obscured and the gap between the human and non-human worlds should be closed.

This is where the field of environmental anthropology enters. Editors Helen Kopnina and Eleanor Shoreman-Oimet (2011), in the introduction to their book *Environmental anthropology today*, underline the importance of environmental anthropology in the present day, given the dire straits the human population has driven the planet, in addition to the

fact that humankind continues to increase the pressure upon the only ecosystem known to support human beings, Earth. Due to increasing environmental concern, they say environmental anthropology is gradually joining hard sciences more and more, and coming in with a more applied approach to the human-environment relationship rather than mostly theoretical one. In investigating the socio-cultural aspects of environmental problems, environmental anthropologists often illuminate a non-Western perspective and transdisciplinary approach, stressing the importance of including local people in solving environmental problems and working with non-governmental organizations (NGOs).

Hence, environmental anthropology can serve as the bridge between natural and social sciences needed in my transdisciplinary dissertation.

3.3.4 Feminist anthropology and power relations

In addition to environmental anthropology, feminist anthropology and its take on power relations influence the creation of the Convergence Process. Anthropologist Henrietta L. Moore (1988), a prominent theorist within feminist anthropology, states that though women have been present in ethnographic accounts since the beginning of anthropology as an academic field of study, they may not have been represented in a fair or neutral form, and that the need for feminist anthropology is not based upon the exclusion of women from the field, but rather of how women are represented in anthropology.

Some theorists divide feminist anthropology into three waves, conjointly with feminist theory. According to Angela Bratton (1998), the first two waves of feminist anthropology occurred hand-in-hand with first and second wave feminism. The first, suffrage feminism, occurred circa 1850-1920 and focused mostly upon women's right to vote and receive higher education. Second wave feminism took place between 1920 and 1980, gaining full force in the 1960s and 1970s, and focused mostly upon Western women's rights in the home and the work field. Third wave feminist anthropology is a field of study influenced by postmodernism, where the focus is taken away from biology and how it has influenced cultures, and moved onto the now-accepted fact that class, race, ethnicity, religion and socioeconomic status matters as much as of which gender the subject matter is. In addition, it acknowledges that women have different needs and experiences depending upon where and how they live, and this

field focuses upon power relations. All three waves of feminist anthropology have in common the intention to move the attention from the traditional white male academia to other participants in the research at hand, be they researchers or subject matters.

Bratton's definition of third wave feminist anthropology as a child of postmodern times suits the work done while creating the Convergence Process. Of essence are two fields of feminist anthropological take on power relations:

a) in the study of the researchers' habitus; and
b) within research projects and the importance of allowing women's voices to be heard during decision-making processes.

First, the effects of a researcher's valuations and habitus (worldview shaped by the person's background, training, social class etc.) upon her findings are a humbling read. This idea is of course not limited to anthropological feminism; Swedish economist and sociologist Gunnar Myrdal (1978) wrote for example:

> Valuations are always with us. Disinterested research there has never been and can never be. Prior to answers there must be questions. There can be no view except from a viewpoint. In the questions raised and the viewpoint chosen, valuations are implied.
>
> Our valuations determine our approaches to a problem, the definition of our concepts, the choice of models, the selection of observations, the presentations of our conclusions – in fact the whole pursuit of a study from beginning to end (pp. 778-779).

A researcher's view on life, in other words, always colours her take on her research matter, Myrdal says and applies it to all types of research. Feminist anthropologists have been quite vocal and focused in their discussion of the effects of the researcher upon the research matter, and studied it with power relations in mind. In 1992, feminist anthropologist Margery Wolf wrote a short book on the different ways a scientist can present her finding. Like Myrdal, she argues that the scientist's background greatly influences her view and her research methods; indeed so much that the scientist may be utterly blind to it. What Wolf refers to, without using that word, is what French anthropologist Pierre Bourdiau

(1977) calls habitus and is formed from economic and social necessities that surround a person and leads to a certain world view. It is the worldview of a person, formed from sexual division of labour, family relationships, economic situation, cultural situation, generation, education, upbringing, domestic morality, tastes and more – all the little things that become the "basis of perception and appreciation of all subsequent experience" (pp. 78). Central to habitus is *embodiment*, which means that humans do not simply learn through their minds, but rather through their material physical being. The body is the point of a person's encounter with the world, and when one learns through the body, that process is embodiment. We are socialized via our bodies – our habitus forms through our bodies. It is not a conscious process; quite often, we are neither aware of what and how we learn through our bodies, nor how it shapes our habitus (Bourdieu 1977). Therefore, it is essential for scientists to be aware of where they stand theoretically and to appreciate how their habitus has shaped their worldview when they conduct research. Furthermore, researchers must be aware that their reading of the data may change with passing time, more maturity and social changes. Wolf says that when she started out as a young scientist, self-reflexivity was not practiced; scientists were of course careful with their data and how they presented it, but they were not necessarily aware of their own influence on their subjects or in the reading of the data. She discovered this when she found her own data three decades old, and realized that her years of experience now gave her a very different reading. She published three different findings in the book *A thrice-told tale* (the first a fictional short story based upon real data, written in the 1960s; the second her field notes from the time; and the last section is her 1990s reading of the 1960s data and field notes), and stresses that if a scientist learns a new theory or achieves a new viewpoint, her understanding of data that she (or others) have gathered can change drastically (1992).

Other scientists have voiced the same concerns. In 1986, historian James Clifford and anthropologist George Marcus edited the book *Writing cultures*, one of the first postmodern anthropological texts. The editors argue that ethnographers, anthropologists and historians can only study their subject from their own social, literary and political point-of-view. Though neither a feminist nor anthropologist, Clifford's words in the book's introduction are quite appropriate here. He compares

ethnographers to a native Canadian hunter, who openly admitted his personal limitations in understanding the world:

> Ethnographers are more and more like the Cree hunter who (the story goes) came to Montreal to testify in court concerning the fate of his hunting lands in the new James Bay hydroelectric scheme. He would describe his way of life. But when administered the oath, he hesitated: "I'm not sure I can tell the truth. … I can only tell what I know" (pp. 8).

In other words, the indigenous Canadian hunter did not believe himself able to offer great truths about his people's way of life – he realized his view would be coloured by his own experiences and might not be the only valid view. Clifford suggests that scientists must, and increasingly do, have that same perspective of their work; scientists must realize that there is no such thing as neutral research.

Both Clifford and Wolf's accounts are in line with Bourdieu's (1977) findings – that the study of habitus is essential to understand power relations within societies, because habitus shows a person's background. This awareness of the researcher's habitus is essential within action research as undertaken in the testing of the Convergence Process, where it is understood that the researcher situates herself in a certain position to illuminate her view on the research matter and on the subjects.

Second in this recount of how feminist anthropological take on power has shaped the Convergence Process, is awareness of power relations within research projects. Here, attention is given to power relations between the genders, classes and races, in addition to the importance of allowing the voices of those normally not in power to be heard during decision-making processes. This discourse is not uncommon within feminism in postmodern times, and some have pointed out that when academic women's voices are heard – be they Western, postcolonial or from the developing world – they do not have the same clout as men, in particular the academic canons (Harding 2008). Donna Haraway's writing on situated knowledges ties in with the discussion above on habitus. In her 1988 article *Situated knowledges*, she criticizes the traditional view that an omniscient observer (the researcher) can arrive from outside and objectively study his subject, which in turn is passive and stable, and she also objects to the then-feminist take on the same,

"decrying what *they* meant and how it hurts *us*" (pp. 575, italics original). Her solution is situated knowledge, which acknowledges that both the researcher and those being studied, the subjects, are always bound by their context. When situated knowledge is applied, she argues, the whole research experience becomes much more complicated, as biological visions and personal wills of mere mortals enter into the equation on all sides, and most importantly, the researcher positions herself and thereby takes responsibility for her work (Haraway 1988). Others have argued that Western feminists have ignored the fact that women in the developing countries have very different experiences from that of women in the Western world, and therefore Western feminists may not be best suited to study and write about women in developing countries (Mohanty 1988; Mann and Huffmann 2005; Harding 2008). So while it is immensely important to include fringe groups and fringe views in work like the Convergence Process, it is likewise important to keep in mind that perhaps Western scientists do not have all the answers, which is precisely why it is important to involve the voices of the general public including those who are often silenced.

3.3.5 Post-colonialism and power relations

The discussion on academic research on power relations that have influenced the Convergence Process cannot be completed without a short discussion on post-colonialism, because one of the Convergence Process test communities is located in India, an emerging economy that used to fall under the rule of Britain, where another test community is located.

Post-colonialism refers to the period following Western occupation of the colonies, the effects colonialism had upon the cultures of both the developing countries and the developed world (Said 1978; Hall 2007). Post-colonial studies look in particular to the power imbalance within the nations at hand. Cultural theorist Stuart Hall (2007) stresses how immensely important it is for Western scientists to be aware of the inherent power imbalance when working with the developing world. This discussion echoes the paragraphs on habitus and situated knowleges – in order to be aware of the power imbalance between cultures, the scientist must be aware of where she comes from and her status within the society where she conducts her research (Zavella 1996).

3.3.6 Public participatory democracy

Democracy is one of the pillars of all the societies involved in this research, and public participatory democracy is a cornerstone in the Convergence Process. Therefore, it is vital to discuss and analyze the term here. Democracy is arguably one of the more complicated terms of our times and scientists are not in agreement on its definition, even though it is one of the more accepted methods of governance today (Stoker 2006). The word is Greek in origins, and literally means that the public is in charge. Austrian-British philosopher Karl Popper (1971) may have offered the simplest definition of democracy as we now understand it; as a type of government defined by an institutional framework that allows us to get rid of a government, or change one politician for another, without bloodshed. The term is ancient and its meaning has changed drastically over the centuries. Democracy as most Western nations know it, where all adult citizens of a nation have the right to vote, has only existed for less than a century.

Democracy is habitually divided into two classifications – direct democracy and representative democracy. The former refers to when the public makes decisions without the interference of another with binding elections, and stems from democracy in ancient Greece. According to 17th century philosopher Jean-Jacques Rousseau (1762), whose theories had tremendous influence on the French Revolution, direct democracy is the only form of true democracy. This form of democracy would, however, be too involved for any modern society, both because today more people have a voting right than was the case during Ancient Greece, when only certain males could vote, as well as because it is rare today that citizens have the time or the necessary knowledge to involve themselves in all societal issues.

Representative democracy is the most common form of democracy today, where citizens with voting rights (often those who have reached the age of 18), can vote their representatives in anonymous elections every few years and these representatives then hold the power of governance on behalf of the citizens. American political scientist Iris Marion Young (2000) says that though democracy is the only known method of governance where the public can elect the government it desires, its demise lies in the fact that minority groups often have little or no say in matters because more influential groups are more powerful. She underlines that democracy is not a system that is either on or off, but rather a layered system, and that even

within those countries considered most democratic, no true democracy is to be found, neither when they are studied in comparison with other contemporary democratic societies, nor when a society's inner structure is considered. The political representatives are often vague in their positions and the citizens' chosen representatives offer their voters few opportunities to influence matters until the next election. Young argues that in a true democracy, non-governmental organizations and other informal groups of citizens would have a voice that government officials would make an effort to listen to. She suggests that to ensure true democracy societies can and should be organized in such ways that all citizens' groups are heard, including minorities.

British political scientist Gerry Stoker (2006) agrees to a large degree with Young, and points out that Western politics mostly occur with the public as an audience rather than participants, where specialists – politicians – look after the performance of politics. The public rarely has much say in decision-making, and when it does, the participants are usually activists such as environmental non-governmental organizations that are not part of the general public, though their role in societies is important as they influence politicians. Stoker also suggests that politics have in recent years or decades moved further away from the public, a trend he thinks is unfortunate, because at the same time citizens' demands for answers and critique has increased. This, he says, suggests people's interest in politics has not diminished, only changed.

In many democratic countries, including Iceland, the UK and India, the citizens have the right to both freedom of speech and of opinions – rights that are often considered of utmost importance in democratic societies. However, when conflicts are not tackled appropriately, society can be greatly affected – when people dare not voice their opinions and stop trusting their neighbours, then the community's social capital diminishes, which in turn can have negative effects upon the whole community (Young 2000; Glasson, Theriviel and Chadwick 2007). The answer to such conflicts may lie in involving the public in a more effective way. At the core of the Convergence Process lies the idea to motivate the public in a course of action that leads to a societal change.

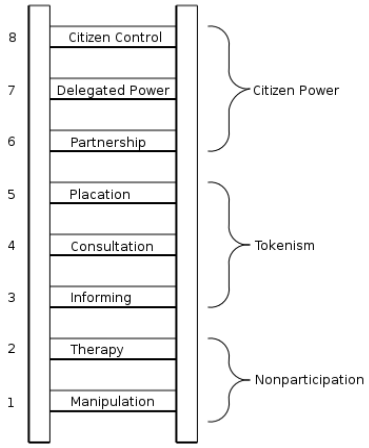

Figure 2 Arnstein's Ladder of Citizen Participation (Arnstein 1969)

Public participatory democracy is a relatively new idea within representative democracy. Young (2000) defines it such that when it works, all affected by a government decision have been given the opportunity to have a say in the decision process. Different degrees of participation exist within public participatory democracy, as defined in 1969 by American scholar Sherry R. Arnstein's Ladder of Citizens' Participation, depicted in figure 2. The two bottom rungs, *Manipulation* and *Therapy*, are examples of no public participation democracy. The intention is not to offer the public a part in decisions; the authorities have a total power in governance, but can, if they desire, get the public's approval. The next three rungs – *Informing*, *Consultation*, and *Placation* – activate the public to some degree, but according to Arnstein, are not symptoms of true public democracy. The public gets information via news releases and leaflets and is allowed to comment but the authorities are neither bound to listen nor act upon the public's information. The three topmost rungs define public participation democracy, as Arnstein encouraged. *Partnership, Delegated power* and *Citizen control* indicate that the citizens have direct influence on the governance of their society. Here, the citizens and authorities have a binding contract that both parties wield power, both get paid for their work and the more people that participate, the better (Arnstein 1969).

Public participatory democracy has been much experimented with in democratic countries in the past few decades, both at municipal and national government levels, in particular in issues related to sustainability, the environment and climate adaptation. This is no coincidence – many international agreements advocate the public's active participation when it comes to making sustainability-related decisions. The United Nations Framework Convention on Climate Change (1992) called specifically for public participation in the development of climate change responses. Other international agreements, such as the 1992 Earth Summit Agenda 21 and the 1998 Aarhus Convention on access to information, public participation in decision making and access to justice in environmental matters, have underscored this development even further.

The processes used to involve the public are as varied as they are many, but the outcome is often reported as work-consuming and unsatisfying (Few, Brown and Tompkins 2006; Stoker 2006). After studying public involvement in climate-based decision processes, Roger Few, Katrina Brown and Emma Tompkins (2006) suggest that the difficulties in involving the public in governmental decisions evolve around two main issues; the different manners of engaging the public, and the practical and conceptual complications in assuring broad-based public engagement, including defining who participates and why. Icelandic political scientist Gunnar Helgi Kristinsson (2005) suggests that a problem can arise if the public realizes after the participation process that the authorities have no intention of including their comments and views, because the authorities viewed the participation process as an introduction rather than cooperation.

Gunnar Helgi Kristinsson (2005, 2006) and Stoker (2006) furthermore discuss problems that arise when the public is invited to participate, because the group that steps forward does not portray an even blend of all layers of society. Both suggest that the more education people have, the likelier they are to offer their time. Meanwhile, minority groups (due to poverty, race or youth) are unlikely to offer their time and attention (Stoker 2006). Furthermore, when attempts are made to include the public in politics, those who have participated in the past are more likely to become more involved, while those who have never participated in politics stay uninvolved (Kristinsson 2005, 2006), which can result in the unintentional silencing of minority groups as well as of those less educated.

These findings indicate that when involving the public in a public participatory democratic process, it is vital to pay attention to who is invited to participate and who attends, how people are invited and what will be done with their work after participation.

It is fitting to close the chapter on public participatory democracy with a few words on two large national meetings held in Iceland in the years 2009 and 2010. In October 2008, three large banks collapsed, taking the domestic equity market and the rest of the banking system with them (Gylfason 2012). The people objected, and the Pots and Pans Revolution (named after the kitchen utensils banged outside the Parliament building) forced the right-wing government to resign early in 2009, and a left-wing government took power (Gylfason 2012). Individuals and a few grassroots movements decided to host a large meeting, which they called a national assembly, to seek the values and pillars to build Iceland on anew. Twelve hundred people were selected at random from the national registry and 300 more were handpicked by the organizers and invited. In the end, a little over 1200 participants attended the meeting that was funded by the government, private companies and individuals. Since only 320.000 people live in Iceland, these constituted 0.38 per cent of the entire nation. The participants identified the following values they felt should underpin Icelandic society in correct order: Integrity, honesty, equal rights, respect, justice, love, responsibility, freedom, sustainability, justice, family, equality and trust (Thjóðfundur 2009).

A year later, the same format was used to hold another meeting meant to suggest values that should be included in a new constitution. About 950 participants attended the meeting and came up with suggestions for a new constitution (Thjóðfundur 2010). A new constitutional bill therefore came into existence in 2011 with considerable help from the public (Gylfason 2012). It is still being debated before the Icelandic Parliament in 2013.

3.3.7 Ecological economics

The economic subfield of ecological economics has inspired this dissertation and the Convergence Process development, touching upon both equity and the need to contract consumption. Ecology and economics share a common root: the Greek word “oikos,” which means a home or a place to live – a commonality that meets in the field of ecological economics. Here, it is acknowledged that endless economic

growth is impossible; it is limited by the economy of the ecosystem it nestles in; nature. Or as Michael Common and Sigrid Stagl (2005) state:

> Ecological economics is the study of the relationships between human housekeeping and nature's housekeeping […] it is about the interactions between economic systems and ecological systems (pp. 1).

Danish ecological economist Inge Røpke assembled the history of the discipline for the journal *Ecological Economics* in 2004 and 2005. She divides the development of ecological economics into two eras – prior to 1980 (what she calls the early history) and after it. She recounts how this transdisciplinary field emerged out of the new environmental agenda of the 1960s, but did not take a tangible shape until at the end of the 1980s (2004). The establishment of the International Society for Ecological Economics in 1988 and the foundation of the journal *Ecological Economics*, first published in 1989, were decisive for the formation of the field as it is known today (Røpke 2004). As these concurred with a rise in political and public interest in environmental matters, the forming field of ecological economics received even more attention than otherwise might have been and likewise, contributed greatly to academia (Røpke 2005).

As for ecological economics and the Convergence Process, it is of value to look closer at how this field has addressed the need to reduce consumption. Common to it is the argument that there are limits to economic growth, and that people must acknowledge this fact if humans are to flourish on Earth (Jackson 2009). In the 1971 book *The entropy law and the economic process* Romanian-American economist Nicholas Georgescu-Roegen draws attention to the second law of thermodynamics and argues that it reigns in economic processes. According to the first law of thermodynamics, energy cannot be created, only transferred from one form to another. The second law of thermodynamics, or the entropy law, states that all conversions lead to some loss of quality of energy. Georgescu-Roegen states that during economic processes, energy is lost and that economists must pay attention to this fact, rather than assume that economic processes are cyclic in nature, or that technology can make up for what has been lost. He argues that acknowledging that economic processes are governed by entropy could reduce environmental pollution and degradation of natural resources.

British-American economist Kenneth Boulding uses the term *spaceship Earth* in his 1966 essay *The economics of the coming spaceship Earth*. Others had used the term before him, but Boulding is known for his comparison of what he called *cowboy economy*, where the attitude is that our resources are endless, to what he names *spaceman economy*, where people have discovered that we live in a closed system, Earth, that has limited resources for both extraction and pollution just as a spaceship might have, and would therefore have discovered ways to recycle materials.

American economist Herman E. Daly (1996), who builds his work to a large degree upon the work of Georgescu-Roegen and Boulding, focuses on the reduction of consumption. He contributes the idea of a steady state economy, which he describes as a non-static physical system that can develop but not grow, just as Earth itself can develop but not grow as matter can neither be created nor destroyed. He says that today's economic system is focused upon growth, where only a quantitative increase in the physical scale of matter and energy is counted valuable, but as Georgescu-Roegen and others have pointed out, such a system cannot continue in the long run. Therefore, a system that focuses not on growing but rather on "[q]ualitative improvement" of a "throughput, resulting either from improved technical knowledge or from a deeper understanding of purpose" would be more desirable (pp. 31).

In his book *Managing without growth* (2008), Canadian economist Peter Victor discusses the possibility of a prosperous future without societies focusing strongly on economic growth. He uses systems approach to look at how Western countries focus overly on economic growth, despite evidence that it is not sustainable, and suggests instead that nations consider ways to enhance well-being. He discusses both the planet's limited resources, as well as the unfairness in Western countries' behaviour when they promote economic growth, as it disadvantages poorer countries even more (2008). Victor's focus ties directly in with Johan Rockström and his fellow researchers article on planetary boundaries in 2009 (see discussion in chapter 2.1), in that we humans must contract our consumption of resources and consider the boundaries of Earth if we are to continue flourishing on Earth.

As for equity, ecological economics and the Convergence Process, it is worth mentioning Spanish economist Joan Martínez-Alier and French economist, political scientist and philosopher Serge Latouche. Both have

been influential in the anti-consumerism de-growth notion, Martínez-Alier stating: "Economic growth is not compatible with environmental sustainability" (2009 pp. 1099). Sustainable de-growth, which is both a concept and a social grassroots movement, traces its roots to ecological economics, economic anthropology, social ecology, and social activist groups (Martínez-Alier et al. 2010). Martínez-Alier states that the concept is not easily explained in a nutshell, but that it refers to "an equitable and democratic transition to a smaller economy with less production and consumption" (2010 pp. 1741), that allows an affluent downsizing (Odum and Odum 2006), or at least a gentler landing than a complete crash due to environmental collapse (Kallis, Martínez-Alier and Norgaard 2009; Martínez-Alier 2008, 2009; Martínez-Alier et al. 2010). Latouche (2009) writes that since exponential growth is not possible on a finite planet, a promising alternative is de-growth, arguing that the term is a political slogan "primarily designed to make it perfectly clear that we must abandon the goal of exponential growth" (pp. 8) in order to survive. Furthermore, he underlines that de-growth is not the same thing as negative growth, but rather an attempt to "build a society in which we can live better lives whilst working less and consuming less" (pp. 9).

Supporting the concept of de-growth is the fact that since post-World-War II, we have used an economic growth model that has little foundations in real life (Fisher and Erickson 2007). This model is based on the assumption that income inequality drives income growth and that in the end, growth will even out inequality. It is built mostly on theories by three economists that were laid out during the middle of last century, the so-called Kaldor-Kuznets-Solow consensus. In short, this model is as such: Nicholas Kaldor argued that countries productivity growth was based upon investment behaviour. Capitalists' and upper-income earners' accumulation of formalized savings was considered to provide a fast source of wealth which again could be invested privately, leading to even more growth (Kaldor 1958, 1967; Fisher and Erickson 2007). Simon Kuznets was surprised when he researched data on economic growth for the United Kingdom, the United States and Germany from 1880 to 1947 and discovered that while these nations moved from agrarian to industrial societies, the income gap at first increased, then peaked and finally decreased (Kuznets 1955; Fisher and Erickson 2007). Unfortunately, time has shown that though this was the case for these three countries at that time, the findings have not held true for many other countries since (Fisher and Erickson 2007). Robert Solow provided a

similar theory to Kuznets', only with an international aspect rather than only a national one. He suggested that technology would increase the productivity of labour and capital, and that the poorer nations would catch up to richer nations with time, in particular as low labour and production costs would attract investors to the poorer nations (Solow 1956, 1957; Fisher and Erickson 2007).

These three theories resulted in what ecological economists Brendan Fisher and Jon Erickson (2007) call "a three-legged stool for neoclassical growth theory and its application" (pp. 54), a theory that does not have as solid a base as people have assumed. Fisher and Erickson point out that not only is there little evidence that increased growth eventually leads to lessened inequality within and between nations, but also that the results of equity-blind growth policy vary greatly from one country to another and that more research has to be done before it is possible to predict what the outcome of such unconstrained growth is for individual countries. Moreover, inequity-based global growth is has not proved to be any kind of a solution to inequity within and between nations.

3.4 On useful and usable sustainability frameworks and praxis from the field

As the Converge Project is a transdisciplinary research project, and the Convergence Process is meant to benefit societies that wish to take further steps in the direction of sustainability and social justice, it is fundamental to apply methods that are easily comprehensible to a wide range of users in real communities and are already in use. This chapter contains an overview of the most useful sustainability frameworks and praxis and the theory behind them.

3.4.1 Contraction and Convergence™

The Global Commons Institute developed the global policy framework Contraction and Convergence™ in the early 1990s in an attempt to halt anthropocentrically caused climate change (Meyer 2000). At the framework's core are the concepts of equity and survival, and it suggests a method for the world's nations to reduce greenhouse gas concentrations in the atmosphere to a safe level, while at the same time increasing social justice in the world. This would be reached by developed nations accepting responsibility for the emissions they have already emitted, while allowing

developing nations to emit more while reaching a higher living standard – a process known for a long time in international law as common but differentiated responsibility (UNFCCC 1992) and which is seen as one of the cornerstones in sustainable development.

The director of the Global Commons Institute, Aubrey Meyer, states that to emit polluting gases is "a human right that should be allocated on an equal basis to all of humankind," adding that the over-consuming countries would be given an adjustment period within this framework (Meyer 2000 pp. 19).

3.4.2 The Converging World and SCAD

The Converging World is a British charity rooted in the principles of Contraction and Convergence™, *equity* and *survival*. Founded in the United Kingdom within a community-based project called Go Zero at the end of the 20th century, the charity aims to combat climate change, social injustice, inequality, poverty, waste and other issues that hinder societies from being able to offer its citizens good lives (Pontin and Roderick 2007). To do that, The Converging World liaised with another charity group based in India, Social Change and Development, or SCAD, founded in 1985, whose focus is to better the lives of those who have little chance to better it themselves – such as gypsies, lepers, subsistence farmers and salt pan workers.

The Converging World began with matching the village of Chew Magna in the UK with some SCAD communities in Tamil Nadu, India, and built windmills in Tamil Nadu that generate clean energy for the growing energy need in the communities. Businesses and individuals in the UK who want to limit their emissions but are unable to draw them down as much as they would like, can liaison to offset their emissions (Pontin and Roderick 2007). Thereby, the idea of Contraction and Convergence™, of limiting greenhouse gas emissions in the world while at the same time increasing social justice, can bear fruit within the Converging World initiative.

SCAD is a partner in the Converge Project, and one team member is a founder of both Go Zero and the Converging World.

3.4.3 The Natural Step's framework

The Natural Step international organization, founded by Swedish medical doctor Karl-Henrik Robèrt in 1989, aims to promote deeper understanding and commitment to sustainability and a wider application

of sustainable development (Cook 2004). Its approach is science- and systems-based, and is made up of four System Conditions and several tools that are put to use during workshops held with selected participants from communities and corporate partners. The Natural Step approach is used by several businesses and communities around the world.

In the development of the Convergence Process, direct or indirect use was made of a few tools from the Natural Step. Here, the theory behind the Natural Step approach is explained, while the actual TNS tools relied upon are discussed in chapter 4.

Table 2 The Natural Step four System Conditions and Principles of Sustainability

The Four System Conditions...	**. . . Reworded as The Four Principles of Sustainability**
In a sustainable society, nature is not subject to systematically increasing	To become a sustainable society we must...
1. concentrations of substances extracted from Earth's crust	1. eliminate our contribution to the progressive buildup of substances extracted from Earth's crust (for example, heavy metals and fossil fuels)
2. concentrations of substances produced by society	2. eliminate our contribution to the progressive buildup of chemicals and compounds produced by society (for example, dioxins, PCBs, and DDT)
3. degradation by physical means	3. eliminate our contribution to the progressive physical degradation and destruction of nature and natural processes (for example, over harvesting forests and paving over critical wildlife habitat); and
4. and, in that society, people are not subject to conditions that systemically undermine their capacity to meet their needs	4. eliminate our contribution to conditions that undermine people's capacity to meet their basic human needs (for example, unsafe working conditions and not enough pay to live on).
	(TNS 2013)

The four System Conditions are fundamental to The Natural Step's work, outlining four scientifically defined conditions that humans must function within, if human society is to continue to prosper on Earth (Holmberg 1995; Cook 2004; James and Lahti 2004). The System Conditions have been in place with TNS from the beginning, along with

the four principles of sustainability, both which can be seen in table 2, and ostensibly, serve the same purpose.

Some academic evaluation has been conducted upon The Natural Step approach. Of note are Paul Upham's two articles, where he states that while effective, The Natural Step approach has been criticized for not being very precise in the science it claims to be based on (2000a, b). Upham argues that The Natural Step "requirement *for absolute limits on inputs and outputs* most clearly distinguishes TNS from mainstream environmental management" and therefore, this factor should be focused upon by companies that adopt The Natural Step approach (2000 a pp. 450, italics original). Furthermore, he says "TNS implicitly requires economies with no Earth-bound growth in physical scale" (2000 a pp. 450) and warns that it is unlikely that corporations will agree to such a requirement. Upham argues that though the organization's "theory of sustainability is educational and capable of facilitating organizational culture change" it is not "simply a scientifically defensible message as it aims to be" but that instead, it "is a limits-to-growth message that uses science for widespread appeal, and in which those limits to growth are assumed already globally exceeded" (2000 a pp. 453-454).

Like SCAD, The Natural Step is a partner to the Converge Project.

3.4.4 The premise behind the World Café

The World Café method is not a sustainability framework per se, but it has proved a useful bottom-up approach in solving complicated social issues, and applies itself well to both transdisciplinary studies and action research (Bordokós 2010; Fouché and Light 2010). In this chapter, the theory behind the World Café approach is discussed, but the ways of applying it are explained in chapter 4.2.2.

A World Café is a conversational workshop process that helps groups engage in constructive discussions about critical issues. This approach is constructed to help build personal relationships, encourage collaborative learning and offer a fruitful venue for cross-pollination of ideas and opinions between people of different backgrounds and social status because the café-style social context allows people to share information in an equitable and non-threatening manner (Brown and Isaacs 2005; Fouché and Light 2010). The World Café approach builds on the assumptions that the knowledge and wisdom needed to solve a certain

problem already exists among stakeholders, and that this intelligence will emerge as they come together and think creatively within the appropriate context and focus (Brown 2002). In the conversations, nobody is an expert and everyone is a contributor.

World Cafés are in vogue as a democratic way to hear the voices of the public, and its originators state that they are increasingly used by businesses, governments and organizations (Brown and Isaacs 2005). However, though the approach lends itself well to action research, it has not frequently been studied academically (Fouché and Light 2010), even if World Café and traditional qualitative research focus groups are in many ways similar. In both cases, a group of people sits down under the observation (and sometimes with the participation) of a researcher or a facilitator, and freely discusses clearly stated powerful questions. The aim with a focus group is to use group dynamics to "explore how and why people make the decisions they do" (Taylor and Bogdan 1998 pp. 114), but not necessarily to find solutions to given problems as is the case with World Cafés. Focus group participants are not asked to write their thoughts down and cross-pollination is not encouraged, as the case is within a World Café (Brown and Isaacs 2005), so the World Café is more solution-oriented than a traditional focus group.

3.5 On combined theories and approaches within the Convergence Process

The collection of various and diverse academic theories, social practices and selective periods of history in chapter 3 may seem like a haphazard selection of attractive ideas. But this collection is far from random. Therefore, this chapter concludes with short overview of how the abovementioned theories, schools of thought and social practices consolidate in the Convergence Process.

An international transdisciplinary research project is bound to build on many different points of view. To use the metaphor of a rhizome, it is possible to state that the advantages of such a study, along with the complications of it, is that the project's theoretical background can be rooted in a plethora of discourses and schools of thought, all of which are connected. A rhizome, or a rootstalk such as bamboo, asparagus or ginger, exists underground and can cover a vast amount of land. The rootstalk is the main stem of the plant, which then sprouts into the visible

part, the green plant. To continue with the metaphor – the researcher then shapes these roots, theories and ideas, into a single methodology, or the rhizome's sprout, the stem, which again then branches out into different results, conclusions and effects in the societies where the research took place. The theories and social practices collected above give an overview of some of the most influential discourses, theories and schools of thought that affected and left their marks on the Convergence Process.

In chapter 2, I set the stage by outlining the survivalism discourse, which explains the dire straits the planet is in as shown by research on planetary boundaries, population growth, consumption and resources. Here, the Ecological Footprint was introduced, which is a way to measure the load of human demand upon Earth's ecosystems by assessing the biological capacity necessary to support human consumption. In Chapter 2, I also defined three key concepts, that is; sustainability, sustainable development and social justice. The Convergence Process is a public participatory methodology, aimed at getting often-silenced groups to speak out and influence the course of their societies, and therefore, theories and international agreements on social justice and equity play an important role. The overall goals of international agreements like the *Universal Declaration of Human Rights*, the United Nations *Millennium Development Goals* and the *Sustainable Development Goals* are all centred in social justice, equity, sustainability and sustainable development. In line with this thought, the Convergence Process always keeps in the foreground the idea that a more equal distribution could contribute to a more sustainable way of life, and could bring social justice into the picture by allowing the developed and highly industrialized world, as well as the very wealthy inhabitants of developing countries, to pay some of their ecological debt back to inhabitants of the developing part of the globe.

Chapter 3 focuses on theoretical frameworks that have influenced the development of the Convergence Process. First and foremost is the transdisciplinary approach, but the transdisciplinary researcher's goal is to select the most useful theories, fields and social practices and bind them into one in order to get as good an outcome as possible.

Second, systems science theory is essential to bind together the diverse fields, methods and theories that lie behind this dissertation, and is additionally an extremely useful approach in the Convergence Process

workshops, as it allows for a coherent and holistic view of the work done in the field with the stakeholders.

Third, the academic theories, fields and approaches deemed useful to the development of the Convergence Process are rooted in environmental anthropology; feminist anthropology; political science and public participatory democracy; and ecological economics. I begin this section with a general discussion on postmodernism and environmentalism, because each field is of course a child of its time, reflecting the strong cultural trends that have occurred over the past decades, and because in a transdisciplinary dissertation, these concepts bear explaining. Environmental anthropology brings together humans and the environment, including how humans have influenced their environment and vice versa. As Ingold (2000) and Kopnina and Shoreman-Oimet (2011) point out, this field of study is also useful for bringing together the hard sciences with social sciences, and thereby creating a more applied approach to the human-environment relationship, and not mostly a theoretical one as the trend was before. The fact that environmental anthropology often takes account of a non-Western perspective and transdisciplinary approach, involving both the public and non-governmental organizations, makes it a particularly attractive field to the Convergence Process, where the same approach is taken. The same line of thought gives weight to feminist anthropology and its take on power relations within the Convergence Process, in particular when it comes to the researchers' habitus in addition to post-colonialism. All of these discourses are concerned with fringe groups, or groups that have had to fight to be considered equal in the eyes of traditional white patriarchal academia. The fact that the Converge Project is made up of a group of four European universities and four European and one Indian non-governmental organizations in addition to the Convergence Process being tested in two communities that used to be a colonizer and a colony, means that the team needed to be alert to the unbalanced power between Western countries and emerging economies. However, some scholars have suggested that simply being aware of the imbalance can aid the outcome, and Harding (2008) suggests that to step out of the comfort zone of a traditional Western university, can bring about increased social justice. This view has been essential to the creation of the Convergence Process, leading the scientists to choose less traditional research methods and public participatory engagement strategies. Political science and public participatory democracy are also

discussed, and attention given to the fact that experience shows that this latter field has not proved as successful as might have been desired (Few, Brown and Tompkins 2006). As public participation is an essential cornerstone in the Convergence Process, this field must be considered and every attempt made to systematically avoid the potholes others have run into. Finally, the field of ecological economics has been very influential in the development of the Convergence Process and this dissertation with its take on the fact that as humans put more pressure on the ecosystem that supports us, the more precarious our future looks. Therefore, it is of essence to find solutions that enable the human race to thrive in the future. Such solutions will have to include a contraction of current human consumption patterns, and a convergence to a simpler, more efficient lifestyle.

Fourth, crucial to this dissertation and the development of the Convergence Process are social practices; methods that are in use in the field. Of note are the schemes that informed the Converge Project itself, namely Contraction and Convergence™ and the Converging World, as the ideology behind both includes social justice and equity. The Natural Step's approach is based upon both science and equity, and the World Café approach illuminates the workshop section of the Convergence Process, offering an equity-based format for discussions and a useful tool to drive brainstorming sessions.

The hope is that Convergence Process can serve as one stepping-stone towards a sustainable and socially equal future where humans can flourish, by suggesting a public participatory democratic way that offers solutions to how humans can contract their consumption and converge their resource use.

4 Methods and tools applied

Chapter 4 covers the research methods used during the formation of the Convergence Process and the testing of it. I divide the chapter into two main sections, both of which follow the same general outline; first, I describe the methods used, then, where appropriate, I introduce instances where these methods have been used before, and finally there is a description on how these methods were used within this research.

The chapter's first section discusses academic research methods employed to create and develop the Convergence Process. This includes the method of action research which allows the researchers to participate in the research itself with the aim of guiding towards a desirable outcome. I describe the literature studies, in addition to explaining of the mixed qualitative and quantitative questionnaires employed during the creation and testing of the Convergence Process. The stakeholder engagement methods are described in short, along with systems approach, causal loop diagrams to analyse the system at hand.

The chapter's second half focuses upon applied methods – the social practice methods used in the testing of the Convergence Process. These include tools adapted from other sustainability frameworks or social practices, such as the Group Modelling public participatory approach that combines systems analysis and causal loop diagrams, workshop methods relied upon from the World Café community, tools from the Natural Step, and a tool developed within the ISIS public participatory method.

4.1 Academic research methods and tools

In this section I discuss the academic research methods used in the forming of and testing of the Convergence Process. These were applied during the workshops as well as when disseminating the workshop results, but the workshops were held to test and further develop the Convergence Process. The overall aim was to create a public participatory process that can be used within communities without the participation of outside specialists, to move the community towards further sustainability and social equity. The goal was that the process

become both simple and effective, where the public can have a lasting and valid say in the development of their community.

4.1.1 Action Research

Action research is a type of experimental research where the researcher actively works with people in developing practice and generating knowledge about practice, not simply to understand the phenomenon but to cause and influence a desired change (Bradbury-Huang 2010; McNiff 2010). It has many definitions, but the one outlined in *The SAGE handbook of action research* is used in this dissertation, where the methodology is defined as:

> a participatory, democratic process concerned with developing practical knowing in the pursuit of worthwhile human purposes, grounded in a participatory worldview. It seeks to reconnect action and reflection, theory and practice, in participation with others, in the pursuit of practical solutions to issues of pressing concern to people. More generally it grows out of a concern for the flourishing of individual persons and their communities (Reason and Bradbury 2001 pp. 1).

Action research is well suited to transdisciplinary research, as it has no single disciplinary or political connection (Fals Borda 1998), but rather combines social investigation, educational work and action. It is meant to create pleasant communicative spaces and lends itself particularly well to transdisciplinary projects attempting to give voice to the local public, especially disenfranchised members of society (Pohl and Hirsh Hadorn 2007, 2008; Bodorkós and Pataki 2009). It is meant to solve identified problems by combining the methodology of different fields and approaches, by bringing together research and action, theory and work, academic knowledge and that of the locals in the area or field in question, and ensure the participation of all those who are involved in the research, including the researcher herself. The learning process is a key element with reflections upon the community and the researcher (Bodorkós 2010).

As seen in figure 3, action research occurs in cycles. Hungarian action researcher Barbara Bodorkós (2010) depicts two cycles in her explanations but states that more cycles are often used. The outcome of the first research cycle is transferred directly into the second cycle, as the goal is to build on former experience and research and learn from repetition. The cycles

Bodorkós depicts are identical, but the outcome changes between cycles. Each begins with common problems identified by researchers and the participants. This leads to action planning, which again leads to action, evaluation and reflections. The reflections are then carried on into the next cycle, and the participants learn from the whole process.

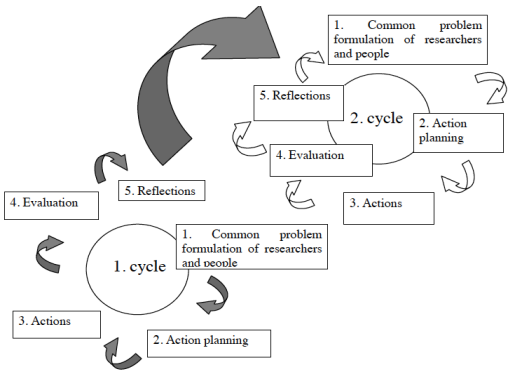

Figure 3 The cycles of action research (Bodorkós 2010 pp. 10)

Bodorkós points out that it is a decisive albeit difficult task to establish an equal standing between academically trained scientists and local people because the locals might see the academics as more powerful people than themselves, which can in turn stop the locals from believing in their own wisdom. Furthermore, the scientists should avoid bringing in expert knowledge too early, or it might hinder participation; but likewise, expert knowledge brought in too late does not aid the conversation.

For this dissertation and research, it is worth recounting two quite different community based action research studies which have bearing upon the development and testing of the Convergence Process. The first began as a traditional qualitative research, but evolved into action research as the scholars developed deeper relationships with their subjects (Bodorkós and Pataki 2009). The study concerned itself with sustainability planning in one of Hungary's most socio-economically disadvantageous areas, and as the researchers got more involved with the local people, the need for participatory planning was increasingly identified, and hence the transition over to action research. What began as a research on the economic valuation of natural capital moved to a research on how to strengthen the local community and sub-communities

within it. The researchers state that a "participatory planning process on future rural development directions" such as they have enabled permits "cycles of planning, acting and reflecting, and that it can be seen as an opportunity for initiating and fostering progress towards the direction of sustainability as social justice" (pp. 316). The research was still ongoing when the article was written in 2009, but preliminary results indicated the work had resulted in a communicative space that did not exist before, leading to an increased sense of agency among the local people who then took more responsibility for their area, including organizing a local product festival. Furthermore, the researchers point out that for action research to be fruitful, the researchers must invest time and engage themselves in the community to build up the necessary rapport with the local people (Bodorkós and Pataki 2009).

The second research recounted here is the Think&EatGreen@School project – a community based action research initiative established at the University of British Columbia in Canada (Rojas et al. 2011). The researchers wondered whether the hundreds of thousands of people involved in Vancouver's public school system could participate in a social learning process, thereby influencing the local food system and move it towards sustainability. The study aimed to foster

> food citizenship by providing its entire community of learners – from pupils to professors, teachers to chefs – with opportunities to be involved in all aspects of the food cycle, to learn how to regain the right to participate in the decisions that shape the food system of public schools and educational institutions, and by extension, the food system of the City of Vancouver (pp. 773).

To reach that goal, action research methods were essential. These allowed for a non-traditional combination of diverse perspectives, and resulted in a "integrative research" that "combin[ed] interdisciplinary and transdisciplinary food system studies that include academic and non-academic participants in the creation of new knowledge and theories," blending "sustainability, public health and pedagogy research approaches" (pp. 771). Furthermore, the researchers used an alliance between the community and the university to develop their model of sustainable institutional food system in the city's public schools.

The Convergence Process is the result of a transdisciplinary research project, where the researchers attempt to give voice to participants in the system in question, and help them to find solutions that can change the system. The research method chosen to test and develop the Convergence Process was action research, where a carefully selected public was invited to both map out its system and attempt to find practical and useful solutions that will bring the community further towards sustainability and social equity. By participating, the public also aided with further developing the process, as obstructions became clear during the workshops when occurrences that needed to be smoothed arose or were pointed out by the participants. The data gathered during the development and testing of the Convergence Process included text analysis and literature review (see chapter 4.1.2), in addition to combined qualitative and quantitative questionnaires gathered during the participatory workshops (see chapter 4.1.3), and a detailed research diary and photographs gathered during the eight workshops, along with responses (written and verbal) from the participants and informal interviews, collected in the research diary.

Figure 4 shows how action research was used during the development of the Convergence Process, which included three workshop cycles in Iceland, three in the United Kingdom, and two in India. The figure shows how the first cycle includes precursory work done by the Converge team, by identifying the problem, the geographic areas to be studied (see chapter 5.1) and the system to be studied – the food system of each area (see chapter 5.2). The invitation process is discussed in more detail in chapter (6.3), but in short included the team identifying and inviting stakeholders to participate in the workshops and providing them with reading material where appropriate.

The first workshop included an introduction to the state of the world and the system chosen. Then the participant group identified how a sustainable food system in their area would look like and did an initial system analysis by mapping the system as it now is by using flow charts and some initial causal loop diagrams. During the workshop, I gathered data via careful notes of what happened in the room, along with questionnaires that I distributed and collected towards the end of the day.

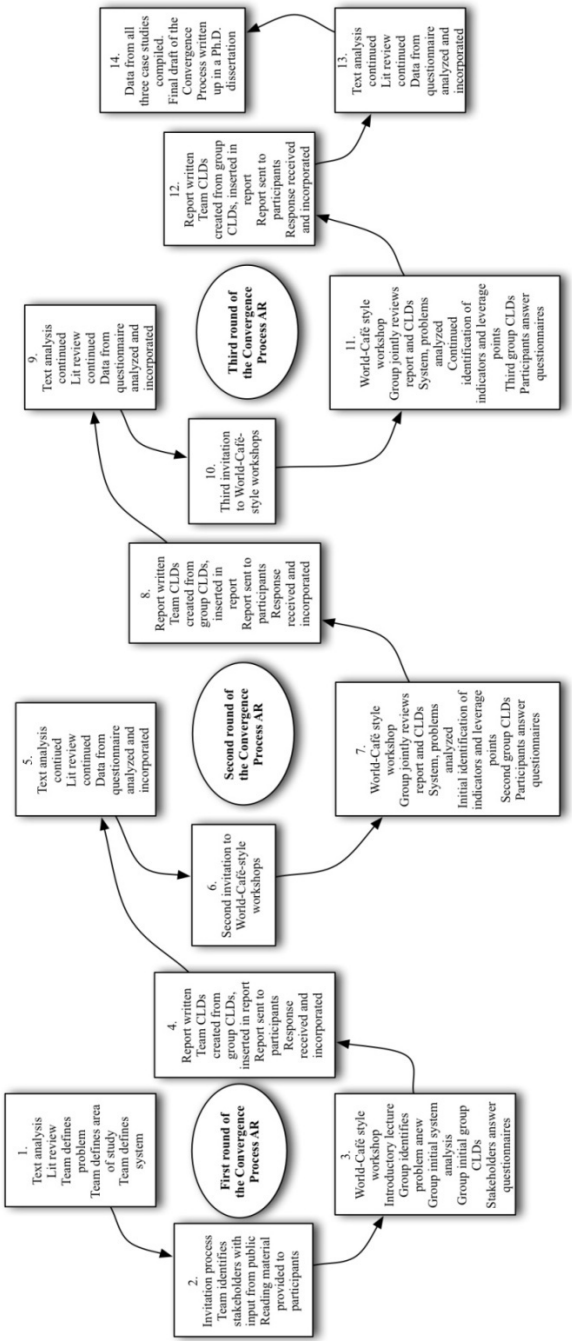

Figure 4 Action research during the development and testing of the Convergence Process

Likewise, I summarized the participants' work at the end of the day, when they presented it to each other. I encouraged informal discussions and emails on the process, which I then noted down and collected in my research diary. I and other team members also took photos, which were then posted in the team's joint internet folder. I then disseminated the results into a report, included the summarized causal loop diagrams chosen and redrawn by other Converge team members, and then the reports were sent to the participants via email. The responses received from participants in between workshops, both to the report and other response, was included in the research data and shed light on aspects of the workshops that were confusing to the participants during or after each workshop, and led to attempts to simplify and straighten the process out the next time around.

Furthermore, I continued to use the data gathered – research diary, questionnaires, causal loop diagrams, photos, emails, informal interviews and observations, and more – to hone the process and smooth any problems, such as to simplify the introductory lecture, identify when the causal loop diagrams should be introduced in the first two workshops, et cetera. In particular, the questionnaires the participants were asked to complete at the end of each workshop, was meant to inform the development of the Convergence Process (see appendix B). In them, the participants were asked to evaluate their experience of the day, how the workshop had met their expectations, and how they expected to use their learning in the future. The answers were used to straighten evident creases in the process, such as when to introduce the causal loop diagrams, how better to adjust and direct the World Café process to each community and so on.

In the second round of the research cycle (the second workshop), the workshop was repeated, and now the participants continued mapping the system, in addition to beginning to identify indicators and leverage points, drawing new flow charts and causal loop diagrams. I wrote another report using the same methods as after the first cycle (relying upon the research diary, results from the questionnaires, informal interviews with the participants, the causal loop diagrams and other written material created by the participants), and sent to the participants. The third cycle was much like the second, only with more detailed suggestions of indicators and leverage points. The third report was likewise created and sent to the participants, but this time it was more

detailed and consisted not only of the day's proceedings but of the process in its entirety as it stood when the reports were created.

Throughout the research, I analysed the research diary and the questionnaires with focus upon improving the Convergence Process, searching for repetition of themes and points of interest. This I did by reading the diary carefully several times, clustering together notes from workshops 1, workshops 2 and workshops 3. I searched for repeated themes, creating a list of and colour coding themes of interest, such as the gender division in the workshops and moments of unrest or lack of interest among the participants. After the questionnaires had been put into an Excel document, I clustered them together creating one document for workshop 1, another for workshop 2 and the third for workshop 3. Then the questionnaires got the same treatment as the diary, I read them several times and colour coded them according to repeated themes.

Then I compared and contrasted the diary and the questionnaires, noting similarities and differences. That gave way to a written analysis of each cluster of workshops – the first, the second and the third – with an attention to the themes, adding into it direct quotes from the questionnaires and diary.

Finally, I used the analysis to create the final version of the Convergence Process, and to illuminate the process of its creation and testing in this dissertation.

4.1.2 Reviewing the literature

The Latin phrase *nani gigantum humeris insidentes* rings ever true, and perhaps especially when it comes to a transdisciplinary international research like the creation of the Convergence Process. All theorists and scientists are dwarfs standing on the shoulders of giants, which is the direct translation of this ancient Latin metaphor, reportedly first quoted in the twelfth century and later cited by many, including Isaac Newton who is quoted: "If I have seen further, it is by standing on the shoulders of giants" (Maury 1992). In other words – no idea stems from nothing. The world is made up of systems of human connections and societies. To be able to stand on the giants' shoulders, one must know the giants – or at least, know who they are and what they wrote. Therefore, it was essential to undertake a thorough and systematic literature review of the various

academic disciplines and social practices that influence and affect the creation and testing of the Convergence Process.

It may appear that the review of the literature in any Ph.D. project should be a rather straight-forward task. But when it comes to an international transdisciplinary public participatory project like the creation of the Convergence Process where influence and expert knowledge of a group of about 20 academics and social practice specialists is united, many of whom want to point the Ph.D. candidate in their desired and specialized direction, the literature review can become highly complicated. Sustainability and social equity are subjects many people may belief they are specialists in. Within both subjects, a lot of literature exists – some scientific and some not, and some of it conflicts with other literature within the same area. Furthermore, when the university where the candidate's studies are being conducted offers few or no courses in how to do a proper literature research study, let alone a transdisciplinary literature study, this becomes an even more complicated, though all-important, part of the candidate's research. British sociologist Ann Oakley (2012) says in the foreword to *An introduction to systematic reviews* that "the art and science of collecting and pooling information from primary research studies" is "an extremely important but often ignored area of research" (pp. vii). The method of systematic review is mostly used in medical disciplines to amass findings across multiple empirical studies, and is gaining ground in the social sciences as well. The aim with such an approach is to promote human welfare, unquestionably building upon what others have done before.

> Whoever does systematic reviews has to be clear about every stage of the process: the question the review is designed to answer; the appropriateness of the methods chosen; where the studies come from and why some are included and others not; how judgements are made about the value of particular studies in answering the review question; and what it all adds up to in terms of lessons learned for policy and practice (Oakley 2012 pp. viii).

In other words, a systematic review is much more than reading the chosen literature. Of course, no academic does a random literature review, but for a transdisciplinary scholar, the material that presents itself can be overwhelming, cover too-vast an area and pull the scholar in too many different directions. A systematic review is a deliberate process that can

greatly aid the transdisciplinary scholar, as the aim here is to gain as much information and knowledge from the work others have done before as possible, in order to better the researcher's studies. Therefore, systematic reviews can be particularly helpful when it comes to transdisciplinary research, as it allows for a thorough orderly view at the literature at hand.

During my four-year research, I adhered to the most important rules found in that method systematic literature review as outlined by Oakley. For example, while reading, I kept the research questions firmly in mind, along with the overall aim of creating a public participatory pathway for societies to sustainability and social equity – a pathway that would illuminate both why a community should choose to follow it as well as explain the application of the process itself to the general public. Moreover, I considered the appropriateness of the methods chosen in the literature, selecting those that pointed towards a public participatory democratic approach, in particular if it aimed to influence governmental policy making.

Of course, I was not alone in choosing the ideology, tools and methods included in the Convergence Process, so therefore, I focused on literature that discussed sustainability, social justice, contraction and convergence as understood within the Converge Project. Furthermore, I considered where the research, ideas and schools of thought came from, keeping in mind the power of habitus and as a side project, made certain that non-Western scholars, feminist scholars and scholars from non-English speaking countries were included to get a broader view. Finally, I considered how the chosen literature adds up in terms of lessons learnt for practice.

4.1.3 Qualitative and quantitative questionnaires

Questionnaires are sometimes used as an addition to action research to inform and aid with the final outcome. These can be qualitative or quantitative, or else, a mixed method of qualitative and quantitative questionnaires – referred to as triangulation. The aim with the mixed methods is to bring out the best of both qualitative and quantitative research (Jick 1979). Qualitative research methods are based on phenomenology, which John W. Creswell, author of *Qualitative inquiry and research design*, says shows how several individuals explain a

certain experience (1998). Qualitative research is most often conducted via interviews, where the researcher attempts to learn how the person explains her experience, and open questions may also be used with the intention of getting the respondent to explain her experience in her own words (Creswell 1998; Taylor and Bogdan 1998). Quantitative research is done with surveys or questionnaires in order to provide descriptive statistics. This is for example done with polar questions, answered with "yes" or "no," or using Likert scale questions where the respondent scales her answer according to a scale given in the questionnaire. Likert scale questions are among the most widely used techniques to measure attitudes (Ary, Jacobs and Sorensen 2010).

A fitting study to cite here is discussed in the book *Mediated modeling: a systems dynamics approach to environmental consensus building* by Marjan van den Belt (2004). In a transdisciplinary procedure, van den Belt and her coworkers developed a modelling process and tested it with action research, using "surveys both before and after the mediated modeling process [...] to establish a baseline and a result" (pp. 21).

In the development of the Convergence Process, a mixed qualitative and quantitative questionnaire was used at each workshop (mixed method), in addition to emails to and from the workshop participants, and informal interviews. The goal with using questionnaires was to ease the comparison of each step of the workshops both between and within the communities, to get a sensation of what in the public participatory process functioned appropriately and what needed more honing, and to realize the experience of the participants of the workshops. The questionnaires were given to all participants in all eight workshops and collected at the end of the workshop.

The questionnaires were loosely based upon those applied in van den Belt's (2004) studies, where she attempted to compare the learning of the groups as whole as well as of individual participants, reportedly succeeding in the former but not in the latter, partly because of new participants entering the studies and former participants leaving them.

In the Convergence Process testing, the questionnaires were deliberately made quite similar between communities, to ease with comparison of the results. The quantitative questions provided descriptive statistics. They were either polar questions, answered with "yes" or "no," or simple Likert scale questions where the respondent scaled her answer

according to a scale given in the questionnaire. The qualitative section of the questionnaires consisted of open questions, where the participants were encouraged to explain their experience in their own words.

As explained above, the answers were typed into an Excel document, and used to evaluate various components of each workshop. The results were likewise used to make the following workshops more convenient – for example to gauge when the causal loop diagrams should be introduced and to evaluate the importance of networking. In addition, the questionnaires allowed for a certain comparison of the groups participating within and between the three communities.

I did not plot the Likert scale questions into graphs as they seemed not entirely believable and did not offer a good comparison between the countries, apart from possibly as an indication of what is considered polite in each culture. For example, nearly all the Likert scale questions were answered at number 5 in India, the top of the scale, regardless of what the question was. The same went for a question meant to gauge the participants' interest in finding lasting sustainability solutions – nearly all participants in all the workshops in all three communities answered at the top of the scale – but that result could have been guessed simply by their choice to participate in the workshops. Possibly, the questions were too broad and not specific enough, and possibly, cultural etiquette came into the answers, as it is considered impolite to criticize outsiders in India. One question at least on the first questionnaire was not specific enough, the one that asked whether people felt they knew understood sustainability better after participating in the workshop, because it did not allow for an estimation of the participants' knowledge of the subject beforehand. Therefore, some people marked 5 but put in comments that they had know it all before, while others marked 2 and also put in comments that they had not learned anything new. On the whole, the Likert scale questions were informative to the researcher, myself, who had been at each workshop and taken careful notes. But plotting the answers into graphs seemed to give skewed results so I avoided that.

The questionnaires in Iceland were all in Icelandic, and analyzed by a native speaker (myself), and in Britain, the questionnaires and answers were all in English. In India, the translation of the questionnaires into Tamil did not occur beforehand as the Indian facilitators appeared to have overestimated the participants' understanding of English. Instead, the

questionnaires were all placed in English before the participants and a copy with the questions translated into Tamil by hand was circulated within the group. That piece of paper was much sought after when the participants answered the questionnaires, which indicated the need for it. The answers were given in both English and Tamil, and translated into English by a native Tamil speaker.

4.1.4 Stakeholder engagement – selecting and inviting the participating public

Stakeholder engagement is a central factor when one is working with participatory workshops, as within the Convergence Process. "Whoever is present at the meetings will shape the process and the outcome. Therefore, the identification of stakeholders is a very important step in the ignition and preparation of" a public participatory process, writes Marjan van den Belt (2004 pp. 62). Hungarian action research scholar Barbara Bodorkós (2010) rightly points out that "[p]articipatory processes do not and literally cannot involve everyone" (pp. 16). It is vital to select carefully participants that can bring to the table different but equally important information about the system that is being studied, regardless of the power, privileges and resources have up until now been appointed in the community. She warns that traditional power relations are difficult to change, but stresses that it is of value to examine "who has been included and excluded in reality, who has been missing from the tables of discussions" (pp. 16).

Bodorkós suggests that the snowball method of inviting people – where word of mouth is used to invite participants – can lead to a biased representation of the community, as human nature is to invite those we know have the same interests as we do ourselves. She suggests key informants should be invited to the table – persons who have knowledge of much information about the research topic due to their social status, education or experience, because they can provide great and valuable insight. However, Bodorkós warns that such persons may be biased. Like Bodorkós, van den Belt cautions there is risk in inviting stakeholders with direct or indirect stake in the issue at hand, because they may or may not feel a certain urgency which causes them to participate. The perceived level of conflict affects how many are willing to participate, along with how easy it is to facilitate the group. However, she encourages a wide variety of stakeholders, as their involvement "fosters a more diverse input

of ideas and worldviews and is therefore a source of creative solutions" (pp. 62). In addition, she points out that it can be extremely difficult to enrol "nonorganized but affected citizens" (pp. 62) and "institutions operating at higher scales" (pp. 63). For example, in one of her studies, which took place in Ria Formosa in Portugal, she explains that it was relatively easy to involve the industries of tourism, fisheries and salt making, whereas official bodies like harbour authorities and the army had little interest in participating in a process aiming to reach an environmental consensus. However, she encourages the involvement of participants with decision-making power, as they can aid with implementing the changes identified as necessary by the workshop.

Furthermore, she suggests that the process of selecting and engaging participants can take a full year, though a month-long process is possible as well. The ideal number of participants in an effective systems workshop is between 10 and 40, van den Belt suggests – 10 because it is difficult to get a valuable discussion going with enough insight among fewer people, and 40 because more people become difficult to facilitate by a small group of researchers. In addition, she suggests that for a systems modelling workshop, it is important to keep the participants as stable as possible – that is, only involve new people if necessary and then make certain that they are briefed on what has occurred before, as newcomers sometimes bring up questions the group has already answered, without adding a new perspective and only serving to "create uncertainty about the process, and little constructive input" (pp. 66).

The World Café process does not specify how best to select participants, but it gives information on how the invitation process can be approached. The authors of *The World Café – shaping our futures through conversation that matters* (Brown and Isaacs 2005) say the numbers can vary from a few dozen to several hundred, and suggest that the invitation should include an initial question or a theme, as opposed to a proposal or a predefined problem, and that this question should be simple, awake curiosity and no easy answer should spring to mind. They suggest the invitation should explain that the format is a café conversation, as opposed to a more traditional workshop. Furthermore, if the invitation is written, it should be special in some fashion, for example, the authors say it should be personal, and may also be colourful, informal or creative, bringing attention to the hospitality, joyfulness and freedom of the café, as opposed to the formality of a business meeting.

4.1.5 Systems approach as a path to sustainability – systems analysis and causal loop diagrams

A systems thinker recognizes that when determining a system's behaviour, it is equally important to look to the structure of the system itself, as to the system's individual components. When a dynamic system is analyzed, it should not be viewed as linear with cause and effects, but rather as cyclical with internal and external feedbacks that can affect the behaviour of the whole system or individual sections of it (Sterman 2000; Meadows 2008). Such holistic approach gives the observer a comprehensive view of the system's different sections, interconnections and internal and external feedbacks, and can give a better idea than linear thinking of possible future behaviours (Sterman 2000; Meadows 2008). Therefore, when mapping the behaviour of a complex system such as the food system of an entire country, as done in the testing of the Convergence Process, systems thinking is crucial, because with this approach, it is possible to show the effects of internal feedback loops and time delays that affect the behaviour of the whole system. This approach means that both the researchers and the subjects (in this instance, the workshop participants) understand that there are relationships between the parts of the system and that the whole is "more than the sum of the parts" (Meadows 2008 pp. 188).

The systems approach methods used in the Convergence Process and described in this dissertation include systems analysis and causal loop diagrams.

Systems analysis is the process of visually mapping out a system on a piece of paper, giving the viewer insight into the system's components, feedback relationships and causalities. Such an overview does not focus on individual components of a system in isolation. Instead, the process of mapping out a system and analysing it allows the observer a comprehensive view of the whole system's different sections, interconnections and internal and external feedbacks. Furthermore, it can give a more realistic idea of possible future behaviours than linear thinking may offer. Such mapping aids with identifying nonlinear feedback loops, time delays, indicators and leverage points. A feedback loop is a closed chain of causal connections that affect the behaviour of the system. Time delays refer to a component in the system that delays the effect of it or other components, and which can cause predictable

oscillations in the system (Meadows 2008). Indicators are the signs people use to monitor and understand our systems. As systems analyst Donella Meadows (1998) says, they "arise from values (we measure what we care about), and they create values (we care about what we measure)" (pp. 2). In systems analysis, mapping is used to select indicators that can offer information on the health of the system. Leverage points are places where it is possible to intervene in the system, where even a small change can lead to a large change in the system's behaviour. Or to use the words of Meadows: "Leverage points are points of power" (2008 pp. 145). The mapping of the system as a whole can lead to new insights and suggest new indicators to monitor that will help making the system sustainable.

In systems analysis, it is vital to get the input of stakeholders, participants in the system itself, to get as complete a map as possible. In the Convergence Process, volunteers, who are themselves participants in the food systems of the communities being studied, draw up the maps.

Causal loop diagrams are a central part to the systems mapping and analysis done within the Convergence Process workshops. Diagrams using arrows to indicate direction of flow may have been used for centuries to analyse systems, but in their computer model World3 and the book *Limits to growth*, authors Donella Meadows, Dennis Meadows, Jorgen Randers and William Behrens (1972) formally made use of systemic causal loop diagrams, to indicate feedback loops. Their World3 model was a computer simulation of connections between population, food production and industrial growth, and indicated that humans would need to slow down growth and resource use for our planet to be habitable in the not-too distant future. In the early 1970s, the computer technology they used could not adequately show the feedback necessary and therefore the authors used feedback loops, or causal loop diagrams to show the cyclical nature of causes and effects within a single complex dynamic system, and demonstrate feedbacks within the system – processes, root causes and effects, but omit stocks, flows and some variables (Meadows et al. 1972).

Causal loop diagrams offer an overview of the whole system. They can indicate how any given behaviour has manifested within the system, and thereby aid in developing strategies to work with or counteract the behaviour. They can also show to what extent and how the problem studied connects with other systems (Sterman 2000; Haraldsson 2004).

Figure 5 shows a causal loop diagram depicting a simplified version of a food system. It is based on figures drawn at the beginning of the Convergence Process workshops, to start the participants on making their own diagrams, and is not a complete diagram.

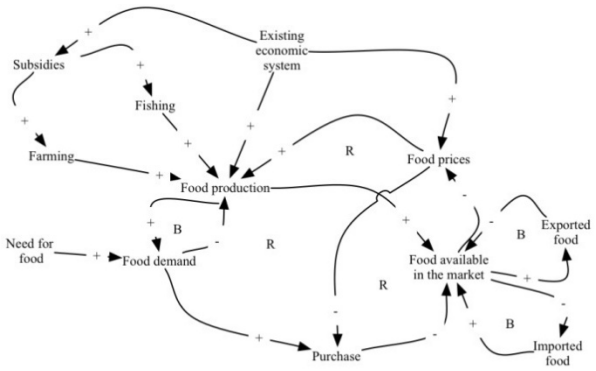

Figure 5 Causal loop diagram of a food system, based on diagrams drawn at the beginning of the Convergence Process workshops

Here, it can be seen how an arrow is used to indicate the causal direction between cause and effect. A plus or a minus sign in the arrow indicates whether the causal relationship is positive or negative – that is, "more of X means more of Y" is indicated with a positive sign (+), but if "more of X means less of Y," then the arrow is marked with a negative sign (-). In other words, if the variables change in the same direction, then the arrow is marked with a positive sign (+), but if they change in opposite directions, then the arrow is marked with a negative sign (-). In addition, time lags between cause and effect can be indicated. The loops created are indicated with an "R" for a *reinforcing* loop and a "B" for a *balancing* loop. A reinforcing loop is a loop that reinforces a certain behaviour in the same direction, away from equilibrium and leading to either a systematic growth or decline. A balancing loop refers to a loop that shows a balancing behaviour, moving the system towards equilibrium. The "Exported food – Food available in the market" loop for example is a balancing loop – the more food available in the market, the more can be exported, but the more food that is exported, the less food is in the market; a behaviour that supposedly balances itself out. Meanwhile, the "Food available in the market – Food prices – Food production" loop is a

reinforcing loop. This is because the loop indicates that the more food that is available, the higher the food prices, which means that more food is produced, which leads to more food available in the market. Without intervention, this loop will spin out of control at some point and crash.

The diagram also shows how individual loops within the system connect with other systems, thereby underlining the need to identify the parameters. As an example, in figure 5, one might connect the "Food available in the market – Exported food" loop to one that shows the need and demand for food in other physical areas.

The causal loop diagrams can furthermore indicate leverage points and identify indicators, where a small change can lead to a large change. In figure 5, such a leverage point might be the "Subsidies" point – changes in government subsides to either farming or fishing would result in changes to the system.

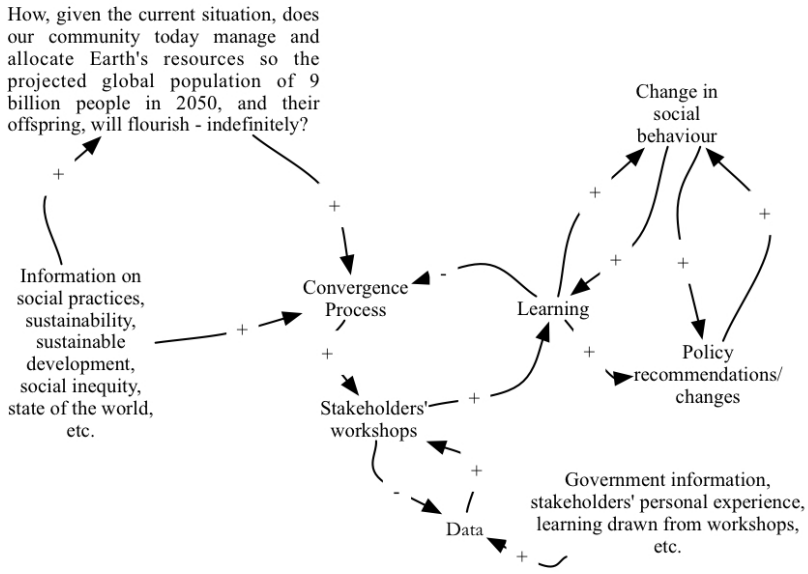

Figure 6 A causal loop diagram showing the Convergence Process

Figure 6 is another example of a simple causal loop diagram, where the intention is to map out the structure and feedbacks of the Convergence Process system in order to understand its feedback mechanisms. Feedback is one of the core concepts in systems analysis,

but human mental models often fail to include the essential feedbacks that determine the dynamics of the system being studied. When a causal loop diagram is drawn, those feedbacks quickly become visible – here, for example, it can be seen that the more the Convergence Process is developed, the better the stakeholder workshops become which leads to more learning, which means less work is needed on the Convergence Process. Furthermore, the more learning that occurs within the stakeholders' groups, the more that affects social behaviour and can lead to policy recommendations, which both can influence and lead to greater sustainability and more social equity.

Though simple when well drawn and explained, it can be a fair trial to draw a realistic causal loop diagram. One way to guide people past the initial hindrances when faced with drawing a causal loop diagram is to suggest they make one list of parameters and another of assumptions prior to drawing anything. A simple flow chart can also help – like the lists, it is linear, but as indicated by the name it is more flowing than a simple list. For the same reason, it is important to set the system boundaries clearly before beginning to draw the causal loop diagram and choose a clearly defined starting point set in current knowledge and science. Once the causal loop diagram is drawn, the results can be a clear model of how the various components of the system affect each other (Sterman 2000; Haraldsson 2004). These diagrams are crucial within the systems analysis practiced in the Convergence Process to get an overview of the whole system and to see how individual components within it affect each other and the system as a whole.

4.2 Directly applied social practice methods and tools

The methods applied in the application of the Convergence Process are a selection of social practice methods that are in use, and adjusted to suit the needs of the process. Because of the size and complexity of the systems in question – the food systems of the areas in which the Convergence Process was tested (see chapter 5.1) – a diverse group of stakeholders who had insight into the system was needed. Therefore, the World Café method along with Group Modelling and causal loop diagrams was used to create a realistic and holistic map of the food systems. These methods are described here in chapter 4.2, that concludes with an introduction of a few tools applied from The Natural Step and the

ISIS method, used during the Convergence Process workshops to introduce the situation we humans currently find ourselves in to the participating public.

4.2.1 The Group Modelling method

Various scholars have created public participatory modelling processes (such as van den Belt 2004), but the method most relied upon in the creation of the Convergence Process was the Group Modelling method, a participatory systems approach method developed at the University of Lund in Sweden in the years 1996-2006 as a part of a pedagogical methodology for teaching sustainability (Sverdrup and Svensson 2002). This method depends on having a defined environmental and social problem, and solving it with a series of group sessions with stakeholder experts who develop the necessary knowledge, thereby hopefully reaching a solution acceptable to both the local public and authorities (Haraldsson 2005; Haraldsson et al. 2007).

The Group Modelling framework needs some of the same fundamental conditions as the World Café, and includes a group of stakeholders from various backgrounds in a community's system coming together under the guidance of a trained systems thinker and creating a map of the current system, using causal loop diagrams. The group and facilitators do a systems analyses of the problem at hand, systematically mapping in large system diagrams, recording causal chains in the systems, time lags and feedback loops. The basic learning that occurs during Group Modelling sessions can be shown in a learning loop based on adaptive learning behaviour as outlined by Senge (1990), Sterman (2000) and Haraldsson (2004), adapted to the Convergence Process and illustrated in figure 7.

Here, it can be seen that the work begins with the definition of the research question. Participants identify problems, phrase them in definite questions, and draw their insights in mental models (causal loop diagrams) during the workshops. Then the diagrams are tested against reason, data, literature and experience, which leads to learning from an emerging overview of the whole picture, and evaluation resulting from the tests. That again leads to a conclusion, which is developed into solutions and implemented by the community's citizens, government, organizations and institutions, and can again lead to the group starting the

learning loop again and define the problem anew. Thus, the question the group asks itself defines the model, not the data.

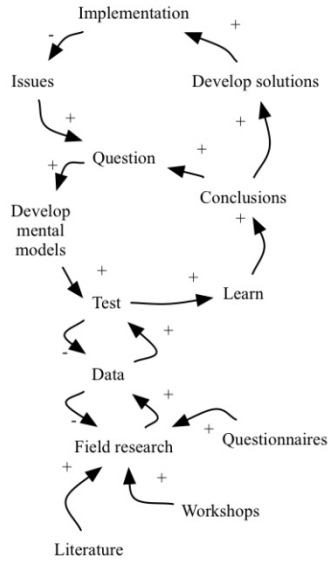

Figure 7 A causal loop diagram depicting the learning loop in problem solving applied in the Convergence Process

The Group Modelling method relies on a series of group sessions to develop the necessary knowledge derived from stakeholder experts. These sessions are entrenched in four implementation phases, and one workshop per phase is typical (Haraldsson 2005; Haraldsson et al. 2007):

1. **The definition phase.**

   During the first phase the research team discusses the research problem and identifies the system analysis that is to occur, research questions are asked and clarified and the study goals are identified. Stakeholders are selected and invited to participate, problem boundaries are defined, and preliminary causal loop diagrams are drawn.

2. **The clarification phase.**

   The second phase includes creating conceptual models using causal loop diagrams (and stock and flow diagrams, not used

in the Convergence Process). The aim here is to generate enough understanding to create conceptual models.

3. **The confirmation phase.**

   The third phase is the verification of the system structure, where the system boundaries are set beyond doubt and research questions are answered and any uncertainties are confirmed. Key concepts relevant to the research question are also clarified.

4. **The implementation phase.**

   The final phase involves the creation of a computer simulation model based on systems dynamics. Now, policies and other tools are developed and implemented in order to reach the group's desired outcome.

The approach of the group mapping the system via causal loop diagrams ensures that the workshop participants are directly involved in the mapping, thus developing a strong sense of ownership over the model (Haraldsson 2005; Haraldsson et al. 2007). It is advocated that as broad a consensus as possible has been established within the group in regards to the map, and that all parties' voices have been heard while making the drawings, so that the map is as realistic as possible, and so that the stakeholders have had the chance to develop a sense of ownership over the model (Haraldsson 2005; Haraldsson et al. 2007).

The Group Modelling method has been tested in a few projects not unlike the Convergence Process, including in Hallormsstaður in Iceland in the years 2004-2007 in a project headed ICEWOOD (Haraldsson et al. 2007), as well as in a project located in a Swedish mountain region (Sverdrup et al. 2010; Stjernquist et al. 2012; Schlyter et al. 2012). The ICEWOOD project used Group Modelling to assess the combined effects of forestation on soil chemistry and ground vegetation in Iceland, and eleven workshops were held during the span of the project (Haraldsson et al. 2007). The Swedish project took place in a Swedish mountain region, and attempted to reach a consensus among the inhabitants and various stakeholders on the use of the region and its limited resources. Six workshops were held in the years 2008 to 2010 in addition to other meetings and workshops (Sverdrup et al. 2010).

During the testing of the Convergence Process, the first three phases in the Group Modelling process were followed, namely the definition phase, the clarification phase and the confirmation phase. That is to say, the research team defined the problem, chose methods to analyse it by, formed research questions, and identified the study goals (definition phase – this phase can include the stakeholders, but did not in this case). The stakeholders gathered together and created, along with the team, conceptual models using causal loop diagrams (clarification phase). Finally, the system structure was verified during the final workshop and via the reports sent out, and uncertainties and key concepts were cleared up or confirmed (confirmation phase).

4.2.2 The World Café

The Convergence Process map-making workshops follow a moderated World Café style (Brown and Isaacs 2005), a conversational process aimed to help groups engage in constructive dialogue around critical issues. This kind of workshop helps build personal relationships, promotes shared learning and offers a particularly good venue for cross-pollination of ideas and opinions between people of different backgrounds and social status, as the café-style social context allows people to talk on an equal plane in a safe setting, where everyone is a participant and no one is the expert (Brown and Isaacs 2005; Fouché and Light 2010). Participants in a World Café assume that the wisdom needed to solve a certain problem already exists among those who live with the problem and within the system at hand, and that this knowledge will emerge as stakeholders come together and think creatively within the appropriate milieu and focus (Brown 2002).

At a World Café setting, care is taken to follow seven integrated principles (see below) that are met by having people sit four to five together at tables covered with large pieces of paper and thick pens of various colours. They discuss one or more poignant questions, writing their ideas and important notions down on the piece of paper (Brown 2002; Brown and Isaacs 2005; Tan and Brown 2005). After a measured interval, cross-pollination of ideas is encouraged by the workshop leaders putting a stop to the conversations and asking the participants to switch tables, leaving one person behind as the table's 'memory' while the other three or four people disperse around the room. Three or four new people come to the table, and conversation about the same question commences again, with the table's memory starting by recounting what previously

had been discussed at that table. This process is then repeated a few times with the participants always noting their ideas on paper, using the same paper on each table for all the discussions (Brown 2002; Brown and Isaacs 2005).

Though this method has not been studied much academically, its originators state that the World Café method has been used when it comes to the public having a say in sustainability matters (Brown and Isaacs 2005). Below, two academic studies of note for the development of the Convergence Process are recounted.

In 2006 and 2007, a practice-based project aimed at developing a culture of enquiry among social service practitioners in New Zealand. A section of the project were the World Cafés, where social and community workers were invited to have conversations focused upon critical questions, create personal relationships and learn together. The researchers observed the participants in the cafés via action research methods (Fouché and Light 2010). The participants consisted of 43 social work practitioners from eight different social service agencies (social workers, community workers, therapists, counselors and psychologists), plus the research team of six, and met six times in a year's span. The researchers found that the particular setup of the World Café was "powerful in terms of the use of cross-pollination of ideas through evolving rounds of information exchange" and commented on how the participants could share information on an equal basis (pp. 45). People could engage in constructive discussions, which enabled them to exchange information and generate knowledge useful to the group as a whole. They also documented that the workshops proved an excellent data collection method. Furthermore, the World Café offered a process that challenged the "traditional hierarchical relationships between the researcher and the researched" (pp. 45), and gave both the participants and the researchers the chance to solve the issues identified (Fouché and Light 2010).

Similarly a group of academics in the City of Bristol, UK, used the World Café approach in 2005-2008 to explore sustainability related topics with more than 200 citizens. The scientists state the cafés resulted in a development of a shared vision for sustainability at the city level and a network of sustainability initiatives, including real and virtual forums

for ongoing discussion on Bristol's move to greater sustainability (Cornell et al. 2013).

Both studies involved intentional breaking down of social barriers in order to reach as beneficial an outcome as possible, and were therefore worthwhile contribution to the creation of the Convergence Process.

It was clear from the start that a World Café style participatory workshops would be used in the Convergence Process, because of the unique networking and cross-fertilization it offers, as had been experienced by some in the Converge team (Cornell et al. 2013). The seven integrated World Café principles (Brown and Isaacs 2005; Tan and Brown 2005) were adapted to the Convergence Process:

1. **Set the context.**

   The research team intentionally set the parameters and clarified the purpose of the workshop. The team also chose who should be invited using the systems value chain and the stakeholder identification template, what themes were most pertinent and which methods to use for the conversations (systems approach, flow diagrams and causal loop diagrams). The team set the parameters of the food system in the communities becoming sustainable, along with the main aim of mapping the current system.

2. **Create hospitable space.**

   The research team ensured that the spaces that housed the workshops was welcoming, provided personal comfort and psychological safety in order to encourage mutual trust within the groups. The spaces were made as hospitable and welcoming as possible, and the participants were given free tea, coffee, lunch and snacks. Tables and chairs were moved in order to enable people to sit together in a group, and A2 size papers were placed on each table along with many multi-coloured pens.

3. **Explore questions that matter.**

   The hosts encouraged the groups to focus collectively on powerful questions on sustainability and social equity that attracted communal engagement.

4. **Encourage everyone's contribution.**

   The research team and the participants themselves ensured that the voices of all those participating were heard and honoured. The workshop hosts moved around the tables, encouraging people who seemed quiet to share their thoughts and making sure the groups wrote their conversations down on the paper in front of them, as well as assisting the groups in drawing their causal loop diagrams. In India it helped to put a rock on the table where the rule was that when people take the rock in their hand, the others must give that person an opportunity to speak and listen to her or him.

5. **Connect diverse perspectives.**

   The hosts invited people to switch tables at certain points in the discussion to cross-fertilize and make the conversations livelier. New points emerged within new groups, and the participants were encouraged to write all down. A few times people were encouraged to switch tables, but one person always stayed behind as the table's "memory," to tell the newcomers what had occurred at that table previously.

6. **Listen together for patterns and insights.**

   The participants were encouraged to listen actively as a group, and pay attention to themes, patterns and insights in order to gain a better view of the system as a whole. Drawing the causal loop diagrams helped in particular with this principle.

7. **Share collective discoveries.**

   The hosts ensured that the collective knowledge gathered during the workshop was displayed and made visible to other participants by having the groups present their causal loop diagrams to each other at the end of each session and/or day. Furthermore, the Converge team then took the diagrams and combined them into one or more diagrams between the meetings and emailed them to the participants along with a written report. The next workshop then commenced from the collective causal loop diagram.

The workshops followed these seven principles of the World Café, but not necessarily in a straight order – some moving back and forth between the World Café principles is both necessary and inevitable (Brown and Isaacs 2005).

4.2.3 Tools from The Natural Step

The methods relied upon from The Natural Step include explanation techniques meant to shed light on sustainability and the state of the world to TNS workshop participants, as well as methods that begin the workshops. These tools are thought useful to the Convergence Process, both because in an initial study by the University of Bristol TNS's sustainability framework was judged as one of the most potential when it comes to contraction and convergence (Fortnam et al. 2010b), but also because of TNS's accessibility to the Converge team as TNS is a partner to the Converge Project. Therefore, as a guiding light while forming the Convergence Process, I relied on TNS's four System Conditions, derived from David Cook's Schumacher Briefing, *The Natural Step, towards a sustainable society* (2004), along with Sarah James and Thorbjorn Lathi's book *The Natural Step for communities* (2004), and John Holmberg's 1995 Ph.D. dissertation on TNS:

1. **In the sustainable society, nature is not subject to systematically increasing concentrations of substances extracted from the Earth's crust.**

   The first System Condition considers the rising problem of substances taken from Earth's crust into the human environment, such as fossil fuels and metals, and the fact that the ecosphere has a limited capacity to assimilate both the mined material after humans have used it, as well as other material included in the mining process. The balance of these materials must be such that concentrations of substances from Earth's crust do not systematically increase in the whole ecosphere or parts of it, such as in the atmosphere or individual ecosystems. In other words, though humans continue mining in the sustainable society, they will mine with care and consideration, limit the rate of mining, and manage the extracted material.

2. **In the sustainable society, nature is not subject to systematically increasing concentrations of substances produced by society.**

   This condition discusses the chemical compounds that are a part of modern society, which are emitted or leak out into natural systems. Like the previous condition, this does not imply humans cannot use chemicals or chemical compounds. It simply stresses that we must decrease our use of them, phase-out the use of those foreign to nature and improve our management of those chemicals we choose to use.

3. **In the sustainable society, nature is not subject to systematically increasing degradation by physical means.**

   Human activity has for a long time had physical impacts upon natural systems and this condition underlines the need to maintain and care for nature, for example avoid overfishing the seas and cutting down rainforests. While using natural resources, humans must consider the future and ensure that these resources will stay both available and healthy for future generations' use.

4. **And, in the sustainable society, people are not subject to conditions that systematically undermine their capacity to meet their needs.**

   This System Condition is about social justice and human well-being. Sustainable development must include giving all people the opportunity to lead fulfilling lives now and in the future. That means ending the continuous damage that humans cause to the natural systems upon which we depend and to which we are indivisibly connected. All humans have a common set of basic needs (Ekins and Max-Neef 1992). When denied the opportunity to meet those needs, individual and social alienation and low quality of live, are the inevitable results. In those impoverished circumstances caring for the environment takes low priority. And in poor environments human fulfilment is impossible. It is a viscous circle that calls for reasserting the connection between human society and nature's systems. TNS stresses that social sustainability is only fully successful if environmental sustainability is in place, and vice versa.

TNS workshops use the System Conditions both for their vision and to develop a baseline; they serve as a neon light that reminds TNS workshop participants what they are focusing on and why. They are meant to help people understand the constraints humans must live within if they choose a sustainable future. The workshop participants evaluate their current reality and question where they go against the System Conditions and evaluate where their society or business is in line with the conditions. These answers are then used in further workshop work, as a lens of sustainability that informs the solutions chosen by the participants.

Though TNS's System Conditions served as inspiration, the Converge team decided not to adopt them unchanged for three main reasons; TNS never openly admits to aim for sustainable de-growth; the psycholinguist effects of including the word "not" in statements as important as the System Conditions; and the fact that the weight of social equity is not as heavy as is desirable in the Convergence Process.

TNS's conditions are science-based and much-encompassing, but they have been criticized for not being based enough upon science and for implying zero growth and even de-growth for the Western world without stating it explicitly (Upham 2000 a, b). No growth, or more precisely, sustainable de-growth in the developed world, is embedded in the Convergence Process's ideology, and this should be evident in our core principles. The Convergence Process is partly based upon contraction and convergence, which must be clear to all that study or apply it, as well as the fact that de-growth does not necessarily imply a lowering of life standards. The reasons have been stated above in this dissertation, but of note is research done by Meadows et al. (1972), Meadows, Meadows and Randers (2004), and Sverdrup and Ragnarsdóttir (2011) that focus on peak natural resources and affiliated peak wealth, in line with the survivalism discourse, along with research and theory on sustainable de-growth (Odum and Odum 2006; Latouche 2009; Kallis, Martínez-Alier and Norgaard 2009; Martínez-Alier 2008, 2009; Martínez-Alier et al. 2010).

The word "not" adds another problem as it is included in every TNS System Condition. One of the first lessons young reporters are taught is never to never include the word "not" in a sentence of importance, such as in a headline or the article's lead (the first sentence). The reason is simple; people tend not to see it. Numerous psycholinguistic studies have shown that

the human eye and brain often miss this word when reading, and that the human brain finds negative sentences more difficult in general to process than positive sentences (Jespersen 1924; Pearce and Rautenberg 1987; Manktelow and Over 1990; Horn 1989; Giora 2006; Ferguson, Sanford and Leuthold 2008). Moreover, two studies published in 1994 showed that in a courtroom, a defendant's over-informative denial serves to convince the subjects of the defendant's guilt, especially when the subjects read the statement – just as when United States President Richard Nixon said "I am not a crook" in relation to the Watergate scandal in 1973, and the public was left with the understanding that Nixon was indeed a crook (Holtgraves and Grayer 1994). These and other studies indicate that including the word "not" four times in a list of statements as important to the whole Convergence Process as the System Conditions would be, is at best not proactive and at worst could even be counteractive.

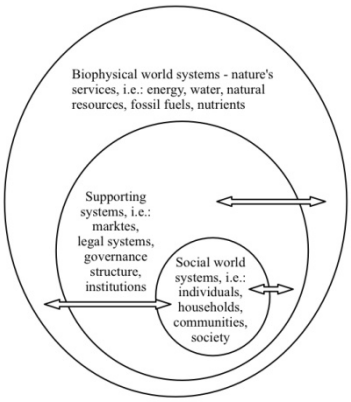

Figure 8 The socio-economic system is contained within, and dependent upon, the biophysical world (based on Fortnam et al. 2010a).

The third reason for why TNS's System Conditions were not adopted to the Convergence Process has to do with social justice and equity. Though the fourth TNS System Condition focuses on that issue, the emphasis on social equity within the Convergence Process should be stronger. The Convergence Process follows a strong anthropocentric thought with social justice at the core, building on the fact that natural ecosystems underpin all humans' livelihood. They are the original source of all material humans can and do use, as well as being the sinks that

eventually accept all waste, as can be seen in figure 8 (a recreation of figure 3 in Fortnam et al. 2010a pp. 13).

Figure 8 shows how the socio-economic world is situated within, and relies upon, the biophysical world. The arrows show that a demand in one circle affects the state of matters in another circle, and the whole human system is contained within the biophysical world – Earth. This also means that the waste created in society must be dealt with within the limits of Earth and that we must move from a cradle-to-grave thinking to a cradle-to-cradle operation where every waste stream in industry or society becomes the source or nutrient for another industrial process (McDonough and Braungart 2002). This idea is well covered by the first three TNS System Conditions, but more emphasis needs to be put on the fact that social justice and equity fall within the innermost cycle, which therefore necessarily suffer if the outer two cycles – supporting systems and biophysical world systems – are not as well cared for as could be.

But though the Systems Conditions were rejected as such, they served as an inspiration to the Convergence Principles, discussed in chapter 6.2, and in addition, several tools from TNS were adopted into the Convergence Process. These are the funnel metaphor, backcasting, the ABCD process and the decision support protocol.

Figure 9 The Natural Step's funnel metaphor (TNS 2011)

The funnel metaphor (see figure 9) is used to explain in graphic terms how growing population along with increasing resource demand leaves us with ever less room to manoeuvre, and that the more sustainable a society becomes, the better. TNS has found the metaphor a useful tool to use in the beginning of their workshop process, as it shows visually how unsustainable development thrusts a society deeper into a funnel, where

the space for manoeuvring becomes increasingly narrower for each person that inhabits that society (Cook 2004).

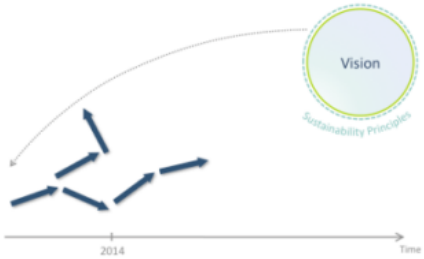

Figure 10 Backcasting (TNS 2011)

Backcasting (see figure 10) is a technique attributed to environmental scientist Amory Lovins, who used it in his article, *Energy strategy: The road not taken?,* published in Foreign Affairs in 1976. The concept has been used by many since, including TNS, and it is seen as particularly helpful when solving complex problems partly rooted in present trends (Holmberg and Robèrt 2000; Robèrt et al. 2002; Quist 2007). The idea with backcasting is rooted in the traditional way of predicting the future – using forecasting based on current state, but uses a different approach. Backcasting occurs when individuals decide upon the sustainable future they desire and then find ways to get there. To do so, they begin by placing themselves mentally in their desired future, imagining it in detail, then look back to the present and analyse how they got to their imaginary-present state. This includes analysing policies, trends, traditions and more that need to be altered so that sustainability can be reached. If backcasting is to be useful in the context of sustainable development, it must begin with a clear definition of the end goal – in the instance of TNS, sustainability according to the organization's System Conditions (Cook 2004).

The TNS ABCD approach (figure 11) is in essence an elaboration of backcasting as explained by David Cook (2004) and Sarah James and Thorbjörn Lahti (2004). This approach, adapted to the Convergence Process, backlit our workshops, outlining what project to focus on when.

As figure 11 shows, Step A Awareness and Vision, started our workshops, when the participants were helped to understand the state of matters today and envision a sustainable future. This was achieved via an introductory lecture, during which the audience was introduced to the planetary boundaries, the rapidly growing human population and nations' individual ecological footprints. This was followed by a two-part visioning exercise, first a short practice where the participants imagined their system cut off from the world due to a catastrophe, and then an exercise where they mentally placed themselves at a certain date in the future when their system had become sustainable.

Figure 11 The Natural Step ABCD approach (TNS 2011).

Step B is called Baseline analysis and begun during the awareness lesson, and continued after the visioning had been done, when the participants assessed their present conditions by listing current flows and practices that either help or hinder sustainability.

Step C focuses on solving the problems, or Actions and solutions, and contains the actual backcasting. Here, the workshop participants were encouraged to find steps from the future vision to the present. They imagined themselves in the future looking back at how they reached the future (their imaginary-present state). All possible solutions were written down, with as little editing as is possible since sorting and prioritizing of ideas came later in the process.

Step D, Prioritization, was the final stage where the most viable solutions were selected. This included creating an action plan and

prioritizing, starting with a mixture of easily attainable goals and more complex and longer-term goals. This step was not completed during the Convergence Process workshops.

Finally, TNS makes use of a decision support protocol when it comes to choosing the creative solutions in a planning process (Cook 2004). These questions are:

1. Does this measure proceed in the right direction with respect to all System Conditions? […]
2. Does this measure provide a stepping-stone for future improvements? […]
3. Is this measure likely to produce a sufficient return on investment to further catalyze the process? (Cook 2004 pp. 42-44).

For the purposes of the Convergence Process, the questions are reworded:

1. Does the decision give us an economic, social and/or ecological return on our investment?
    a. If not, are the benefits worth the sacrifice?
    b. Does it fit the monetary means we have?
    c. Can we make the necessary social commitment?
    d. Do we have the necessary physical resources?
2. Is the platform flexible enough?
    a. If not a direct path to success, does it allow for more progress later?
3. Does it offer more than one solution to our problems?
    a. Does the decision take us in the direction we want to go to?
    b. Keep the vision in mind.
    c. Is it possible the decision and solution will backfire?

(Adapted from Cook 2004)

These questions are a simple and an effective tool to sort and prioritize possible solutions that may move the community to greater sustainability and social equity. If the answer to all of the above is positive, then the option is a viable one. This selection of the most viable solutions (both in the short and the long terms) should be done by more than one facilitator to get as sensible outcome as possible, but preferably by the participants themselves, and be the base for an action plan. However, the Convergence Process workshops never reached this stage.

Other steps involved in TNS's approach were not followed**.**

4.2.4 The ISIS Sustainability Compass

The ISIS method is a collection of tools, gathered and created by American entrepreneur and consultant Alan AtKisson, aimed to help organizations, communities and businesses to take steps towards sustainability (AtKisson 2008). Of his various tools, the Sustainability Compass proved useful for the Convergence Process, as a simple method to explain a complicated issue.

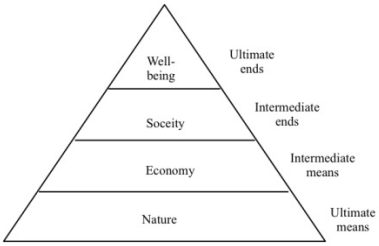

Figure 12 Herman Daly's triangle of means and end (as quoted in AtKisson 2008 pp. 35).

The compass is built upon economist Herman Daly's triangle of means and ends, as can be seen in figure 12 based upon the figure in AtKisson's book, *The ISIS agreement* (2008).

Daly, who drew his diagram in 1973 and no longer uses it as such in his work (Daly 1973, 1996), divides his triangle into four sections: Nature, Economy, Society and Well-being, but all four categories refer to other aims as well. Nature is linked with Ultimate means, as nature is the ultimate source of Earth's resources and all waste ends in nature. The economy lies on top of nature and is labelled Intermediate means, as humans base their economy (goods and services) on nature. Then comes Society, also labelled Intermediate ends, and includes governments, religions, cultures and institutions. Finally, the top of the triangle is Well-being, or Ultimate ends, and includes individual health, quality of life and satisfaction, and according to Daly, here lies each individual human's ultimate ends (Daly, as quoted in AtKisson 2008). It is very clear in Daly's diagram the triangle's hierarchical shape is of importance – the bottom layers build up for the top ones, so that Well-being is not possible

without the first three layers. Furthermore, Daly speaks about a social Well-being and not only societal Well-being.

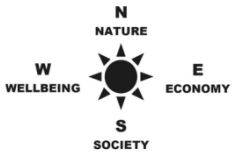

Figure 13 The compass of sustainability (AtKisson 2008 pp. 142).

AtKisson, like Daly, uses the four main categories of Nature, Economy, Society and Well-being, but he arranges them in a compass as can be seen in figure 13, making use of the four directions (North, East, South and West), which most people are familiar with. Unlike Daly, AtKisson gives equal importance to all four directions, thereby disregarding the triangle's hierarchy. AtKisson declares that one of his reasons for creating and using the compass rather than the triangle is that Daly's triangle is too Western in thought, as Asians tend to see society as a whole as the individual's Ultimate end, while the individual's Well-being is an Intermediate ends. Therefore, AtKisson argues, the compass is a more internationally acceptable tool – it is both more circular than the triangle and more systems-oriented (AtKisson 2008). Regardless, this simplified version of the triangle can aid laypeople to keep the four directions in mind during work on sustainability issues.

5 Case study scenario boundaries

Before any testing could be attempted, the system boundaries needed to be set. These included selecting the participatory communities where the testing was to take place, as well as deciding upon what system was to be studied in each community. While both of these decisions were made jointly by the team during team meetings, I wrote, co-authored and edited the rational offered here.

In this chapter, I discuss the research premises and boundaries; why the three communities we tested were chosen, and give an overview of each. The latter half of chapter 5, I explain the team's decision to focus on the food system in each community.

5.1 The participatory communities

The Converge team chose to test the Convergence Process on the food sector in three very different communities, and to prepare, we wrote a comprehensive analysis on the island of Iceland (320,000 inhabitants), the City of Bristol in the United Kingdom (420,000 inhabitants), and the Tirunelveli and Tuticorin districts in Southern Tamil Nadu in India (72 million inhabitants live in Tamil Nadu).

The Ecological Footprints for the three communities vary greatly; from 0.91 global hectares per person in India (GFN 2010). Britain with 4.89 gha, and to 12.77 gha per persons in Iceland (excluding fisheries) (Jóhannesson 2010).Meanwhile the world average is 2.7 gha per person and the world average biocapacity 1.8 gha per person (GFN 2010). Thus, the communities are clearly very different, and in fact, they were selected with the aim of covering a multilevel cross-section of society, as well as for the convenience of the team's location within each community.

This last factor should not be underestimated – several different languages are spoken in the communities and having locals involved in the research who understand the language and recognize both issues specific to each location and the nuances found within each culture, is immensely valuable.

However, the possibility of bias clearly arose as the teams' members live in each of the three communities, including but not limited to the fact

that subjective views may affect choices of who is invited to participate in the workshops. Therefore, every effort was made to limit possible bias, including the creation and application of a specific stakeholder selection methodology (which includes selecting participants from the whole food value chain (see chapter 5.2)).

5.1.1 Iceland[3]

Iceland is an island on the Mid-Atlantic ridge in the North Atlantic Ocean, just south of the Arctic Circle. It is 103.000 square kilometres, making it the world's 18th largest and Europe's second largest island. It is volcanically active and the landscape is dominated by lava fields and geothermal areas in between green pastures, with the interior mainly made up of a plateau marked by black sand fields, mountains and glaciers. Glacial and clear water rivers flow through the lowlands to sea. Much of the island is barren of vegetation, and a good deal of the country's topsoil and vegetation has been lost due to disturbance caused by both volcanic activity and 1100 years of livestock grazing of sensitive northern flora (Arnalds 2000; Sigurdsson and Snorrason 2000). Over 60 per cent of the country is classified as wastelands, and slightly less than 25 per cent of the land is vegetated (National Land Survey of Iceland 2010) – down from at least 60 per cent before humans arrived. Icelanders have in the past decades put serious effort into re-vegetating the land, but progress is slow. As the Gulf Stream flows from the Caribbean and by the island, the climate is rather mild relative to latitude, with average temperature in January +2 degrees Celsius and in June +12 degrees Celsius. Climate change has had its effects, resulting in warmer weather year-round and less snow in winter, and the island's flora benefits (Björnsson et al. 2008). Birdlife is fairly rich, but the only native mammal is the Arctic fox. Wild species now include fox, mink, reindeer, mice, rabbit and rat. Livestock includes cattle, sheep, horses, pigs, goats and chickens, in addition to pet dogs and cats. Insect species are relatively few, and no reptiles or amphibians are native to the island.

[3] I wrote a draft of this chapter and submitted in the Converge Project Deliverable 36 (Kristinsdóttir et al. 2010). Here, I have agumented the chapter, rewritten it and edited.

Table 3 Iceland at a glance

Location	Iceland – an island in the North-Atlantic
Coordinates	65 00 N, 18 00 W
Total Area	103,000 km^2
Population (2011)	319,452
Population density (2010)	3.0 / km^2
Ethnic composition	Icelandic: 93.2%, foreign born: 6.8%
Government	Unitary parliamentary republic
Official language	Icelandic
Human development index (2010)	0.869 – Very high
GDP (2010 estimate)	PPP: $11,818 billion total, $36,620 per capita Nominal: $12,594 billion total, $39,025 per capita
Ecological footprint (2010)	12.77 ha per person (7.1 planets) fisheries sector excluded
Life expectancy (2009)	Male 80.8, Female 83.9

(UNdata 2009; Statistics Iceland 2010; Jóhannesson 2010; UNDP 2011).

The coastline is 4,970 km long, and most settlements can be found alongside it (Statistics Iceland 2010). Seventy-nine municipalities dot Iceland and the local governments look after matters such as schools and transport. Two-thirds of the nation lives in the capital Reykjavík and nearby towns.

Icelanders are made up of the descendants of Viking settlers and their Irish slaves who arrived about 1100 years ago – only 6.8 per cent of current inhabitants are immigrants (Statistics Iceland 2010) – and Icelanders speak their own language, Icelandic.

The nation gained independence from Denmark in 1944, and was until mid-20th century one of Europe's poorest. That changed when employment and infrastructure was influenced by British and American military presence in Iceland starting during the Second World War. Since then, Iceland has developed from a nation that based its income on fishing to a more complex economy, and was ranked first in the United Nations' Human Development Index report for 2007/2008 (UNDP 2007). Another indicator of the changes in the past 60 years in Iceland is infant mortality rate – in 1951 the infant mortality rate was 27.3 per 1000 live

births, but in 2009 that number had dropped to 1.8 per 1000 live births (Statistics Iceland 2011). Icelanders are also an educated nation with a literacy rate of nearly 100 per cent (Statistics Iceland 2011) and gender equality is higher than in many other countries. For example, women constitute 60 per cent of new students at university level (Statistics Iceland 2011). The country's welfare system is organized around social democratic principles, with public education mandatory and free of charge for age six to 16, and upper education relatively cheap. Health care is state-run.

The financial landscape changed severely after the global economic crash in 2008. Iceland's economy was greatly affected, as the country's banking sector had grown out of proportion with the nation's economic system; the economic situation is still in upheaval in 2013. To illustrate the situation, unemployment rates rose from 2.3 per cent in 2000 to 7.6 per cent in 2010, dropping down to 6.0 per cent in 2012 (Statistics Iceland 2013), and though Iceland still ranks high in the United Nations' Human Development Index report, or number 17 in 2010, it is no longer in the first place as it was before the economic crash (UNDP 2011). Iceland belongs to the European Economic Area (EEA) and started working on its application to the European Union in 2009 though that remains a debated issue and a referendum has yet to be held when this is written in August 2013. Main industries include fishing, tourism, services, IT, financial services and various industries (including three energy-intensive foreign-owned aluminum smelters and a ferrosilicon plant). Partly due to the smallness of the nation and the island's location, Icelanders import more consumer goods than most other nations in the world (Jóhannesson 2010).

No railways exist on the island, so Icelanders depend greatly upon the personal car for transport and the majority of these cars run on imported fossil fuels, but interest is growing in increasing the use and production of domestic energy for vehicles. Electricity is mostly produced from renewable energy sources such as hydropower and geothermal energy, and geothermal energy is also used to heat houses (Gunnarsdóttir 2002).

Currently Iceland is self-sufficient for fish, meat and dairy produce, though some import exists for these products due to the European Economic Area (EEA) and trade agreements with the European Union, United States and other nations. The country's agriculture is still far from being able to produce enough vegetables and fruit for the market; 70 per

cent of all vegetables and 99 per cent of all fruit consumed are imported (Statistics Iceland 2009). Nearly all grain consumed is imported, though in recent years, due to climate change, it has been possible to grow small amounts of barley for human consumption and farmers have even been able to ripen wheat (Bjarnason, Einarsson and Gíslason 2009). Furthermore, the geothermal heat in Iceland gives greenhouse farmers the chance to grow tomatoes, cucumbers, pepper, roses, flowers and saplings in greenhouses (Rögnvaldsdóttir 2011). In 2004, official records showed that geothermally heated greenhouses covered 176,000 square meters in Iceland (Rögnvaldsdóttir 2011).

Since the financial crisis, interest in green initiatives and sustainable local production has been on the rise, both at the grassroots' and governmental levels. Reykjavik, the capital, was shortlisted as a European Green Capital in 2010, and the city has several green initiatives. The national government, along with local governments in Iceland's capital region, agreed to halt most road expansions for a decade, and instead pour the money (a total of 10 billion Icelandic kronas) into improving public transportation (Ministry of the Interior 2011). Awareness of the importance of consuming local and organic food appears on the rise, which can be noted by the several shops selling organic food and local produce (year round or at certain times of year) that operate around the country, while organic food sections have been put up in most supermarkets in the capital region and an upheaval in supermarkets if imported vegetables are displayed in trays meant for locally produced food.

The Icelandic Minister of Education and Culture announced a new education policy in 2009 where sustainability is one of five pillars of education. Thus the awareness of the nation will rise, but it will take some years to spread to the whole nation (Jakobsdóttir 2009). In addition, the Foundation for Environmental Education ecoschool program, which started in Iceland shortly after the turn of the century, has grown extremely rapidly without any advertisement campaign – simply by word of mouth. In April 2011, over 40 per cent of schools of all levels either flagged the Green Flag or were on the track towards gaining the Foundation for Environmental Education acknowledgement (Jóhannsson 2011; Ministry of Education, Science and Culture 2011).

Iceland's existing links to convergence are mostly focused upon carbon emissions. The national government has repeatedly stated its goal

of becoming independent from fossil fuel (Ministry of the Environment 2009). Iceland is a signatory party to the Kyoto protocol, but between 1990 and 2007, greenhouse gas emissions from Iceland increased 32 per cent, largely due to a significant increase from energy intensive industries as well as from road transport (Davíðsdóttir et al. 2009). Iceland is also a signatory to the Copenhagen Accord, agreed at the United Nations COP 15 conference in Copenhagen 2009, and the government aims to reduce the country's CO_2 emissions by 15 per cent by 2020 from 1990 emissions (Ministry for the Environment 2010).

Common knowledge of sustainability, effects of pollution and climate change has been on the rise in Iceland in the past years, though the nation as a whole is still not as aware as some of the neighbouring nations, especially when it comes to effects of pollution and climate change (Árnason 2005; Magnason 2006; Jónsson 2007).

5.1.2 Bristol City, United Kingdom[4]

Bristol is the most populous city in the South-West of England, and the eighth biggest in the United Kingdom, with a population of over 420,000 inhabitants in the urban area itself, and over one million people in the metropolitan area including the peripheral towns and villages (Legg 2005). Bristol is a growing city – its inhabitants under the age of 16 are more numerous than those of pensionable age – and Bristol's population is projected to increase by an additional 159,600 people by the year 2033 (Bristol City Council 2011).

Bristol is a city-region and is governed as a unitary authority – a body that combines the functions of city and county councils. The city lies upon the river Avon, and the port has enabled the city to become an important marine trading centre. It has Britain's most centrally located deep sea port and is the only major port in the United Kingdom with North, South, East and West motorways and rail connections. Throughout the centuries, ships containing all sorts of merchandize have set sail to and from Bristol, and in the 17th and 18th centuries, the city's port became important in the slave trade. The city's merchants were granted

[4] The Converge Project UK team submitted a version of this chapter, submitted in the Converge Project Deliverable 36 after I had rewritten some sections of it and edited the chapter as a whole (Kristinsdóttir et al. 2010). Here, I have augmented, rewritten, and edited the chapter anew.

the right to trade in slaves in 1698 and actively pursued that business until the end of the slave trade in Britain in 1807 – with more than 2000 slaving ships leaving Bristol during this period to fetch slaves from Africa and carry them to the colonies. The city's merchants and others who invested in the vessels, profited well by slavery and about half a million Africans are reported to have been shipped into slavery on Bristolian boats in that time (Smart 2004).

Table 4 Bristol at a glance

Location	A city region in the south-west of England
Coordinates	51 27 N, 2 35 W
Total area	110 km^2
Population (2008)	421,300
Population density (2008)	3,639 / km^2
Ethnic composition	88.8% White (83.5% White British), 4.2% S. Asian, 1.9% Black, 2.2% Mixed Race, 1.9% E Asian or Other
Government	UK is a unitary parliamentary democracy and constitutional monarchy. Bristol's city government is a unitary authority.
Official language	English
Human development index (UK) (2010)	0.849 – Very high
GDP (UK) (2010 estimate)	PPP: $2,173 trillion total, $34,920 per capita Nominal: $2,247 trillion total, $36,120 per capita
Ecological Footprint (UK 2007)	4.89 ha per person (2.7 planets)
Life expectancy (UK 2009)	Male 77.8, Female 82.3

(UNdata 2009; GFN 2010; UNDP 2011).

The city is often regarded as one of the UK's more culturally diverse cities, although only a little over 11 per cent of the population is from a non-white ethnicity (Bristol City Council 2009). Certain areas of the city retain strong African-Caribbean cultural identities, which contribute to Bristol's reputation for a vibrant urban and counter-culture scene. However, in common with many UK cities, these areas have a history of economic deprivation. In the 1980s, an outbreak of race riots that later spread around the UK began in the central St Paul's area as a protest against racism and race-related deprivation and poverty.

Gender equity needs to be improved in Bristol, according to news from the Bristol City Council in 2013. In 2013, the Mayor of Bristol created a group to tackle inequality experienced by women. He also signed the European Charter for Equality of Women and Men in Local Life, but no other UK city had signed the pledge at that time. The aim is to lessen the existing gap between men and women when it comes to the highest levels of decision-making, limit the unpaid hours women in Bristol work, and diminish harassment and violence suffered by women (Bristol City Council 2013).

Public education is mandatory and free of charge from age five to 17, and the literacy rate is high for the UK, or 99 per cent for both genders (CIA 2011). Private schools exist as well, though they are mostly attended by children of upper-middle class and upper class citizens. In addition to the publicly funded healthcare offered in the UK, a private healthcare sector exists where patients' fees are paid by a private health insurance, which is either funded partly by an employer or directly by the citizens (NHS Constitution 2013).

The quality of Bristol's urban environment is average for cities in the United Kingdom, with several areas of green space, though parts of the city are comparatively under-provided with open recreational green spaces (Forum for the Future 2009). With regard to transport, although the city is chronically congested by traffic, Bristol is a hub for many local and national initiatives, such as a sustainable transport charity.

The area surrounding the city is important for agriculture, particularly dairy, sheep, arable and market gardening. It is also archaeologically and environmentally important, with nationally and internationally designated areas of chalk and limestone areas, wetlands, and coastline. Employment is diverse, including everything from commerce to tourism and high-tech industries, and more.

Bristol is reputed to be one of the most advanced cities for sustainability in the country. It has three times been shortlisted as the European Green Capital (2009, 2012 and 2013), and won the bid in 2013, which means it will be Europe's Green Capital in 2015. The environmental charity Forum for the Future (2010) ranked Bristol fourth in its 2010 Sustainable Cities index, which ranks 20 of Britain's largest cities. Bristol scored high on metrics for quality of life and waste management, with low unemployment rate, improving school standards, and highly skilled and

qualified residents. It ranked quite low for its environmental performance (12th), with poor scores for its ecological footprint, recycling, climate change, air quality and biodiversity management (2010).

Still, sustainability issues are prominent in Bristol's local government and civil society. The Ecojam directory is a website that works to raise the profile of local green businesses, initiatives and organizations, and connect them with each other. Many projects operate at the grassroots level, and 26 community groups and projects are registered in the Ecojam directory in Bristol, mostly focusing upon geographic areas in the city (Ecojam.org 2013). The Bristol Partnership, which is a civic level forum for businesses, non-governmental organizations and local government, established the Green Capital initiative in 2007 (Bristol Green Capital 2011), with the aim to find ways to cooperate in tackling climate change, and to build on the city's entrepreneurial strengths to develop the environmental technology and services sectors. Drawing from a more diverse section of civil society, Transition Bristol was also formed in 2007, aiming to develop an "Energy Descent Action Plan" – a consensus-led roadmap for the transition away from a dependence on fossil fuels. The business of sustainability is thriving in the city – many ecologically focused small and medium-sized enterprises exist, ranging from supermarkets to eco-advice and consultancy, for example offering energy efficiency advice (Centre for Sustainable Energy 2011). Furthermore, Bristol houses a thriving environmental technology sector, focusing on anything from wind technology to biofuel.

Three notable sustainability networking 'spaces' operate in the city, offering physical space where eco-minded small and medium sized enterprises can hire desk space. Cooperatively run community interest businesses are also common, such as a cooperative housing association.

An increasingly sustainable food sector is emerging in Bristol and the city has potential when it comes to the food sector and convergence. Forty per cent of food in the United Kingdom in general is wasted, either before being sold or within households, restaurants and caterers. Food recycling in Bristol amounts to 9,000 tonnes of household food waste being recycled each year out of an estimated 20,000 to 25,000 tonnes of household food waste (Carey 2011).

The City of Bristol is interested in the resilience of the food system, as seen by Joy Carey's report *Who feeds Bristol* (Carey 2011) that

attempts to shed light on the resilience of Bristol's food supply. The food sector is the city's second biggest employer after the health sector representing 11 per cent of jobs in Bristol, Bath and North Somerset and over 4,500 food related businesses in Bristol itself (Carey 2011). Bristol has a local food network and several farmers' markets. Furthermore, a host of food-related grassroots initiatives exist in the city, and several sustainability and local food networks have emerged in the recent years, including the Bristol Food Network, a municipality-lead initiative launched in 2009.

In the past quarter of a century, British citizens have begun to realize anew the importance of local food produce when it comes to food security (Hopkins 2008). Prior to the Second World War, Britain imported a large portion of its food and about 12.9 million acres were used for cultivation in 1939, and the country could feed itself for about 120 days per year. By 1944, that land had increased to 19.8 million and food production had risen by 91 per cent, so the country could now feed itself for 160 days per year. During the same time, food imports to Britain halved (Hopkins 2008).

After the war, the British lost sight of the importance of creating their own food, partly due to the rise in fossil fuel prices, urban agriculture appears to have become a priority for city planners, and the City of Bristol now produces about 80 per cent of its fruit and fresh vegetables in and around the city, while the City of London produces 60 per cent of its vegetables and 30 per cent of its fruit (Hopkins 2008).

Estimates for the area of agricultural land needed to feed a city range from 0.2 hectares to 0.5 hectares per person. This means that land area needed for supplying staple foods for Bristol City would extend well across the sub-region and into Wales (Fairlie 2007-8). In 2011, the Southwest of the UK produced 23 per cent of England's cattle and sheep, 37 per cent of England's milk and had more than 5500 dairies. In terms of organics, 38 per cent of England's organic producers are in the southwest amounting to 1.9 million hectares of organically farmed land (Carey 2011).

The city has a sustainability policy, but this policy does not explicitly identify convergence save in the assertion that the city will be a fair trade city (Bristol Fairtrade 2011). However, at least four organisations in Bristol are working specifically with convergence – The Converging World, Go Zero, Shift Bristol and Transition Bristol.

Like the national government, Bristol's local government is committed to carbon reductions. The national government's Climate Change Act has a target to reduce CO_2 emissions by 34 per cent relative to 1990 levels by 2020 (UK Government 2010) and Bristol's local Green Party has a strong commitment to contraction and various voluntary groups are vocal about contraction and eco-justice (convergence) aspects of climate change responses. This theme of global social fairness within the city is apparent within the grass roots movements – for example the Bristol Food Links promotes healthy, sustainable and affordable food across the city and Black South West Network looks at equality for the black and minority ethnic communities.

However, in Bristol overall, sustainability and social equity are rarely explicitly found together and even more rarely with an international perspective; the Converging World charity is one of the few exceptions to this rule.

5.1.3 Tirunelveli and Tuticorin districts, Tamil Nadu, India[5]

India, the world's seventh largest country, is home to the largest democratic nation in the world and holds much cultural and physical diversity. The Indian nation is one of the most ancient civilizations in the world, stemming from at least 5000 years ago. The British took control of India in the 17th century, and the country did not regain independence until the middle of last century. India now comprises of 28 states and seven union territories (Nilakanta Sastri 2000).

India's territory includes a geographical mix of various features with its mountain ranges, valleys, desserts, tropical rain forests, fertile plains, dry plateaus, coastal areas and more. One can find cool mountain pastures in India, windy plateaus, warm river valleys and dry deserts. Seasonal winds determine the four major seasons, winter months (November to February), summer (March to June), heavy rainfall due to South West monsoon (June to September) and North East monsoon (October to November). The country is rich in natural resources but rising energy

[5] The India team and I wrote a version of this chapter and submitted in the Converge Project Deliverable 36 (Kristinsdóttir et al. 2010). Here, I have augmented the chapter, rewritten it, and edited.

demand along with economic growth has created a perpetual state of energy crunch in India, and power cuts are almost daily events in many areas. India is poor in oil resources and is currently heavily dependent on coal and foreign oil imports for its energy needs (CIA 2011).

Table 5 Tamil Nadu at a glance

Location	Districts in Southern Tamil Nadu state, in Southern India
Coordinates	13 09, N 80 27 E
Total area	130,058 km^2
Population (Tamil Nadu 2011 / Tirunelveli and Tuticorin districts)	72,138,958 / 4.373.467
Population density (2011)	554.7 / km^2
Ethnic composition	Australoids speaking Tamil, large proportion of lower-caste people
Government	Elected Tamil Nadu Legislature. India is a federal parliamentary constitutional republic
Official language	Tamil
Human development index (Tamil Nadu 2006)	0.666 – Medium
GDP (India 2010 estimate)	PPP: $4,060 trillion total, $3,339 per capita Nominal: $1,538 trillion total, $1,265 per capita
Ecological Footprint (India 2007)	0.91 ha per person (0.5 planets)
Life expectancy (India 2009)	Male 63.7, Female 66.9

(UNdata 2009; GFN 2010; UNDP 2011).

Tamil Nadu is India's southern-most state, and this tradition-steeped society is regarded as the cradle of Dravidian culture as is evident by ancient cultural monuments, such as temples, gateways and carvings that dot the state. It is the most urbanized state in India and the key industries of the state are heavy engineering, manufacturing-based companies and textiles. Tamil Nadu covers a total land area of 130,058 square kilometres and is divided into 32 districts, including the Tirunelveli and Tuticorin districts.

Tirunelveli district covers 6,823 square kilometres of Tamil Nadu state. According to the 2001 Census, the total population of the district is 2,801,194, and opposite to the national trend, women here are slightly more numerous than men (National Informatics Centre, Tirunelveli

2011). The economy of Tirunelveli is chiefly agrarian in nature and people are engaged in the cultivation of pulses, groundnut, coconut, chillies, indigo and cotton. It is rich in mineral resources of limestone and sulphides (National Informatics Centre, Tirunelveli 2011).

Tuticorin district, also known as Thoothukudi district, is located in Tamil Nadu's southeast. The district covers an area of 4,621 square kilometres and the population is 1.572.273, again with women slightly more numerous than men (District Collectorate, Thoothukudi 2011) – and again opposite to the national trend. The main industries include salt-pan work, fishing and tourism.

The Indian non-governmental charity organization Social Change and Development (SCAD) has been working in 500 villages in these two districts for the past 25 years, placing special emphasis on the unreached communities where people are deprived of their basic rights, and focusing especially on empowering women. Gender discrimination is rife within India, as can be seen by data from the Census of India. In 2011, the sex ratio of India stood at 940 females to every 1000 males partly due to female infanticide, and has been improving in the past twenty years, as in 1991 it was recorded at 927 females for every 1000 males (Chandramouli 2011). The gap in male-female literacy rates is another statistic that tells a story – fewer girls and women know how to read than Indian men. Public education is mandatory and free of charge from age 6 to 14, but the need for income is often a limiting factor in poorer families – the children must work to sustain the family, even though child labour is officially banned in India. In 2011, the total literacy rate in Tamil Nadu was 80.3 per cent (74.0 per cent in all of India) whereas female literacy rate is 73.9 per cent in the state (65.5 per cent in all of India) (Directorate of census operations, Tamil Nadu 2011). In other words, though both men and women do better on the whole in Tamil Nadu than in the rest of India, over a quarter of all women in Tamil Nadu are illiterate.

Women are also frequently powerless when it comes to female infanticide and divorce, and dowries are still paid in India, often with the bride having little or no say in the amount paid, the selection of her husband or receiving any benefits from the sum paid. That said, it is important to remember that arranged marriages are the norm in India, but in more progressive and educated families both parties must agree to the marriage first and the tradition of dowry is being abandoned.

The majority of Tamil Nadu's rural population live under the poverty line. In agriculture operations, rural women do more than half of the work but even though they contribute more economically, they are discriminated against as the society is male-centred and women in India have been traditionally suppressed. In addition, women who belong to the economically and socially weaker sections of society have been even more repressed, and are more inclined than men to face problems such as malnutrition, poor health, lack of power and self-confidence in decision-making.

Although most women in India work and contribute to the economy in one form or another, much of their work is not documented or accounted for in official statistics. Women plough fields and harvest crops, weave and make handicrafts, sell food and gather wood. Additionally, they are responsible for the daily household chores (cooking, fetching water, and looking after children), and the informal sector is particularly important for women. Estimates exist that over 90 per cent of working women outside agriculture are involved in the informal sector, which includes jobs such as domestic servants, small traders, artisans, and field labourers on family farms. Most of these jobs are unskilled and low paying and do not provide benefits to the worker (Chen 2001).

The Indian government and local governments have in the past years taken steps to lessen the gender and social discrimination within India, though much work still remains. But to name a few, on a national level, after 14 years of trying, the historic Women's Reservation Bill was passed in the Rajya Sabha (the Parliament of India) in 2010, despite the threat of withdrawal of support by some parties. This bill ensures 33 per cent reservation to women in Parliament and state legislative bodies. Also, India is a signatory part of the United Nations *Declaration of Human Rights*, and has ratified various international conventions and human rights instruments committing to secure equal rights of women. Key among them is the ratification of the Convention on Elimination of All Forms of Discrimination Against Women (CEDAW) in 1993. The policy takes note of other policies relating to empowerment of women and the underlying causes of gender inequality related to social and economic structure based on informal and formal norms and practices. Furthermore, in the panchayat raj system (South-Asian political system), the government has given reservations to not less than one-third seats for women and proportionate seat reservation for considered to be untouchables and tribes who live mostly in the forests or the hills.

In addition, the State Government of Tamil Nadu is keen on women development issues and has established a special women's development department that enables voluntary organizations to take forward issues relating to women.

The links of the Tirunelveli and Tuticorin districts to convergence are mostly on the social justice side. The founders of SCAD felt a strong need to organize women into groups to bring out their talents. They believe women must be grouped so they can build their capacities to interact, motivate and act with a self-help spirit. SCAD has formed 2500 women self-help groups with the total membership of about 40,000 rural women in the Tirunelveli and Tuticorin districts. A self-help group is a group of 12 to 20 women of the same socio-economic background who come forward voluntarily to work together for their own uplifting under the leadership of a woman they choose from their group. The unique feature of these groups is their ability to inspire among its members sound habits of savings and banking, regular savings, periodic meetings, compulsory attendance, and systematic training.

The challenges faced by India are many, including poverty, health, low agricultural production, poor soils, water scarcity, population explosion, unemployment, underemployment, gender inequality, illiteracy and higher prices for basic commodities to name a few. SCAD's hope is that such empowering of women in all sectors (economic, social, cultural, political, educational, health care, nutritional and legal) can bring about greater change than other methods, though attention is also given to these as can be seen in the fact that SCAD also works with and provides training to local farmers (men and women) and runs several private colleges that are attended by thousands of students from all over Tamil Nadu.

5.2 Focus on the food systems[6]

Several reasons lie behind the Converge team choosing to use food as the focus during the testing of the Convergence Process. The team sought a compelling scope through which to engage the test communities, where the focus was on something comparable, of concern in each community and easily understood by the various stakeholders in all three communities the

[6] I wrote and submitted a version of this chapter in the Converge Project Deliverable 36 (Kristinsdóttir et al. 2010). Here, I have edited and augmented it.

Convergence Process was tested in – the island of Iceland; the City of Bristol, the United Kingdom; and in the districts of Tirunelveli and Tuticorin, Tamil Nadu, India. The team's initial research question focused upon the basic survival of the human race on a resource-limited planet, and after a preliminary comparison of the communities in question, food and energy emerged as areas of immediate concerns.

The team decided that energy was too wide a beginning point to approach communities with, as it can be linked to almost all areas of municipal life – including food (such as transport, distribution, wholesale, production, processing, packaging, cooling). Food, however, provides a compelling scope through which the test communities could engage. Humans cannot live without it, it is of concern in most communities, and distress is on the rise in regard to food security (Schmidhuber and Tubiello 2007; FAO 2010b; Smedshaug 2010; World Food Programme 2011). As a result, individual stakeholders can easily understand the concept of a food system within their own communities as well as how their section of the system links to the global food system.

Food is fundamental to human life, and it is an issue all governments discuss at some level or other. With the growing human population on Earth, concerns keep rising in regard to the scarcity of it and with regard to food security for humans. Global demand for food is on the rise, due to the growing population, change in diet preference worldwide, and increasing demand for biofuel (Hubert et al. 2010). The United Nations Food and Agricultural Organization estimates that humans must increase the global food production by as much as 70 per cent by 2050, if demands and needs are to be met (Schmidhuber and Tubiello 2007; Smedshaug 2010). Though a high number, some researchers have even found this to be an underestimation (Tilman et al. 2002, 2010). The United Nations' Food and Agriculture Organisation (FAO) established a Special Program on Food Security in 1994 (FAO 2010b) and alarm-bells have been ringing since 2008 when food prices rose sharply (World Food Programme 2011), as higher price on food means that those who are less affluent may not be able to feed themselves or their families.

A bitter irony lies in the fact that hunger is still a great, unsolved problem in the world while obesity is increasing rapidly, often within the same countries (WHO 2011). In 2010, an estimated number of 925 million people were undernourished on Earth (FAO 2010a), or nearly one

seventh of the global human population. It goes without saying that women and children are the great majority of those who go hungry (Halweil and Nierenberg 2011). Meanwhile, obesity worldwide has more than doubled since 1980 (WHO 2011). In 2008, 1.5 billion adults were overweight in the world. Of those, more than 200 million men and nearly 300 million women were obese. More alarmingly, in 2010, nearly 43 million children under the age of five were overweight (WHO 2011).

Even more disturbing is the fact that obesity is also on the rise in the countries where malnutrition is still a great problem (WHO 2011). These numbers point to a great divergence between classes of people, where convergence might be a solution.

Furthermore, while the problems of hunger and obesity remain unsolved, a recent FAO-commissioned study showed that about one third of all the food that is produced in the world for human consumption every year gets lost or is thrown away (Gustavsson, Cederberg and Sonesson 2011), and a report published in 2013 shows that half of food in the Western world is thrown away, and much water is wasted during food production (Institution of Mechanical Engineers 2013).

These facts taken together seem to indicate that there is room for convergence in the food sector worldwide. Humans produce enough food to feed the world appropriately, but the problem lies in the fact that our treatment and distribution of food needs to be considered anew.

Another issue connected with convergence and food issues is connected to the growing methods of food. Scientists believe global water and food security may be in jeopardy towards the end of this century (IPCC 2007). Recent research seems to indicate that the current ways of growing food are not sustainable, and voices are becoming louder that the world as a whole needs to move more towards agro-ecology, which is the study of ecological processes operating within agricultural production systems (Karner 2010; de Schutter 2010).

Irrigation, chemical inputs and mechanization have over the past 200 years allowed us to increase food production to support the steadily growing population. During that time, as the human population rose exponentially, it followed that more land space was continuously needed for food production. The problem now is that “most high-quality agricultural land is already in production. [...] Much of the remaining soil is less productive and more fragile” (World Resources Institute 1998).

Worldwide soil erosion on agricultural land is now as much as 100-1000 times faster than soil formation (Brantley, Goldhaber and Ragnarsdóttir 2007). In Iceland, for example, desertification or severe soil erosion affects 40 per cent of the island's total surface area (Björnsson 1999). Water shortages are also becoming increasingly pressing in various parts of the world. Moreover, in addition to being at a time of "peak oil," we now are also at a time of "peak phosphorous," which according to some research means that humans must now move towards organic agriculture to feed the population (Ragnarsdóttir, Sverdrup and Koca 2011; Sverdrup and Ragnarsdóttir 2011). The way that food is produced and distributed on the global scale is rife with inequality. It is sometimes said that the use of cheap labour and the externalising of environmental costs in food production is exploitative of developing countries and economies. In response to such perceived social injustices, the fair trade movement has emerged as a means of equalising labour in food production, including via the use of product labelling. Finally it is worth noting that currently it is estimated that over a billion people have little or no access to safe drinking water, and it is expected that by 2025, 1.8 billion people will live in regions with absolute water scarcity (UNEP 2007).

Considering all of the above, it is clear that opportunities abound for the communities to touch upon issues connected with the planet's biological limits and equal or fair sharing of Earth's decreasing bounty. Furthermore, the hope was that choosing the same system for each community would ease comparison between the tests.

Population issues are of course included in concerns about food production for the world, but these were not addressed in the Convergence workshops, except for official numbers for estimated population growth, which were introduced and discussed by some participants.

6 Testing and developing the Convergence Process

The testing and the developing of the Convergence Process were essentially interlinked. The testing began with a half-developed process, which was then crafted and fashioned better to fit the demands of the workshops. The testing progression is recounted in this sixth chapter.

The Convergence Process builds on several approaches, including systems approach, causal loop diagrams and World Café-style workshops. During the workshops, the intention was to have local people map the whole food system of a particular area, as the locals live in that system and have first-hand experience of it. This mapping demonstrates how causes and effects are connected in sometimes surprising ways and illustrates how different activities can and do affect each other. The map can then be used to identify realistic, viable and lasting solutions to the problems the system now faces.

I begin this chapter by analysing the research questions in context of the theory, followed by discussing how the Convergence Principles were developed, and explaining the creation of the invitation process; how the stakeholders were identified and invited.

In chapter 6.4. I give an overview of a pilot test done early in 2011, when an early version of the Convergence Process was tested on a group of master's students at the University of Iceland.

Section 6.5. contains a general overview of the workshops, and tells of a short course on systems thinking and analysis some of the Indian participants took prior to the workshops. In chapters 6.6, 6.7. and 6.8. I discuss the actual testing in the three communities; three workshops in Iceland, three workshops in Bristol and two in India [7]in the years 2011 and 2012.

Finally, I conclude chapter 6 with a short discussion on the action plan and monitoring scheme that is an essential part of a participatory process like the Convergence Process. Though I did some of the necessary initial work, the actual follow-up was out of the scope of this research.

[7] A third workshop was held in India without the involvement of the University of Iceland, and is not discussed in this dissertation.

6.1 Analysing the research questions in context of the theory and the testing

The main goal of this research was to set up a public participatory process for communities that wish to reach increased sustainability and social equity. To that purpose, three research questions were formed (see chapter 1.2.3), whose answers were meant to make the Convergence Process as smooth and utilitarian as possible. Furthermore, they were meant to answer whether the process reaches the goals it is meant to – that is, whether it is a methodology communities can use to move closer to the goal of sustainability and social justice via contraction and convergence.

The transdisciplinary nature of the whole Converge Project was a clear benefit to the research. The prefix "trans" refers to what moves between, across and beyond the disciplines (Nicolescu 2005), and in accordance, this type of research combines both the knowledge and experience of several academic disciplines as well as that of social practise specialists, in this instance, at the grassroots level (as opposed to the government level). The intention is to find more holistic and sound solutions to local problems, by involving the grass root in academic work, as those who live with the problem may have sound ideas on how to address them. The theory should be useful to the scientist (Ellen 2010), and within transdisciplinary studies, the scientist takes the most useful theories – regardless of the discipline they stem from – and applies them to the research at hand, while at the same time, carefully sifting out only the most appropriate ones (Pohl and Hirsch Hadorn 2008).

In answering the research questions, environmental anthropology and feminist anthropology add a human perspective to the more calculated systems science approach, and aid with describing the world explicitly as a joint social-environmental system. The systems science theory stresses that a phenomena is a part of a system, and that interconnectedness exists both within the system itself as well as between different systems, resulting in possible time lags and feedback loops. These may not be evident at a first glance, but the systems approach aids with uncovering connections, time lags and feedback loops (Boulding 1985; Meadows 2008). It is a useful theory to apply to transdisciplinary research, as at its core is the belief that the world we live in is in fact an interconnected socio-environmental system (Jantsch 1970, 1972; Bammer 2005;

Robinson 2008). Meanwhile, the systems science theory does not always account for the unpredictability of human behaviour, which is where environmental anthropology and feminist anthropology enter. The Convergence Process is an anthropogenic process with humans at its heart. It focuses upon sustainability, keeping in mind the biophysical boundaries of Earth, but the intention is to keep and continue humans flourishing on the planet. Environmental anthropology locates humans within ecosystems and studies how humans affect their environmental surroundings (Johnson 2013), and is therefore an essential approach when it comes to looking at a human-created system, such as the food system of a certain area, and its function within Earth's boundaries. Feminist anthropology offers a helpful take on power relations, which are useful to keep in mind when answering the research questions, especially when it comes to analysing the participation of certain less visible groups and how they are represented (Moore 1988) within the testing process.

Political science theory, focusing upon public participatory democracy, and ecological economics were used to offer the necessary practical approaches to tackling the issues at hand. Namely, to select practical approaches that can be used with the public and that will overstep some of the already identified problems with public participatory democratic processes (Young 2000; Few, Brown and Tompkins 2006; Stoker 2006). These were used to enlighten the selection of social processes that have already proved useful in the world, and mixing them together into a single process, in the hope of creating a process that people can use to move their communities closer to sustainability and social equity.

Meanwhile, the economic subfield of ecological economics offers a realistic view on the state of the world to be kept in sight during the workshops and in the creation of the public participatory process. It offers a view of the relationships between humans and the environment (Commons and Stagl 2005) and allows insight into how societies can reduce consumption (Boulding 1966; Georgescu-Roegen 1971; Jackson 2009). The field offers insight into different views on the economy than the traditional Western view which focuses on growth (Victor 2008), such as types of economy where social equity has a more prominent role as within steady-state economy (Daly 1996) and sustainable de-growth (Martínez-Alier 2008, 2009; Latouche 2009; Martínez-Alier et al. 2010).

In order to both answer the questions and to make the process more feasible and wieldy, I created and placed questionnaires before all participants at the end of each workshop. Questionnaires are often used in action research and they proved useful in fine-tuning the process, as the participants could both rate their experience of each day and suggest what could be done differently, what was missing and what was not needed in their estimation. They touched upon issues related to the development of the process as well as upon the contents of individual workshops and the participants' experience thereof. They covered topics such as what the participants expected from the workshop, whether the workshops met their expectations, the depth of their understanding of sustainability and convergence prior to and after the workshops. The results from the questionnaires were typed into an Excel document and systematically analysed by theme.

Patterns and recurrent issues of concern were highlighted, percentages found out and results organized in charts and tables. The answers were then incorporated into later workshops. The response rate to the questionnaires was rather high, as can be seen in table 7, or 91, 89, and 64 per cent in Iceland, 84, 72, and 64 per cent in Bristol and 82 and 95 per cent in India, in order of workshops. Furthermore, use was made of informal personal discussions with participants and emails I received from them, along with literature review and more.

The reports I wrote after each workshop were intended to give the participants an overview of the work they had completed. We emailed the reports to all participants, and at the beginning of next workshop, the group looked at the report together and began work from it. In India, where we had many illiterate participants and where we had the workshops on two consecutive days, an oral report was given at the beginning of the second workshop. After the workshops, I sent a written report via email to SCAD and the organization forwarded it to those participants who had email access. Few written responses were received to the reports, but the discussion at the beginning of each workshop was duly noted in my research diary, according to action research methods.

Finally, while answering the research question, I kept in mind that there is no such thing as a non-biased knowledge (Wolf 1992) and therefore, the transdisciplinary scholar, as other scholars, must be aware of their own habitus (Bourdieu 1977) and the influence thereof.

6.2 Principles – pillars

Early on in the preparation of the Convergence Process, I suggested to the Converge team that statements or principles were desirable that could serve as guiding lights in the workshops. These should be written in clear language and be easily understood by the workshop participants, and should contain the ideology and philosophy of the Convergence Process; proclamations that describe a converging community on the way to a sustainable state. I suggested they should be short, to the point and even possible to learn by heart. Furthermore, that they should be used during the workshops to reflect on whether the groups' work is moving in the direction hoped for.

The question asked throughout the Converge Project, is this: *How, given the current situation, do we today manage and allocate Earth's resources so the projected global population of 9 billion people in 2050, and their offspring, will flourish – indefinitely?* One of the goals with the Convergence Process is to develop a method that large and small communities can use to foster convergence consciously in their world and thereby bring it systematically towards sustainability. Since the Convergence Process builds on the belief that every global citizen has the right to a fair share of Earth's biocapacity and access to fundamental human rights, the process should advocate socio-ecological justice by calling for wealth, well-being and consumption to converge across and within nations to a level that the biosphere can support, within and between generations. These beliefs must be clearly and simply reflected in the Convergence Principles, if they are to be of use to the process and the participants.

The Iceland team first proposed five and then six Convergence Principles, inspired by the four Natural Step System Conditions and the United Nations' *Universal Declaration of Human Rights*. The aim was to spell out the pillars underpinning the Convergence Process and have them serve as a simple and easily understandable milestones Convergence workshop participants could keep in mind before, during and after the workshops – but a converging society is of course a society that is moving towards sustainability and increased social justice, both locally and globally.

This first suggestion of the Convergence Principles were five principles, meant to be the umbrella under which the Convergence Process falls:

1. **Convergence for sustainability is the progress towards human equity within biological planetary limits.**
2. **In the convergent society, people are given the capacity to meet their needs.**
3. **In the convergent society, nature is systematically cared for and improved by physical means.**
4. **In the convergent society, concentrations of substances produced by society are dealt with within society, using the three R's as a guideline – reduce, recycle and reuse.**
5. **In the convergent society, substances extracted from Earth's crust are reduced, reused and recycled** (principles 2-5 are adjusted from James and Lahti, 2004, Holmberg, 1995).

Here, I simply took The Natural Step system conditions and principles and adjusted them to fit the Convergence Process' purpose. Neither I nor the rest of the team were satisfied with that, so my second suggestion consisted of the six principles below, all of whom follow a strong anthropocentric thought, and build on the fact that Earth's ecosystems underpin all humans' livelihood:

1. **Convergence for sustainability is the progress towards human equity within biological planetary boundaries.**

   This first principle explains the aim with convergence for sustainability. Converge is about exploring possible pathways which will bring the society in question closer to equity and sustainability within the planet's boundaries. In other words, convergence is a process on the way to sustainability. This first principle encompasses the other five and underlines the importance of the final goal, human equity within biological planetary limits. The United Nations' *Universal Declaration of Human Rights* applies to all nations and affirms the equal rights of all men and women – civil, social, economical, cultural and political, and this principle is meant to help communities reach that equity.

2. **In a converging society, every global citizen has the right to a fair share of Earth's biocapacity and the opportunity for secured human well-being.**

   The proposed Converge Principles are anthropologically centred, and thus focus on human well-being. This principle underlines individuals' rights to equity even further than the first, and brings well-being into account. The Millennium Ecosystem Assessment states that human well-being has five main components: health, good social relations, freedom of choice and action, security and the basic material needs for a good life (Reid et al. 2005).

3. **In a converging society, people have the opportunity to meet their basic human needs.**

   The proposed Converge Principles highlight the role of society to protect the opportunity for all citizens to develop their own well-being and livelihoods. This underlines even further Principle 2, on the chances people are given to meet their needs – societies work consciously and systematically towards offering their citizens, and the citizens of other societies through direct or indirect ways, the opportunity to flourish.

4. **In a converging society, nature is systematically cared for, maintained and restored.**

   Nature as a whole is systematically cared for in the converging society, as that society realizes that eco-system services provide the sustenance of all humans. Natural capital is maintained and built to protect and increase the benefits humans derive from nature. The fifth and sixth principles fall under the fourth principle and express its meaning further.

5. **A converging society is aware of the fact that everything humans have and use comes from nature. In a converging society, nature's resource inflow to society is recognized, managed efficiently and the focus is on using resources in the least harmful way possible.**

   The fifth principle is concerned with the inflow of matter into human society. In figure 8, the arrows indicate that a demand in one circle affects the state of matters in another

circle, and the whole human system is contained within the biophysical world – Earth. In a converging society, citizens are aware of the limits of resource availability on the planet. They are aware that materials humans use come from nature and that many of the resources people have used with little thought for thousands of years are about to be exhausted.

6. **A converging society deals efficiently with its outflow (waste), using the four R's as a guideline – reduce, recycle, restore and reuse. It is a circular society (as opposed to a throw-away society) that has learned from nature.**

   Principle six has to do with outflow of waste created by human society. As seen in figure 8, the socio-economic world is situated within, and relies upon, the biophysical world. The arrows show how waste created in society must be dealt with within Earth's limits, and if possible, create value out of waste. Both intentional and unintentional waste, such as pollution from mining, chemicals, and general waste, is dealt with in a neutralizing way. Citizens of a converging society endeavour to close the waste loop by for example putting industrial waste back into the production process and creating something else from it (McDonough and Braungart 2002).

The six draft principles were considered cumbersome and too long, in addition to containing overstatements (such as the word "efficiently," used twice without explanation). Furthermore, draft principle one was not really a principle, but rather a definition, and draft principles four to six could be combined into a single principle. In addition, the last three principles speak of "nature," but as anthropologist Tim Ingold (2000, 2005) has pointed out, nature is inherently political term, as no actual divide or boundary exists between human society and nature. Though "nature" is referred to in this dissertation, it is wise to avoid such laden words in principles meant to underpin the whole Convergence Process.

But to be fair – they were never intended to be anything but a first draft.

For that reason, I honed and rewrote the principles in collaboration with the Converge team, always keeping the *Millennium Development Goals* and the United Nations' *Universal Declaration of Human Rights* in mind. The draft principles were used during the Convergence workshops. Eventually, with the assistance of many, the Convergence Principles were whetted down to three simple and easily understood values, headed by an umbrella

statement or clarification. These three principles and the umbrella statement are the pillars that hold up the Convergence workshops:

Convergence for sustainability is the progress towards equal opportunities for all people, within biophysical planetary boundaries.

The umbrella statement explains the term convergence for sustainability, illuminating the social equity embedded in this ideology as well as the focus on Earth's biological limits.

1. **In a converging society, every global citizen has the right to a fair share of Earth's biocapacity and social resources, to enable him or her to live a fulfilling life.**

   The first principle encourages fairness and equity, stressing people's rights to equal access to material and non-material resources, which also includes an equal right to pollute. It underlines the ecologically responsible anthropocentric point of view taken within the Convergence Process. It stresses the importance of respecting human life, in line with the United Nations' *Universal declaration of human rights*.

2. **A converging society uses its resources efficiently, recognizing the critical value of services from natural systems and limiting its harmful impacts upon them. It recognizes interdependence amongst human societies and between human societies and nature.**

   The second principle observes the biological planetary limits – source limits, sink limits and ecosystem health limits. It focuses upon Earth's natural systems and human dependence upon them, and stresses the fact that these systems are ultimately and always interconnected with human society. Furthermore it emphasizes the need for humans to treat Earth's natural resources with respect and care, so the human race is able to survive and flourish indefinitely.

3. **A converging society invests positively in human, social and environmental resources; and cares for them, maintains them and restores.**

   The third principle gives a deeper insight into the evaluation of human communities and stresses how a converging

society values all of its resources. Furthermore, it offers the individuals that inhabit the converging societies the chance to influence their near and far environment.

Ultimately, the three Convergence Principles describe a community on its way to sustainability. The final goal may not have been reached, but they set out the milestones needed to reach a world Convergence workshop participants may wish to pass on to their descendents.

In order to stress the ideology of the Convergence Process workshops and to remind people why they participate in them, the principles should be given to the participants both before the workshops as well as during the workshops, and the participants should be encouraged to take them home with them as a reminder of the work in between the workshops. By reading the principles and thinking about them, the participants are reminded of the need for a sustainable and socially equal society, and may come to the next workshop with new ideas and solutions as a result.

6.3 Invitation process

This section discusses the Convergence Process workshop invitation process and methods created to reach the necessary participants. It is vital in a methodology like the Convergence Process that as broad a selection of stakeholders as possible be invited, because it allows more voices from various levels of the society to be heard and documented, which in turn allows for a more realistic map of the system to be drawn up.

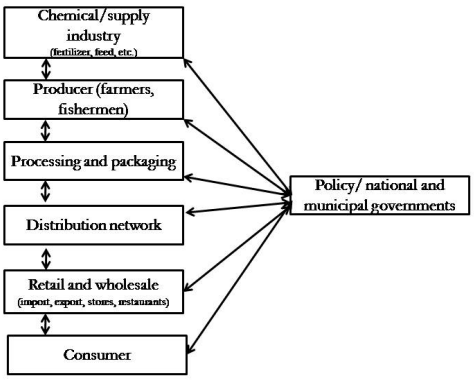

Figure 14 Early version of the food system stakeholder value chain

The workshops are led by a team of people trained in systems thinking and group management, who also have a background in sustainability, but the workshop participants are always the people who will continue working in and with the communities. They are the final owners of the Convergence conceptual models (the causal loop diagrams and the analysis thereof) and the strategic action plan created for their community, and they are the key to any problem solving to be undertaken in the communities, including any changes to policy and social behavioural changes. Therefore, careful thought needs to be applied in the selection of workshop participants. The workshops are held in the communities and should include interested stakeholders, who collectively may have the power to move the community via convergence to a state of greater sustainability. Ideally, 20 to 50 relevant stakeholders are involved, who commit themselves to at least three full days of workshops, plus the necessary follow-up.

A value chain shows all the activities necessary to bring a product from raw material, through different stages of production, through delivery and to final consumers, and finally to waste disposal (Kaplinsky and Morris 2002; Schmitz 2005). It offers a logical diagram of the system in question, and if used as a tool to select stakeholders, it gives an outline of individual sections within the system from where the stakeholders should be selected.

To get an overview of which stakeholders should be invited, it was appropriate to create a value chain of the system at hand – the food system of each case study community – depicting the various sectors of the case study food systems, including government and the waste and energy industries (figure 15). Like other aspects of the Convergence Process, the chain developed during the time span of the testing, and an early version of the stakeholder value chain can be seen in figure 14. Figure 15 is the final Convergence Process food value chain, used in all three case study communities. It depicts the route food items take from the supply industry (pesticides, feed and so forth) that supplies items needed for food production; to primary production parties such as farmers and fishermen; to processing and packaging; to the distribution network; to retailers such as export and import companies, grocery stores, restaurants and catering companies; and finally to the consumer. At every stage, the energy industry, the waste industry and various levels of governments (as they determine the policy for the system as a whole) are involved.

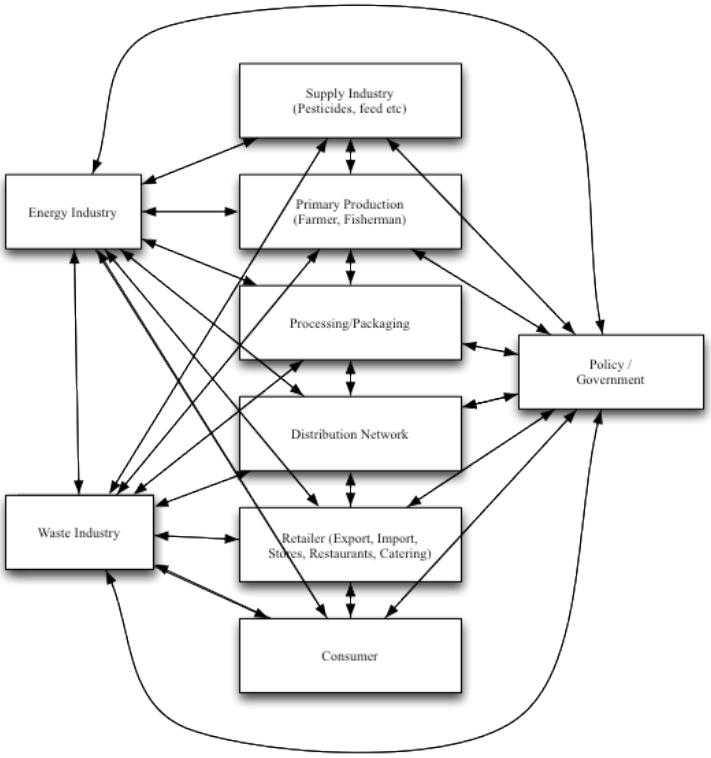

Figure 15 The Convergence Process food value chain

To increase the likelihood that stakeholders from all levels of society were given the opportunity to participate in the Convergence Process, I also formed a stakeholder identification template (table 6) to use alongside the value chain, because certain interest groups and societal institutes (such as non-governmental organizations and educational institutions) cannot be identified via the value chain alone.

With the use of this template, some of the local heavyweight stakeholders are identified, such as local media and educational institutions in the community. It is meant as an aid to the system value chain, and used as such it can be of great value. But if it is used on its own, chances are that gaps would appear just as is the case with the value chain above.

It is of importance that more than one person choose who should be invited to the Convergence Process, and that the people engaged in selecting the participants have a good overall insight into the society and

culture in question. This is because a group of people is better equipped to avoid unintentional bias in whom to invite, and a group that has good insight into the society is more likely to know of possible valuable key stakeholders than those who have little knowledge of the community.

Table 6 Convergence Process stakeholder identification template

Stakeholder	Specific inf. on why involved etc.	Contact inf.	Connection to Convergence Process	Location w/in value chain
National government				
Local government				
Institutions				
Educational institutions incl. economists				
Private companies incl. food processors, import, export and distributors				
Local media				
NGOs – grassroots incl. farmers' assoc.				
Others – incl. individual citizens etc.				

During the preparation for the Convergence Process workshops, the local teams in each of the three communities were requested to identify and invite possible local stakeholders, using the system value chain (see figure 15) and the stakeholder invitation template (see table 6). Each community used the contacting methods the local Converge team deemed most appropriate, given the local culture and the team members' research experience. In all three communities, the snowball method (see chapter 4.1.4) was also used, where word-of-mouth participants and other participants' personal invitees were welcomed as well as those the team had selected, though of course care was taken that no one group was overrepresented at the cost of another group and extra invitations sent out when it became evident that bias might occur – such as in India when it became clear that very few women would be in attendance, more were

encouraged to, and did, participate. We did not have to reject any participants, due to a possible bias or overrepresentation within the group, but were fully prepared to do so, explaining that seating was limited.

Care was taken in all communities to stress that ideally, a participant should commit to all two or three workshops, as the memory of the group keeps most intact between workshops if the same participants attend. Furthermore, less time is lost if there is no need to introduce to newcomers material already covered by the group. However, those participants who wished to attend but could not commit to all workshops were given the opportunity to attend those they could make it to. As a result, some participants attended all the workshops, a few attended two, and some only one.

In Iceland, a formal letter was written (see appendix C) and sent to about 260 carefully chosen individuals from the food industry and related institutions. The literacy rate is high in Iceland and knowledge of sustainability issues has increased in the past years, so care was taken to include reading material in the native language with the invitation letter (see appendixes D and E). The two articles introduced the project in very different terms. One was a newspaper article that I wrote and was published in Iceland's agricultural newspaper (Kristinsdóttir 2011). The other was a learned article written by myself and the Iceland team and published in *Þjóðarspegillinn*, the University of Iceland's Social Science Research Institute's journal in connection to its yearly conference, in the fall of 2011 (Kristinsdóttir et al. 2011). The snowball effect was used as well and at least two invitees published the invitation letter on their networks' websites and at least two more participants contacted the project team and asked to be included after reading the agricultural newspaper article.

The Bristol team relied on Bristol's existing sustainability networks and the team's personal contacts to these networks, and distributed hundreds of leaflets (see appendix C) by hand at farmers' markets and to the team's contacts. Furthermore, formal invitation letters were emailed later on in the process to hand-selected individuals, companies and institutions from the food industry (see appendix C). Most of the participants in Bristol either knew each other or knew of each other, unlike in the other two communities.

The workshops in Tamil Nadu in India were hosted by Social Change and Development (SCAD), a non-governmental organization that focuses on

bettering the lives of poverty stricken Indians. SCAD staff looked at the food value chain and the participant invitation table, and created a list of possible invitees, including representatives from universities, agriculture centres, veterinary services, farmers, women's self help groups, government officials and more. Then a personal invitation letter (appendix C) was sent out by mail or hand delivered to about 50 individuals, companies and institutions connected with the food industry and related institutions. Most had formal or informal association with SCAD.

All the participants were also directed to the project's website, http://www.convergeproject.org, where Converge Project is explained, the decision to choose the food systems of the test communities is discussed and the aim of the workshops described.

In Iceland, a lot of primary producers attended, in Bristol mostly marketing or retail business people came, and in India mostly SCAD staff and affiliates were in attendance. Using the food system value chain, the facilitators in all the communities identified several key stakeholders that were missing from the participants' group and made attempts to include them. For example, in Iceland, individuals from the fishing industry and the national government declined the invitation sent to them, in Bristol, none attended from packaging, transport and supermarkets, and in India government officials were missing and more women from the self-help groups SCAD organizes could have been in attendance, as the focus there was from the beginning to be pointed towards these groups.

6.4 Pilot test – class of informed MA students at the University of Iceland

On Sunday the 27th of March, 2011, during the last weekend session of a University of Iceland course called Sustainable Futures, myself and two other people from the Converge research team tested the still-unfinished Convergence Process with an informed audience, when 28 graduate students participated in a daylong workshop trial. The students had a background in sustainability frameworks, systems thinking and causal loop diagrams, as well as the concept of sustainability in general, planetary boundaries, The Natural Step, backcasting and more, and they had been sent an early draft of the Convergence Process and asked to familiarize themselves with it. In a previous class they had discussed food security and indicator systems. The group contained a mix of master's level students

from different disciplines, professionals taking the course out of interest and one BA student, and a high percentage of the students was of foreign origin. The genders were about equal and the age ranged from about 25 to about 45. This audience can be assumed to have been more informed than the general public, simply by showing interest in the topic of sustainability by taking the course. However, some may not have been interested in the topic at all but only have chosen to take the course due to the units it gave, the fact that it was taught in English (which counted for the high number of international students), or because it was only taught during weekends and thus fit well with the schedule of working professionals.

Below is the workshop's draft schedule given to the students.

1. **Definition phase**
    a. Awareness lecture – here the baseline is first outlined (in class, 40 mins, in reality, 2 hours)
    b. 2061 visioning – definitions – group work (In class, 40 mins, in reality, 2 hours)
        i. Focus only on visioning, not problems
        ii. Speak as if you are in the future, i.e. speak in present tense, in first person singular or plural, see solutions, i.e. "we export water sustainably to Denmark and instead we get medicine." Don't say "will be" or "should be," say "is" – pretend in your mind that you are in 2061.
        iii. We start this as a group, for about five minutes, and then the groups take over.
        iv. Start with lists – i.e. parameters and assumptions, make a flow chart if necessary
    c. Causal loop diagrams
        i. Draw up a causal loop diagram from your visioning session
2. **Clarification phase**
    a. Mental models developed
    b. Understanding
    c. How to do it
3. **Confirmation phase**
    a. Systematic action plan created
    b. Testing, learning, revising
4. **Implementation phase**
    a. Action plan followed.
    b. Monitoring scheme followed and revised on a regular basis.

The students' pilot test focused on the first section in the workshops' series (here named *Definition phase*, later renamed *Vision, Goals and Obstacles*), where awareness is raised, the baseline outlined, research questions formed, the vision set and backcasting done.

The test-run took place in a large classroom in a new building at the university. The workshop commenced with a short version of the awareness lecture, after which the students were asked to divide themselves into groups of four to five people, creating a World Café-style atmosphere. However, this was not a true World Café , as the students stayed in their groups for the whole exercise so they could be graded on their work. They were specifically asked not to sit with their friends, but some disregarded that request. Each group was given a sheet of paper with the six proposed Convergence Principles, copies of the AtKisson's Sustainability Compass, sheets of blank A2 paper and coloured pens.

Then began the visioning exercise, during which the students were asked to imagine a sustainable foods system in Iceland fifty years into the future, focusing on visioning, not problems. The workshop facilitators made efforts to set the goal clearly by speaking as if they were themselves in the future, and speak in first person plural present tense, to aid the participants with the exercise. Furthermore, the leaders started this visioning exercise by telling a story of a marathon runner and is based upon the practices of countless outstanding athletes. The story tells of fifty marathon runners at the start of a race, seconds before the start gun goes off. Forty-nine excited runners think: "I am going to win the race," but the fiftieth runner thinks: "I have already won the race! Just look how proud my mother is of me, here is the mayor putting the gold medal around my neck and gosh, do I ever need a shower!" Then the students were asked whether they thought it more likely that the fiftieth runner would win the race or any of the other 49 runners, agreeing he was at least not less likely, probably more. Furthermore, the groups were encouraged to make lists of assumptions, parameters and visions during their visioning exercise.

Once the time allotted was up, each group presented their findings to the others. After lunch, the participants sat again in their same groups, and began drawing causal loop diagrams from their visioning session, which they then presented to the whole class at the end of the day.

At the end of the course, all the students were handed an anonymous survey, which they were asked to complete and 26 returned their copy, or 93 per cent of the group. Finally, a week after the lecture, the groups

handed in their causal loop diagrams along with a two-page summary of the work they had done, and were graded on their work.

A few important lessons were learned from the work done during the trial run of the Convergence Process and brought forward into continued development of the process and preparation for its testing. The first has to do with how the large group was broken into smaller groups. Expecting people to leave their customary groups and sit with strangers proved not realistic. In fact, in the anonymous questionnaire given at the end of the lecture, a few students complained over not having been manually divided into groups, as in reality those who were diligent were sought out by others who preferred not to be as active during group work – and by this time, the students knew each other well and had done much group work together. In addition, the dynamics of a group of strangers can create more vibrant solutions than a group of people who know each other. Therefore, it is advisable for the team to allow the group to sit as they please for the lecture and then break them up with some kind of a system (such as "you're number one, you're number two"), ending with four to five people in a group as suggested in the World Café method.

The second lesson learned concerns the tools we chose, and the fact that many appeared effective. The backcasting figure from TNS simplified things for the participants, and it helped some to be able to see it during the visioning exercise. The same can be said of the backcasting figure and a simple causal loop diagram, as both are foreign to most people. We also handed out the Sustainability Compass, the ABCD process and the six principles. However, only a couple of people used the compass and the ABCD process, so the lesson was that handing these out might be in excess. In addition, too many sheets of paper on the table can overwhelm participants and therefore should be avoided.

The third lesson concerns the visioning and backcasting exercise. This exercise seemed to confuse a few people and not everyone managed to do what the workshop leaders asked – to focus on the future as if it is the present and as if success has been achieved. Here, it became clear that it is very important that the workshop facilitators guide the workshop participants into the exercise for as long as it takes (probably no less than five minutes), as people are prone to begin looking at the present problems and attempt to solve them rather than to situate themselves in the future, working backwards. We led the students through the first steps

and told them to begin with the final goal and define it prior to writing up the problems, but two groups jumped into solving individual current problems they immediately identified, and did not want much help form the workshop leaders once it became apparent they had misunderstood the exercise or not placed enough importance on the visioning itself. This mistake then coloured all their work – they could not write down their vision in detail as the other groups could and therefore, had a vague goal in mind. In addition, those groups were on the whole more negative, quicker to give up and not as optimistic as the others. Meanwhile, it was clear that those who asked early for help, or understood from the beginning that they were expected to begin with visioning and not focus on problems until later on, had a much better time and came up with more solid work. They wrote out a clear vision of their desired future – a sustainable food system in the community in question – thereby defining that imaginary reality in detail before writing any lists of parameters and assumptions, and only after that, did they begin making their causal loop diagrams – otherwise their work can become muddled. Therefore, it seemed evident that the participants must be guided away from traditional ways of solving problems. Furthermore, it helps if the workshop leaders speak in first person plural and locate themselves in the future; say for example: "We are now in Iceland in 2061 and our food industry is sustainable. What does our reality look like?" and when someone answers, gently guide them to use present tense, first person singular and plural, as if the group is already in the future.

The fourth overall lesson learned during the pilot test was that it is helpful to ask people to start with making lists when it comes to drawing causal loop diagrams. The students tended to jump into making loop diagrams, which can become very complicated as few people are accustomed to thinking in such terms. We found that the causal loop diagramming became easier if the students started by writing several lists of their vision and baseline – such as one list of their system's parameters, one list of the assumptions they make – and a few flow charts and mind maps.

The fifth and final lesson learned during the pilot test was that the workshop leaders must periodically walk around the room and offer assistance, along with listening covertly in on conversations to make sure the groups are all on track and to be able to jump in to assist or bring the conversation back to the task at hand – finding solutions that can bring the system towards greater sustainability and social justice.

Table 7 The Convergence workshops in the three communities

Work-shops	Reykjavik, Iceland		Bristol, UK		Tamil Nadu, India	
# 1	September 28 2011: 23 participants, 15 women, 8 men	**Questionnaires response rate** 91%	November 1 2011: 19 participants, 6 women, 13 men	**Questionnaires response rate** 84%	October 17 2012: 40 participants, 16 women and 24 men	**Questionnaires response rate** 82%
# 2	October 13 2011: 19 participants, 13 women, 6 men. 14 attended before	89% (one responder had not attended the first workshop)	November 30 2011: 11 participants, 2 women and 9 men. 6 attended before	72% (three responders had not attended the first workshop)	October 18 2012: 39 participants, 13 women and 26 men. 37 attended before	95% (all had attended the first workshop)
# 3	January 10 2012: 14 participants, 11 women, 3 men. 10 attended before	64% (two responders had not come before, three come to one workshop, four to all)	January 12 2012: 14 participants, 2 women, 12 men. 7 attended before	64% (four responders had not come before, three to one workshop, two to all)		

In conclusion, the Convergence Process test run proved useful in that the students understood the process and came up with some innovative solutions. The causal loop diagrams opened new doors to many of them; they enjoyed looking at problems from a new and different point of view.

The facilitators learned the importance of keeping the exercises compartmentalized and to guide people through individual parts of the whole process. These lessons were incorporated in the planning and hosting of the eight workshops in Iceland, Bristol and Tamil Nadu.

6.5 Overview of the workshops

The Convergence Process testing was a multi-sited research, done over eight full days in the years 2011 and 2012. Table 7 offers an overview of the dates, how many attended and of those, how many had come before.

The gender division was markedly different in the three workshops, as seen in both table 7 and figure 16, with male participants in the majority in England and India, while chiefly women attended in Iceland:

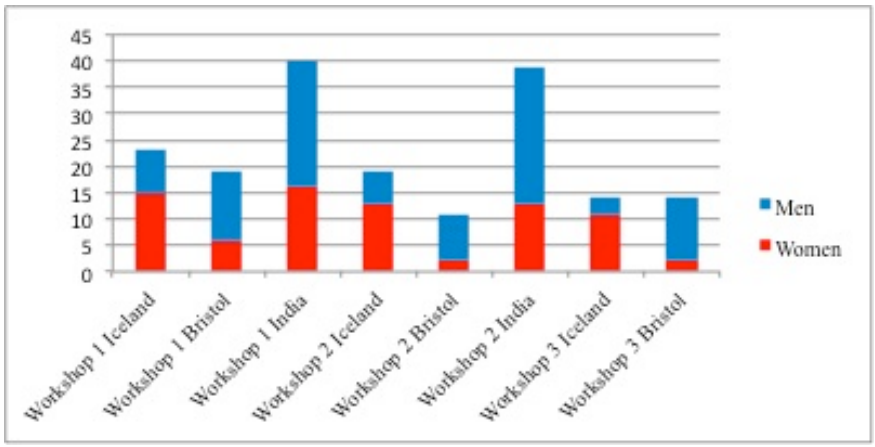

Figure 16 The gender division in the Convergence Process workshops

Three daylong workshops were held in Iceland, all of them at the University of Iceland's School of Education in Reykjavík, a centrally located and well-known building, which eased the venue's accessibility. The venue was a classroom on the second floor in a new part of the building, and the tables and chairs were rearranged so people could sit around them café-style. Tea, coffee and snacks were served on a small table outsider the room and lunch was served in the university cafeteria on the first floor.

Three daylong workshops were likewise held in Bristol. The first two were held at the Bristol and Bath Science Centre, a new building outside of Bristol. The Bristol team chose the centre to give the project more

prestige, as the building was new and impressive, which was counteracted by the fact that it was that it is quite hard to find and no proper public transportation ran to the centre. However, transport in a small bus was offered from downtown Bristol. Tea, coffee, fruit and snacks were on offer in the room and lunch was served in the café in the main hall. The third and last workshop was held at the Hamilton House in Bristol, a centrally located office building used by grassroots movements. This building was much less flashy than the centre – in fact rather run-down – but more easily accessible by public transport. Again, tea, coffee, snacks and lunch was offered free of charge to the participants.

Finally, two daylong workshops in India are included in this research, both held at the KVK Agricultural Training Centre in Tuticorin, Tamil Nadu, which is a rural setting but transportation was provided to some participants. The hall where the workshops were held is in an outbuilding. Agricultural Centre staff set up water coolers and brought in snacks at appropriate times, but lunch for the participants was served in on an outside terrace in an onsite cafeteria whereas the workshop facilitators ate in a dining room inside the Centre.

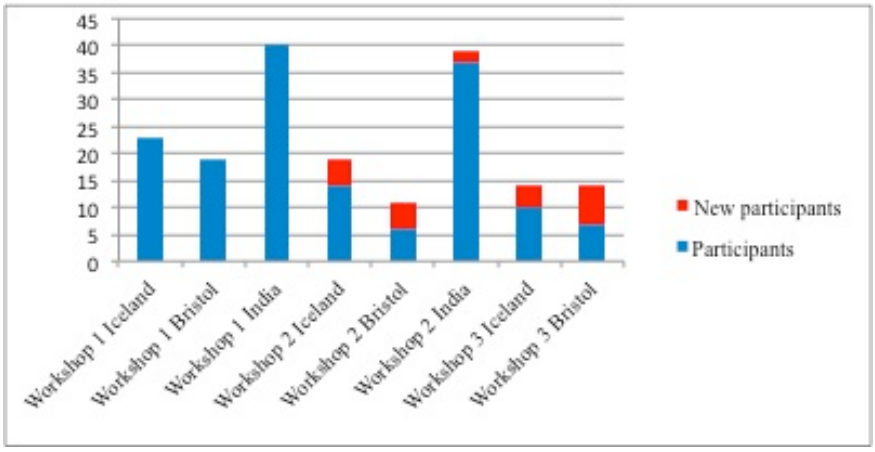

Figure 17 Number of participants and returning participants at the Convergence workshops

Figure 17 indicates the number of returning participants at each workshop, and figure 18 shows the number of questionnaires returned at the end of each workshop compared to the total number of participants. During the first cycle of workshops in the communities, the questionnaire

response rate was excellent. Of the 23 participants in Iceland, 21 handed in the anonymous questionnaire at the end (91 per cent response rate), of the 19 participants in England, 16 returned it (84 per cent response rate), and of the 40 participants in Tamil Nadu, 33 completed the questionnaire (82 per cent response rate).

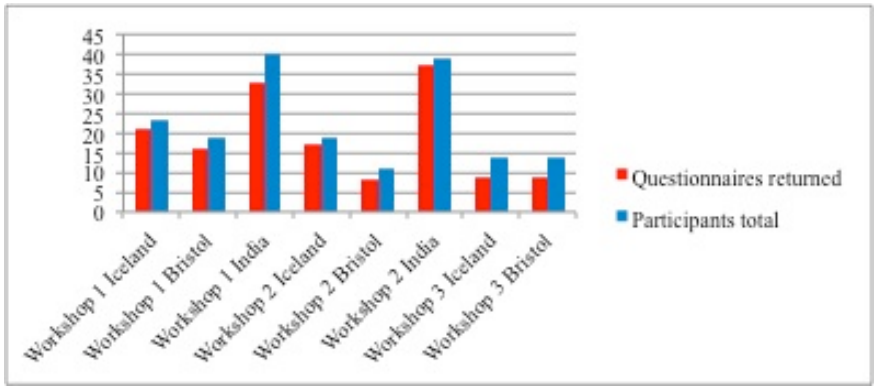

Figure 18 Questionnaires returned at the Convergence Process workshops

Nineteen people attended the second workshop in Iceland (13 women and six men). Of those, 14 had attended before. Seventeen questionnaires were retrieved at the end of the workshop (89 per cent response rate), and of those, thirteen had attended before. Eleven participants came to the second workshop in Bristol (two women and 9 men), and of those, six attended the first workshop. Eight questionnaires were handed in at the end of the day (72 per cent response rate), five from people that attended the first workshop. In Tamil Nadu, 39 came to the second workshop (13 women and 26 men). All but two had been there the day before. At the end of the day, 37 responses were returned (95 per cent response rate). Two did not answer the question on whether they had attended the previous day, but indicated in their answers they had so it appears all the responses had come the day before.

During the third round of workshops, fourteen people arrived in Iceland (11 women and three men) and of those, ten had attended before. Nine questionnaires were gathered at the end of the day (64 per cent response rate), and of those, four had attended the first two workshops, three had attended one of them, and two were attending for the first time. Fourteen people participated as well in Bristol (two women and 12 men). Of those, half of the group, or seven people, had attended before. Here,

nine responses were received as well (64 per cent response rate), and of those only two had attended the first two workshops, three had attended one of them, and four had not attended any.

The work done during the workshops was similar in all the communities, with some very noticeable cultural and other differences – such as the number of women attending in the three communities (see figure 16 and table 7). In addition, we had to deal with some logistics problems both in Iceland and in India – with one of the winter's worst snow storms occurring during the third workshop in Iceland, weather-binding several participants, and power cuts in India that affected the running of the overhead monitor during both workshops. These events were symbolic in that they illuminated some of the problems facing the food system in the two communities.

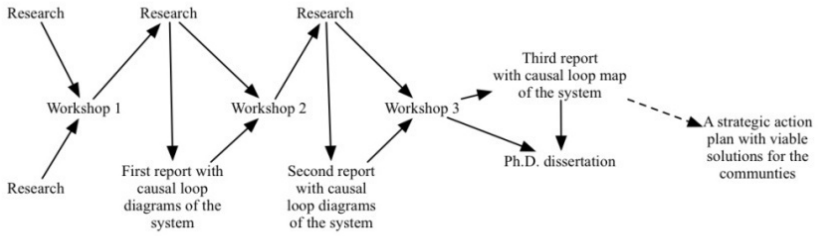

Figure 19 The workshop facilitator's work between workshops

Figure 19 shows the research team's work between workshops. The facilitators endeavoured to clarify the emerging system map as well as possible, using for example detailed notes taken during each workshop, the causal loop diagrams drawn during the workshops, literature studies, communication with the workshop participants and more. After each workshop, the day's results were drawn together in one or two causal loop diagrams which is then used to begin the following workshop. The dotted line showed where the community could take the systems map created, but which was out of the scope for this research – for the workshops to make a strategic action plan and have the community follow it.

In accordance to the World Café procedure, the Convergence Process workshop hosts moved between the tables, encouraging people who seemed quiet to share their thoughts and making sure the groups wrote

their conversations down on the paper in front of them, as well as assisting the groups in drawing their causal loop diagrams. A few times people were persuaded to switch tables, but one person always stayed behind as the table's "memory" to tell the newcomers what had occurred at that table prior to them joining it. The groups were encouraged to listen collectively to the conversation at their table, and pay attention to and write down themes, patterns and insights. Finally, the groups presented their causal loop diagrams to each other at the end of each session and/or day, and the Converge team then took the diagrams and redrew them or combined into a new diagram between the meetings. These were then emailed to the participants along with a written report of each workshop.

The next workshop then commenced from the collective causal loop diagram and the report.

Participants in all three communities commented very positively upon the networking that occurred at the workshops, in particular in Iceland, both in the questionnaires and in other comments. Two Facebook sites were created for the participants in Iceland and in Bristol. The participants were encouraged to join and several did so immediately and soon others, including many that had not attended the workshops, joined in. In June 2013, 24 people were in the Iceland group, whereas 100 people had their name in the English Facebook group, which on the whole has also been much more active.

6.5.1 Systems thinking, systems analysis and problem solving for sustainability course in India

The Converge research team held a two-day course on Systems Thinking at the FX Engineering College in Tirunelveli City on October 15 and 16 2012. A few staff from SCAD attended the course, along with other individuals from the neighbouring colleges and universities and other institutions. The SCAD staff then attended the Convergence Process workshops, held in the two consequent days.

6.6 First workshop – vision, goals and obstacles

The first stakeholder workshop was a full-day event, during which the groups created a shared vision of a sustainable and socially just food system in their community, wrote up their goals and began to map the system as it is today. The pilot test had showed that handing out too many

pieces of paper was not efficient, and therefore we distributed the principles on pieces of papers, but drew most other figures on whiteboards or showed them using an overhead projector.

The workshops were similar in each community, but some cultural difference was noticeable, such as that the workshop facilitators were not invited to eat lunch with the participants in India, but ate instead in a smaller room with other Western scientists working at the agricultural centre. The reason given was that the participants got traditional food, whereas less spiced food was served for the researchers. However, prestige might have had something to do with it, as some of the more educated participants and SCAD supervisors ate with us (though that may also have been because they spoke English). In the other two communities, facilitators and participants ate together, which offered opportunities for informal discussions.

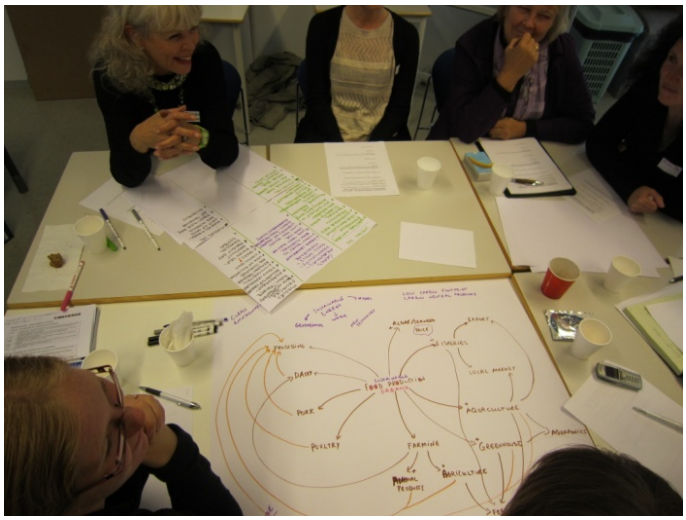

Figure 20 The first workshop in Iceland (photo: Hrönn Hrafnsdottir)

The gender division was remarkably different in the communities as can be seen in the graph depicted in figure 16 and table 7 and may have been due to a cultural difference. In Iceland and Bristol, the numbers contrasted each other – more women attended in Iceland (15 women and eight men) and more men in Bristol (six women and 13 men). In India, (16 women and 24 men), even fewer women would have been present if not for the intervening of one of the Converge research team members, who, when she realized how few women intended to attend, asked that

some Social Change and Development (SCAD) female staff would be called in to even out the numbers – not the least because of SCAD's strong emphasis on empowering women. Many of the men were SCAD staff as well. Political scientists Gunnar Helgi Kristinsson (2005, 2006) and Gerry Stoker (2006) suggest that more educated people are more likely to participate in participatory political events. Stoker furthermore argues that minority groups (due to poverty, race or youth) are unlikely to attend such events. In accordance, the fact that the women in the self-help groups belong to a little-educated minority groups in India due to gender, cast and poverty, may explain why so few attended.

Figure 21 The first workshop in Bristol (photo: Charlotte Biering)

Figure 20 was taken towards the end of the first workshop in Iceland, and shows a group of people sitting around a table with long lists and a causal loop diagram in front of them. Figure 21 was taken during the first workshop in Bristol, showing how this approach grabs the attention of the people participating. It likewise illustrates the lack of women in attendance in Bristol. Figure 22 was taken early in the day at the first workshop in India while the groups' were still being formed. Though it shows several women in attendance, more men were present than women.

As for the preparation of the participants, it was obvious that the more prepared they were, the more they enjoyed the workshop process. However, few made full use of the material available prior to the workshops except in Iceland. There, those who read the provided articles

said they understood better what was expected of them. One person complained about the mixture of languages (some material was presented in English), another complained that the word *convergence* was misleading, and a third found the material too complicated. However, the majority was pleased or reasonably pleased and four people wrote that they found the articles clear and concise.

Figure 22 The first workshop in India (photo: Alice-Marie Archer)

In Bristol, most of the participants had received an email or a leaflet prior to attending, but few seemed to have either read the leaflet properly or looked at the website. This became clear during the visioning exercise when one person complained loudly that he had not been told he was participating in an EU-funded research, even though that fact is both stated on the leaflet and announced clearly on the website. In my research notes I wrote that he was "very upset" and that he argued that he would not have participated had he known that, and I wondered if this was a sign of "research fatigue." Likewise, at that same workshop in Bristol, a couple of participants erroneously noted in their questionnaires that the information they received did not specify that the Converge Project was a scientific research; "It did not specify that the methodology is experimental" one person said and the other stated: "It was not precise and not very clear: who was behind it? why? how (methods)? etc." One of these respondents may have been the person who voiced his complaints during the workshop. This was surprising, because that point is made quite clear in the leaflet distributed. However, those who did

familiarize themselves with the available material seemed generally pleased with it: “Gave me some info on project,” one said.

In Tamil Nadu, little reading material other than the website was made available as few of the invitees spoke English. But those who attended the systems workshop in the two days leading up to the first workshop reported a better understanding of the workshop proceedings than others.

During the workshops, other problems with the language became obvious. In Bristol, some complained that the facilitators’ native tongue was not English (the presenters were Icelandic, Norwegian and Turkish) in addition to the fact that they did not understand the jargon used when systems approach was introduced: “The presentation was at times difficult to understand as this English was unusual. You may be helped with a more direct use of ordinary English” and that a “crisper presentation style would help greatly.” Furthermore, some of the questionnaires from India were clearly copied one from another, with the same answer appearing verbatim on several sheets, possibly because of lack of understanding of English. This occurred again in the second workshop.

6.6.1 Introductory lecture

The workshops began with the facilitators giving a lecture on the state of the world and that particular community, in addition to introducing the Converge research project and the research parties. The contents of the lecture are outlined in chapter 2, and focus on the predicament Earth and humankind is in, and underlines the need for contraction and convergence when it comes to sustainability and social justice. The aim was to raise awareness among the workshop participants on the state of the world and the predicament humankind is now in. To do so, we used the funnel metaphor (see figure 9) to explain how humans have an increasingly narrow space to manoeuvre within, and how convergence can offer a solution that can move the community towards sustainability and social equity. The connectedness of systems was explained and how changes in one area can affect another previously seemingly unrelated area. Information from the Global Footprint Networked showed the importance of contraction in developed countries, and illustrated the great difference in resource use (Ecological Footprint) between nations.

The planetary boundaries were discussed including resource depletion (such as oil and phosphorous) (Rockström et al. 2009), and social equity

discussed according to the United Nations' Universal Declaration of Human Rights and the meaning of human well-being explained in accordance to the Millennium Ecosystem Assessment. In addition, an introduction was given of the emerging school of thought on the possible fulfilling future for humankind without the traditional marriage between prosperity and growth (Jackson 2009). Furthermore, possible solutions at work in the world were introduced such as city food production and organic farming in Cuba and how to use human waste to recycle phosphorous. In India, we had been warned that it is culturally unacceptable for anyone but the lowest caste to touch human waste and that any discussion of human waste issues might be problematic, and while this discussion caused no stir in the other communities, I wrote in my notes in India: "Now [lecturer] says we must use human waste as well as animal waste, says she knows it's not culturally acceptable, but necessary [for recycling of phosphorous and for ground water sanitation reasons]. People's eyes avert. Says it's done in China, called night soil. Some nods."

In India, the lecture also included an introduction of organic agriculture in Tamil Nadu when of one of the participants, an organic farmer who gets more crops and/or higher price for his produce, told his story to other participants.

The lecture was given in Icelandic in Iceland, in English in the United Kingdom, and likewise in English in India but translated to Tamil simultaneously.

In India, an explanation of causal loop diagrams was offered after the introductory lecture, but in Iceland and Bristol the diagrams were not explained until the second workshop (see chapters 6.6 and 6.7).

The lecture received different responses in the communities, perhaps as the examples taken seemed too far removed from the participants' lives. On the one hand, the research notes state in all communities that people appeared somewhat apprehensive, which led us to include more local facts into the lecture as time passed. In Iceland, the very first workshop held, I wrote people were visibly sceptical at this time. Likewise, in India, in my research diary it says: "No questions, people jot things down from time to time. But not much. Some fall asleep. The look on people's faces is serious. [Lecturer] questions the real need to own many computers, many cars – these seem strange examples in this culture." However, when the lecturer moved onto examples from India, introduced an organic farmer present in the

audience and asked him to speak of his experience, people woke up and a very lively discussion arose in Tamil.

On the other hand, in the questionnaires, most people said they were very pleased with the lecture, though several in Bristol and slightly fewer in Iceland, said they had known most of the information given.

6.6.2 Envisioning the desired future – backcasting

All the workshops then moved onto an envisioning exercise of a sustainable food system for the area in question, which started the backcasting process. The aim was to break the ice, start people talking and to begin setting a future vision for the rest of the workshops. This exercise, called *Spaceship Iceland/Bristol/Tamil Nadu*, included the participants imagining their community suddenly isolated due to a catastrophe that made all import or export impossible. The participants had to focus on how their society could deal with such a reality. This exercise was given up to an hour in Iceland and Bristol, but in Tamil Nadu, only ten minutes were spent on it due to time limits as lunch was being served. Interestingly, these ten minutes appeared enough, which is a lesson that could be tested again in future research.

The session began with people being grouped onto tables of four to eight people. In all the workshops, the discussion began slowly, but quickly became very enlivened – in particular in India, where I noted in my research diary that though the women were a bit less inclined to speak than the men, they clearly enjoyed the conversation. “One man comes over and explains that people are so engaged because they understand [the scenario] and can participate [in Tamil],” I wrote in my notes.

After the spaceship exercise, some time was spent envisioning a sustainable future community, working with backcasting. Here, people were asked to consider sustainability and social equity and define within the limits set by convergence how success would look to them. The questions focused on were: *Imagine a sustainable Iceland/Bristol/Tamil Nadu – what does it look like? Where are we now*? The group started by imagining a certain date in the future and described the reality it wished to see then. The participants placed themselves mentally in the future and imagined they had already achieved success and that their community was now sustainable. During the visioning exercise, all ideas were written down, regardless of how utopian they sounded. Alongside it, the

participants collaboratively began defining system boundaries, listing the assumptions they made in their vision of a sustainable and just society, and writing a list of the obstacles noted by the group.

The research team had difficulties with the visioning part in all the communities, as noted by more than one participant who both mentioned it in informal conversations and in the questionnaires. This was because one of the academics in the Converge Project team was not in agreement with the rest of the group, believing it enough to tell the participants that their vision was a sustainable food system in their community and after such an announcement, the vision needed no more work. Despite many discussions between the researchers in between and prior to each workshop, this issue rose in every first workshop as was felt by the participants. One Bristol participant in particular complained about the disagreement within the research team in the questionnaire, stating it was clear to the participants that the facilitators "were not singing from the same hymn sheet throughout, which was confusing." Another participant in the Iceland group complained that two of the facilitators did not seem to understand what the groups were meant to do and jumped in to do their work for them, creating confusion within the groups and though particularly one of them "clearly had a tremendously good understanding of the material" they "indeed destroyed the group's initiative and originality before the work had commenced," he wrote in an email.

This underlines the need for the facilitators to be absolutely clear on the procedure before entering the room with the participants. The participants clearly indicated their desire to set their own and detailed future vision. In Iceland, we followed the visioning as then outlined in the Convergence Process methodology, and in England, the participants asked to be allowed to set their vision in detail after they realized that this one academic facilitator did not want to spend time on it while the others felt it was time well spent, as observed in my research notes. Those comments further stressed how fundamental the visioning exercise is as it firmly sets the ultimate goal in the participants' minds and therefore, the exercise was kept despite the opinion of one of the researchers. Indeed, in India, I wrote in my notes that the participants quite busily set their vision while the research team "yet again argued about the issue of visioning exercise."

Only after this exercise was the workshop's focus directed to the current food system in the area the workshop took place in.

6.6.3 World Café and causal loop diagrams

When the workshops broke into individual groups of five to seven people, the World Café method genially began, by having people rotate between tables at certain intervals. This method also caused problems within the research team in most of the workshops, as one of the research teams' academics thought "moving people around is a waste of time" as he said and I quoted in my research notes during the eight and ultimate workshop. However, the World Café style rotation of the participants was kept in the Convergence Process because with a couple of exceptions, the participants appeared to appreciate them and understand the purpose of changing tables. In the questionnaires some even suggested people should be rotated more: "It may also [have] been helpful if the groups were shuffled more regularly. Louder voices ended up dominating and the creativity of groups was therefore compromised." In India, it proved a challenge to move the women about, and the research team eventually agreed to divide the groups up by asking individual persons to move with the intention of evening out the gender differences, so that four to five men and two to three women sat at each table. "We organize them so there are no fewer than 2 women per table, this is very difficult, they do not want to do this, women look frightened," I wrote in my notes. However, this proved effective as I recorded shortly afterwards that many of the women seemed more at ease after awhile. I placed a rock on each table, explaining that it served as an aid for those who wish to speak and received large smiles from several women. Though I never saw anyone actually use the rocks, I noticed several women touching them during the process of the workshop, some of them speaking after doing so.

The causal loop diagram work went smoothly in Iceland and in Bristol, but no real causal loop diagrams were drawn during the first workshop in India as the participants did not receive instruction on how to draw them at this point. Instead, they drew an assortment of flow diagrams, charts, notes and lists, which the workshop facilitators translated into causal loop diagrams in the evening, noting the strong motives that appeared (such as soil fertility and household water).

The groups drew diagrams and presented to each other at certain intervals and at the end of the day.

Figure 23 Causal loop diagram drawn by the workshop participants in Iceland (photo: Hrönn Hrafnsdóttir)

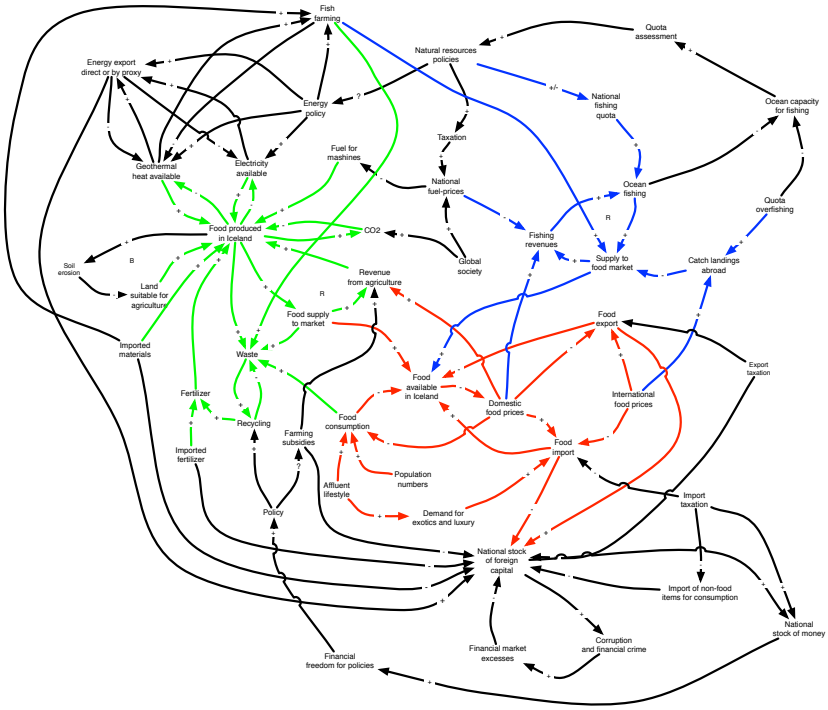

Figure 24 A causal loop diagram combining all the groups' diagrams during the first workshop in Iceland (drafted by Harald Sverdrup in Kristinsdóttir et al. 2012)

Figure 23 is a photograph of a diagram drawn by the participants during the first workshop in Iceland. It shows how intricate the diagrams can become and how the cyclical appearance of the system emerges while

drawing these diagrams. After the workshop, the team gathered all the diagrams and one team member compiled the day's work into a single more complicated version, figure 24 (Kristinsdóttir et al. 2012). The colours are for clarification, they are a first start at identifying different subsystems gathered into a cohesive whole in one diagram – thereby showing how the different systems connect.

The questionnaires and the research notes from the first and second workshop combined indicate that more of a formal lecture on causal loop diagrams is needed in the first workshop, and therefore, the lecture described in chapter 6.7.2 (second workshop) has been moved up to the first workshop for the final version of the Convergence Process.

6.6.4 Other observations made during the first workshops

A marked cultural difference was in the participants' expectations after the first workshop. The Icelanders were hopeful but somewhat sceptical. Many reported they were pleased to understand the holistic approach of systems thinking better, saying things such as "Solutions / approaches more clear," that the Convergence Process "explains the picture (the whole picture)" and that this method allows for a better understanding of "processes and systems within food production." Scepticism was noticeable, though, as seen by one person's words: "Models are academic by nature. They are useful as a base. The challenge is to translate them into action."

The British participants were more critical and sceptical of the process, and wrote things such as that they were not convinced governments would appreciate this process, that the Convergence Process "may be too academic" and that the process itself was still too unclear for them to have great expectations of it: "Not sure what it may do of yet – unclear of any benefits?" and "Not yet clear what we are trying to achieve."

Meanwhile, not one person out of 33 responsees in Tamil Nadu was critical of the process and all reported they expected the methodology that was being developed would help them in the future. Most people there wrote appreciative things such as they gained "[b]roader understand[ing] of food system through others sharing," that this methodology would help "[i]n academic programme education" and that it was helpful because "we work together for a common goal."

These responses indicate that the process was likely too complicated at first and the researchers were not confident in presenting it during the first workshop in Iceland and Bristol. By the time the workshop was held in India, all three had been run twice over in Europe, so we, the facilitators, had polished our presentation style and mode of running the Convergence Process. Furthermore, they may indicate that the participants in Iceland were hopeful and eager to contribute to finding a lasting solution for their food system, whereas the British participants, who had already seen a lot of sustainability initiatives come and go, were much more seasoned in such work and not as hopeful. In India, people may have been very hopeful at the end of the day or they may simply have been too polite to criticize the process.

However, the networking that occurred was unanimously well received by the participants in all three communities. One English person wrote that it was "good to be with people on the same page" and another that to get an insight into systems approach was helpful: "it shows interdependencies and makes [the] very abstract tangible." This indicates both the desire of the citizens to participate in making their community more sustainable and socially just, and likewise, a lack of an active platform in all three communities for people to voice their concerns and to be able to make a difference. This is in line with the findings of American political scientist Iris Marion Young (2000), who says that though democracy is the only known method of governance that allows the public to elect the government it wants, its demise lies in the fact that minority groups often have little or no say in matters because more influential groups are more powerful. The public is an audience, rather than an actor in its own society, despite the fact that the public does not lack the interest in politics and participation (Stoker 2006)

6.7 Second workshop – system mapping and system insight

The second workshop was held some weeks after the first workshop in Iceland and Bristol, but the following day in Tamil Nadu. The aim was to gain more systems insight, in addition to further develop the Convergence Process.

The diagrams resulting from the first workshop (either created by the groups or assembled by the team) were used to explain the diagrams to the audience and worked as a starting point for the day's work, along

with the vision the participants had already set, lists of obstacles, assumptions and system boundaries. During the workshop, the groups continued drawing causal loop diagrams focusing still on the baseline, and begun brainstorming and searching for creative solutions and actions, prioritizing those that were considered easiest and/or most important.

Of note is that in Bristol, because of how few volunteer participants showed up, the Converge team agreed to have those team members who lived in the area participate to get a more diverse vision of the baseline. No questionnaires were collected from the team, nor were they counted in the total number of participants, in order to keep the continued development of the Convergence Process as unbiased as possible.

6.7.1 Recapture and vision in the second workshop

All the second workshops begun with a welcoming note and in Iceland and India, a short reminder of the previous workshops' outcome, such as the vision, the Convergence Principles, their community's food system baseline and the system boundaries set. This is an important beginning to consequent workshops, as we learned in Bristol. There, by oversight no formal recapture was done of the previous workshop, which caused confusion among the newcomers, I wrote in my research notes. This was unfortunate, as such a recapture would have been especially important in Bristol, as few of the English participants seemed to have read the report sent to them, though most agreed they had received it. This unintentional experience underscored how necessary it is to start each workshop with a short summary.

6.7.2 Causal loop diagrams lecture

In Iceland, it was clear the participants needed more of an introduction to causal loop diagrams than we had previously given them, and therefore workshop two in Iceland began with a short lecture on the diagrams. In my research notes for Iceland's lecture, I noted that people's attention wandered greatly and wrote "lecture far too complicated. Must keep to the very simple [...] and use what we've already done." The participants were asked about the lecture in the questionnaire and their answers corresponded with my notes, as people answered that it was helpful but should have been simplified.

In accordance to the lesson learned in Iceland, the diagrams lecture in Bristol was less formal and more pointed towards the participants and the

diagrams from last time were explained in detail. This appeared to work and the facilitator giving the lecture held "the attention of the people in the room" while discussing the diagrams, I wrote in my notes.

In India, the facilitator whose job it had been to explain the causal loop diagrams intended to introduce them during the first day, but ran out of time. As a result, the diagrams created by the team in the evening of the first workshop's day were explained step by step in the morning of the second day, which seemed enough – particularly since some of the participants had already attended the course on systems thinking that was offered prior to the workshops (see chapter 6.5.1).

As explained above, the combined lessons learned during the three second workshops resulted in the causal loop lecture first to be introduced to the process; second, to be simplified greatly from when it was first presented; and third, moved from the second workshop to the first in the final version of the Convergence Process, at the same time as the summary at the beginning of the second workshop includes a short overview of the causal loop diagrams created last time, containing a lesson on how to read and draw such a diagram.

6.7.3 Causal loop diagrams in the second workshops

The participants' goal for the day was to add system mapping and system insight to the work already done; gain greater system insight and begin to identify solutions without focusing on those. The vision had been firmly set, some obstacles identified and work on the baseline causal loop diagrams continued, where the current system was mapped out. The participants began discussing the current policies and possible policy changes that might bring the community towards the participants' desired future. Possible solutions and indicators, that were to be used to create an action plan and monitoring system, were jotted down either in a different colour or on a different piece of paper, but participants were warned from placing too much emphasis on the solutions as of yet (especially in the morning session), as that work was to be done later; the solutions are the main goal of the third workshop.

Figure 25 was taken during the second workshop in Iceland, and shows the participants working. Their efforts included adding missing links and loops into the diagram combined by the workshop facilitators in between the workshops. When studying figure 24 for example, the Icelandic participants

discovered the economic impact was missing, along with grain and seed banks, public health and the distribution network, to name but a few.

Figure 25 The second workshop in Iceland (photo: Hrönn Hrafnsdóttir)

At this stage, the whole system can be too large for all the groups to work on. Therefore, three groups were formed in Iceland – greenhouse agriculture; traditional agriculture (crops, vegetables) and animal husbandry; and ocean fishing and aquaculture. In Bristol, four groups were formed – health; consumer choices; supermarkets; and economics.

As before, the groups introduced their diagrams to the rest of the group after certain intervals and at the end of the day, during which I took notes as before. A problem in India occurred when most of the explanation occurred in Tamil, because I did not understand what was omitted by the translators. The participants, however, understood the discussions and the diagrams were mostly in English.

6.7.4 Other observations made during the second workshops

Several other observations were made and a few more lessons were learned during workshop two. The participants begun to understand the process better and on the whole, were positive towards it.

The Bristol participants were still very sceptical after the second workshop, but were beginning to get a grasp of the purpose and appeared more pleased than before. One person wrote: “Much more detail and interesting discussions than last time. Much more positive conclusions.”

The Icelanders were on the whole not as positive as before on whether this methodology would be beneficial, but were overall rather positive, saying things such as that the process "increases my awareness," "it helps people to see the big picture. Think outside of one's normal surroundings and home" and that looking at the whole system is necessary for any solution to work. The new concepts and words were again criticized, and while some were very pleased with the outcome of the work, others still reported confusion on the method used. One person reported that the work done during the workshop was very "practical work" and that it was "good to work with these tools, but in the end, all needs to be translated into a human tongue."

On the whole, the Indian participants in the second workshop reported pleasure with the approach and the outcome, one stating that they had been made to "think out of box," having arrived searching for solutions and found some interesting alternative solutions. Another said it would be helpful to have such workshops on a monthly basis. Two Indians wrote "Instead of blaming the Dark we can light a single lamp. Well understood. Instead of blaming we should go with solution. Well understood." Though clear that one person copied from another verbatim (with some spelling mistakes in the version not shown here), the message is clear; they left the workshop with hope for the future.

The growing appreciation of the work can be viewed via Arnstein's Ladder of Citizen Participation (figure 2). The participants had begun to feel they were moving up the ladder, that their contribution mattered, and that citizens sat at an equal level to government officials around the tables. The general experience in the workshops was that public participation democracy was occurring, where the citizens have direct influence on the governance of their society. However, as the Convergence Process workshops were a researcher-driven research rather than community- or government-driven public participatory process, and as the action plan was neither created nor implemented, this needs to be researched further. The process should be applied by a community, with full involvement of government officials, in order to see the full effects of the public participatory democratic aspect of the Convergence Process.

The participants appeared to realize this too, because several people wished for more time to be spent upon the workshops, in particular in India at this stage. One Indian wrote: "Programme duration should be 5 to

7 days. So that so much information we can share from each participant." Another wrote: "Not sufficient time to discuss in depth regarding any given problem & its possible solutions" and a third one: "We have to discuss more topics." The longing for a strategic plan was clear, as seen by these comments: "The discussion made today is towards the sustainability only. But the achievement of sustainability is not an easy" and: "In general it is not a very ease task to analyse and understand and asses the food system; and its sustainability, however the organiser where able to made in & understood the linkages of food to understand various connectivity & linkages needed for such effort."

Again, the networking that occurred appeared to please the participants greatly and the stakeholder invitation process seemed to work especially well. Many Icelanders mentioned how pleased they were with the selection of participants and the opportunity to meet others working in the same field or thinking along the same notes. This was also the case in Bristol, where one person reported: "A great selection of interesting and informed people. An enlightening discussion of the many complex issues involved in the global / local food system" and others asked for the contact information of other participants so the conversation could continue off-site. The Indian participants in workshop two were likewise pleased with the networking occurring, with one person saying: "So much awareness and information collected from participants," and another: "I meet so many villagers and youth [and] I can promote a reality that exists." However, one person in India complained that "It is not possible to discuss everything in frank" during the workshops, which indicated that despite the World Café approach, that person did not feel safe enough to share his or her views.

Despite this one complaint, the networking occurring in the World Café approach should not be underestimated in a public participatory democratic process like the Convergence Process, and led to a firmer belief in the need to rotate the groups on a regular basis, especially in the early stages of the group work.

6.8 Third workshop – solutions and action plan

A third workshop was held in Iceland and in Bristol, where the focus was upon finding solutions and prioritizing. The workshops started with recapturing the work done in the previous two workshops. The baseline causal loop diagrams were then studied and solutions identified. The

groups were not divided according to subjects like in the second workshop, but rather focused on the diagrams already created and attempted to identify solutions.

Again, a marked difference in the gender composition of participants occurred in the two communities, with 11 women and three men in Iceland but two women and 12 men in Bristol. The numbers of participants bears some explaining. In Bristol, due to the few people attending in the second workshop, an effort was put into getting more people both by inviting more people and by making the venue more accessible – as noted positively upon in the questionnaire by one participant who had been invited before but been unable to attend. This resulted in seven new participants and seven who had attended before. Meanwhile, in Iceland, seven would-be participants called in cancellations as they were weather-bound due to one of the winters' worst snowstorms, indicating the interest in the project still held by the Icelandic participants at this time.

In hindsight, an action plan and a monitoring scheme should be made in this workshop. This did not occur in the Convergence Process workshops, because time-wise, a fourth workshop would have had to be held in both communities to complete that work, and both time and budget barred a fourth workshop.

6.8.1 Recapture and vision in the third workshop

Like before, the third workshops began with an overview of the work done previously. The facilitators went step by step over the causal loop diagrams and the written reports sent to the participants prior to the third workshop, to get a common understanding of where the group was at and where the day's work should start from. The vision was also clarified anew, and the role of the third workshop illuminated – to find solutions.

Such a thorough overhaul may have wasted time for those who had attended two workshops previously, but it assured that the new participants understood the work and could participate fully. It was especially needed in Bristol, where half of the participants were new, and underlined the need for a flexible approach in the final outcome of the process, where the facilitators can estimate how much of a summary to give at the start of each workshop.

6.8.2 Causal loop diagrams in the third workshops

The overall goal with the third workshop was to identify solutions. The groups studied their previous diagrams with the intention of closing gaps, detecting missing links and correct what may work better, and coming up with viable solutions.

Figure 26 The third workshop in Bristol (photo: Alice-Marie Archer)

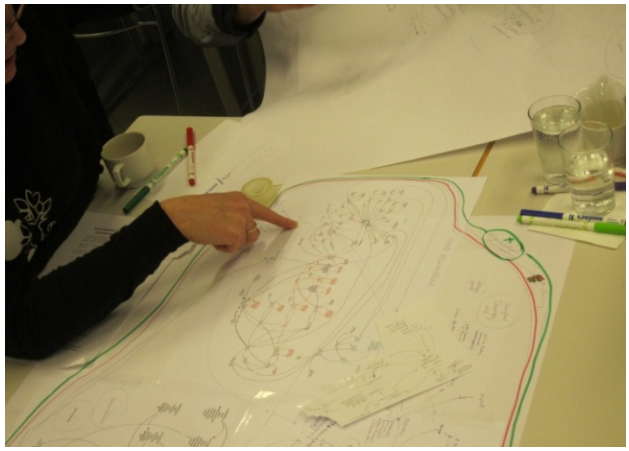

Figure 27 Solutions identified in the third workshop in Iceland (photo: Hrönn Hrafnsdóttir)

Figure 26 was taken during the third workshop in Bristol, and shows a team member adding a detail to a diagram the group had already created and figure 27 shows a workshop participants identifying possible solutions to

her other group members, working with the causal loop diagrams from the second workshop.

In Bristol, problems such as oil dependency, health issues, alterative uses of food waste other than landfills were discussed, and solutions considered. Likewise, in Iceland, possible general solutions that needed more discussion were identified, such as the need to produce biofuel and energy out of algae and aqua-plants, along with the need for a seed bank, and the possibility of using refuse for fertilizers, but time constraints did not allow for as thorough a discussion of viable and tangible solutions as might have been desired. Nonetheless, some real solutions emerged, such as using geothermal waste water to increase carrot production in plots heated with excess hot water from greenhouses.

Much progress was made in clarifying the system map diagrams and identifying both problematic areas and possible solutions, but at least one more workshop in both places would have been helpful in finding more specific details in the solutions identified and to create the action plan. This need for more workshops underlined that the Convergence Process must allow for flexibility in the number of workshops. The participants were interested in the work and many indicated they would come to more workshops, were they to be held, which also signifies their interest and belief in the work they were doing, as the Icelander who wrote: "Could have been longer, lacks at least one day." In addition, such comments further underline the need for a public participatory process like the Convergence Process to realistically bring communities towards sustainability and social equity.

6.8.3 Other observations made during the third workshops

As in the previous two workshops, participants in both countries were pleased with the networking occurring during the day. Most of the Icelanders, for example, reported in the questionnaires that they intended to continue speaking with their co-participants. Again, some of the English participants asked for their co-participants' contact information (those who chose offered their information via the Facebook site), and business ideas rose within the group in Iceland, as reported by one participant who said he or she would like to "apply for a grant to map the business opportunities & make this information accessible to the public.

Anyone can create a job & income by solving problems." Again, this indicates the need for an active platform in the communities for citizens concerned about sustainability and social equity to voice their concerns and be heard by the relevant authorities.

The Convergence Process offers such a platform, as could be seen in the fact that both communities' participants reported more pleasure with the methodology in the third workshop than previously, commenting upon being "allowed to state my ideas" and "people are in agreement with my ideas and have given me much new knowledge." Several people noted that it was useful to map the whole system, thereby identifying both problems and solutions possible. The Bristol participants reported their pleasure with sentences such as: "Allowed me to more clearly see the system as a whole and its strengths and weaknesses" and: "It's great that people are creating systemic methods of both the failed systems and noble solution."

However, participants in both communities were aware that the Convergence Process workshop testing was researcher-driven, rather than community- or government-driven, and voiced concerns about whether the information and solutions found in the workshops would be used by authorities. One Icelander began by praising the work done, but added that it was necessary to get the information to "the right people," and another participant in Bristol said: "May not be used by decision-makers or those running the food system." Some wondered whether the message would reach the ears of those who need to hear it most, as the one that wrote that there was "[r]isk of preaching only to converted." Furthermore, people complained again about the lack of key stakeholders: "Some key players were missing e.g. decision makers, [?], health sector."

The Bristol group seemed quite aware of social problems and realized they were a hindrance to reaching their desired goal; "because a large part of sustainability is the social situation – if there's a problem there, that may mean there is no sustainability" I wrote in my notes. They were discussing local social issues, but global issues were likewise discussed to a degree in both Iceland and Bristol, in particular issues that related directly to the local food systems, such as import of flowers from Kenya to Iceland and the benefits of the Fair Trade organization to both producer and consumer.

In addition, more time and attention could, and perhaps should, have been given to the contraction and convergence aspect of the workshops –

mostly the participants focused on contraction and local social equity In Iceland, however, where people are generally aware that much of the vegetables and nearly all the fruit is imported, some discussion rose on import and export, and the human rights of communities elsewhere in the world. However, the issue appeared too large and vague at this stage, when the mapping of the local system and finding solutions to its problems was a large and complicated enough. That said, this aspect was also brought in by the facilitators, who in this run of the Convergence Process had a greater knowledge of the global system than the local citizens. With a later run of the Convergence Process workshops, especially if they are community- or government-driven, this aspect should be emphasised more and studied weather it is too large an issue for a group of citizens, focusing upon mapping their local system of choice, and if so, more attention should be placed on bringing the global aspect in by the facilitators in the work between the workshops.

6.9 Action plan created, implemented and monitored

For a public participatory process to be effective, the results of the workshop must be evaluated, summarized and taken seriously by the authorities and citizens of the community (Young 2000; Few, Brown and Tompkins 2006; Stoker 2006). To that end, the workshop facilitators must be capable of reading the workshop results – the causal loop diagrams – and be able to communicate them to the public and appropriate authorities. An action plan needs to be created, agreed to by the citizens and the authorities, implemented and finally, monitored and adjusted as time passes.

This action plan was out of the scope of this research – the purpose here was to create the Convergence Process and financial and time restraints did not allow for the work necessary in reaching the appropriate authorities and ensuring the workshops' message is incorporated in governmental policy changes (see discussion in chapter 8).

However, some of the initial and necessary preparation work for an action plan to be developed was done. Placing much weight on understanding and translating the outcome of the workshops so the participants and others could understand it, I wrote a synopsis of every workshop, into which another team member inserted the causal loop diagrams. The report was then sent to the participants asking for feedback

received and I collected the responses. After the three workshops, I summarized the whole process and drew out the main points into reports that I likewise distributed to the participants with the aid of other team members in England and India. In order to create a report like this, it is necessary that the person writing the report has taken notes at the workshop itself, and that she has a thorough understanding of causal loop diagrams. She does not need to have a university education in systems analysis and causal loop diagrams, but she needs to have studied both and have experience in reading causal loop diagrams, along with being able to listen and note what has occurred at the workshop.

Finally, a very useful tool to use when creating an action plan and selecting viable solutions is the decision support protocol (see chapter 4.2.3), which I adapted to the Convergence Process. In this research, these questions were not put to the test, but they are recommended and included in the Convergence Process for communities to use in the field, as they are a simple and effective tool to sort possible solutions that may move the community more to greater sustainability and social equity.

7 The Convergence Process

The aim with this Ph.D. dissertation is to create a method communities can use to move towards increased sustainability and social equity without the intervention of academics or researchers. Therefore, it is of utmost significance to devote a whole chapter to the process in its entirety. This chapter is written for potential workshop facilitators and outlines the complete Convergence Process in its final version.

It is important to observe that this chapter does contain repetitions from earlier chapters of images, tables and text, but I cannot avoid this because though earlier chapters offer insight into the development of the Convergence Process as well as into the testing of it, the process in its entirety has not been presented yet. It is also important to note that though the focus within this dissertation has been on the food systems of the communities, the Convergence Process is usable for other systems within the communities, such as the energy system or the educational system.

This chapter served as a base for Converge Project Deliverable 37 (Kristinsdóttir et al. 2013).

7.1 An overview of the process

The Convergence Process consists of several tools and methods, which when mixed together provide a thorough methodology for communities wishing to reach increased sustainability and social equity. This is done with a public participatory process, where local citizens within a community's single system come together and collectively find solutions that may bring them toward increased sustainability and social equity. Here, the system demonstrated is a community's food system, but other systems within the society may be used as well, such as the transport system, energy system or others.

The tools and methods are:

- The three Convergence Principles for sustainability and social equity
- Selection of stakeholders
  - System value chain
  - Stakeholder identification template
- Participatory workshops

- World Café-style workshops
- The ABCD Process
- Introductory lecture
  - State of the world, Ecological Footprint, resource depletion, overpopulation
  - The Natural Step funnel
  - The sustainability compass
  - Causal loop diagrams introduced
- Visioning
  - Backcasting
- Systems analysis
  - System mapped with causal loop diagrams
  - Solutions identified
- Systematic action plan created
- Monitoring system created

• Dissemination and implementation of the plan
  - Follow-up report with selected conceptual models (causal loop diagrams), an action plan and monitoring system distributed to key stakeholders
  - Action plan implemented and monitored

Taken together, these create an effective public participatory methodology that can be used by larger or smaller communities.

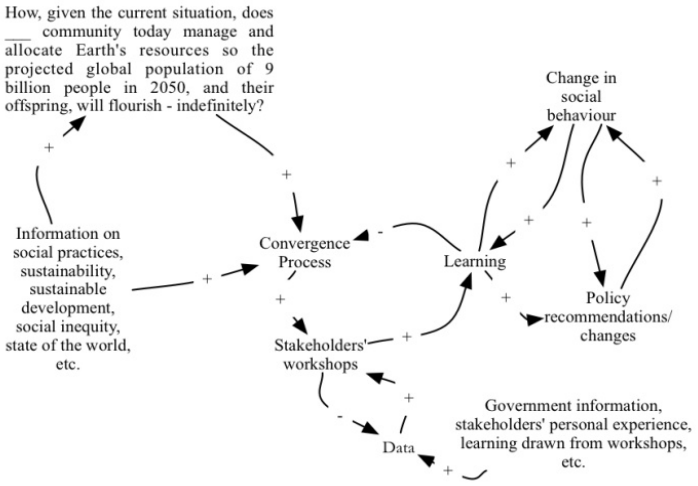

Figure 28 The Convergence Process within a community

The intention with the workshops can be seen in figure 28, which depicts the Convergence Process for any given community. It shows how awareness of the current state of the world leads a community to wonder about the future and choose the Convergence Process. That choice leads to stakeholder workshops and learning within the community, which again leads to changes in social behaviour and policy recommendations.

7.2 The Convergence Principles for sustainability and social equity

The Convergence Principles set the tone for the workshops and all other work done in relation to the Convergence Process. They describe a community on its way to sustainability and lay the milestones needed to reach a world the workshop participants may wish to pass on to their descendants.

Convergence for sustainability is the progress towards equal opportunities for all people, within biophysical planetary boundaries.

1. **In a converging society, every global citizen has the right to a fair share of Earth's biocapacity and social resources, to enable him or her to live a fulfilling life.**
2. **A converging society uses its resources efficiently, recognizing the critical value of services from natural systems and limiting its harmful impacts upon them. It recognizes interdependence amongst human societies and between human societies and nature.**
3. **A converging society invests positively in human, social and environmental resources; and cares for them, maintains them and restores.**

The principles should be given to the participants both before the workshops as well as during the workshops, and the participants should be encouraged to take them home with them as a reminder of the work in between the workshops.

7.3 Selection of stakeholders

Here, the first steps in the World Café method are taken, by selecting the workshop theme, as well as identifying and inviting participants. Care must be taken when identifying and inviting workshop participants to get as broad a spectrum of citizens as possible as well as to have the key

people involved. Likewise, care must be taken to get a group of a manageable size for the facilitators – no less than 20 and no more than 50 participants is most effective.

For this, two tools can help – the system value chain (figure 29) and the stakeholder identification template (table 8), that need to be used together to get as good an oversight as possible on the community and individual participants. Here, they are set for a community's food system, but both can be adjusted to fit any other system chosen by the Convergence Process workshop facilitators.

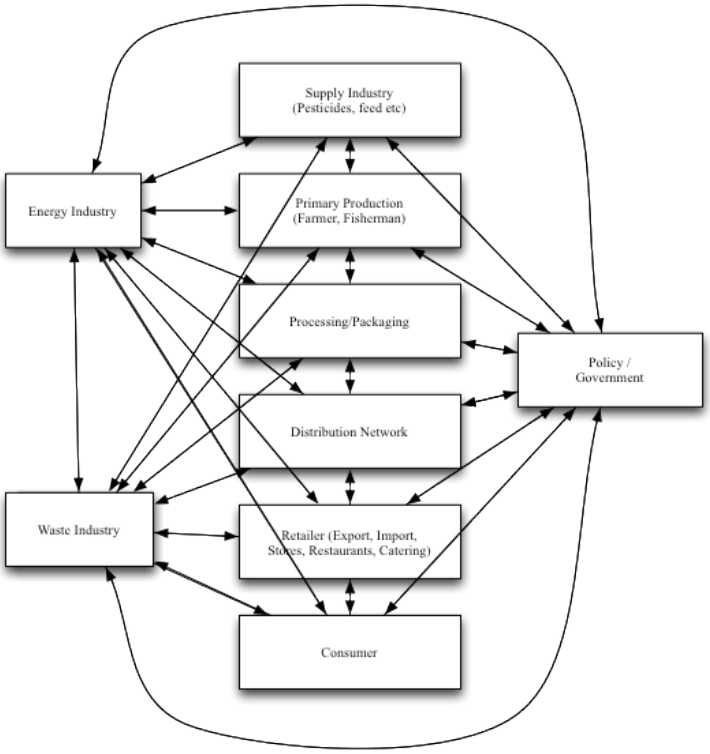

Figure 29 The Convergence Process food value chain

A value chain such as seen in figure 29 shows the activities that bring a product from raw material through different stages of production and delivery to consumers, including waste disposal, the energy industry and various levels of government. This value chain can be revised for other consumer good systems, such as the clothing or the fossil fuel systems, to

name a few. It depicts the route food items take from the supply industry to primary production parties such as farmers and fishermen; to processing and packaging; to the distribution network; to retailers such as export and import companies, grocery stores, restaurants and catering companies; and finally to the consumer. At every stage, the energy industry, the waste industry and various levels of governments are involved. The value chain offers a common-sense diagram of the system that is being studied, and if used as a tool to select stakeholders, it gives an overview of individual sections within the system from where the stakeholders should be selected.

Table 8 Convergence Process stakeholder identification template

Stakeholder	Specific inf. on why involved etc.	Contact inf.	Connection to Convergence Process	Location w/in value chain
National government				
Local government				
Institutions				
Educational institutions incl. economists				
Private companies incl. food processors, import, export and distributors				
Local media				
NGOs – grassroots incl. farmers' assoc.				
Others – incl. individual citizens etc..				

But the value chain does not cover all aspects of the system being studied, and therefore, the stakeholder identification template (see table 8) is needed as well.

The stakeholder identification template offers a deeper analysis of possible invitees, and ensures even further that stakeholders from all levels of convergence governance are given the opportunity to participate in the Convergence Process and thus maximising the potential success of the project. It allows the workshop facilitators to identify easily some of the local heavyweight stakeholders, such as media outlets and educational institutions in the community that might be beneficial to include.

Of utmost importance is that more than one person choose who should be invited, and that the people engaged in selecting the participants have a good overall insight into the society in question.

7.4 The Convergence Process participatory workshops

At the Convergence Process World Café setting during the workshops, these seven integrated principles are followed (adapted here to fit the Convergence Process from Brown and Isaacs 2005; Tan and Brown 2005):

1. **Set the context.**

   The facilitators intentionally set the parameters and clarify the purpose of the workshop – that is, to increase sustainability and social equity within the community at stake, either as a whole or within a certain sector of it. They also choose who should be invited using the systems value chain and the stakeholder identification template, and what themes are most pertinent. Furthermore, they make it clear to the participants how many World Café workshops are planned (as one or two is often not enough). If appropriate, they offer reading material for the participants' preparation.

2. **Create hospitable space.**

   The facilitators ensure that the space that houses the workshops is welcoming, provides personal comfort and psychological safety in order to encourage personal comfort and mutual respect. This is done for example by ensuring that free coffee, tea, lunches and snacks are available. Small tables with seats for four to five people each are prepared, covered with A2 sized paper and provided with multicoloured pens for jotting down

thoughts and drawing up causal loop diagrams of the system at hand. Coat hangers and clear directions to the workshop's location should also be provided, and people should be welcomed personally upon entering the premises.

3. **Explore questions that matter.**

   The facilitators ensure that the groups focus collectively on powerful questions on sustainability and social equity that attract communal engagement.

4. **Encourage everyone's contribution.**

   The facilitators and the participants ensure that the voices of all those participating are heard and honoured. Within some cultures and groups (for example where it can be assumed that one group of people will speak more than others, such as in a patriarchal society where government officials participate with poverty stricken single mothers) it helps to put a rock on the table, and when people take the rock in their hand, others must give that person an opportunity to speak and be heard. The facilitators also remind the participants that no idea or thought is wrong – innovative solutions can arise from what is at first considered utopian or odd. The participants write their thoughts and ideas down on a piece of paper, eventually gathered together in simple flow charts and causal loop diagrams.

5. **Connect diverse perspectives.**

   The facilitators invite people to switch tables at certain points in the discussion to cross-fertilize and make the conversations livelier. New points emerge within new groups, and all should be written down and drawn into causal loop diagrams when appropriate.

6. **Listen together for patterns and insights.**

   The participants are encouraged to listen actively as a group, and pay attention to themes, patterns and insights in order to gain a better view of the system as a whole. Drawing the causal loop diagrams helps in particular.

7. **Share collective discoveries.**

   The facilitators ensure that the collective knowledge that has been gathered during the workshop is displayed and made

visible to other participants at the end of the session. In addition, they assemble, analyse and evaluate the final results of the workshops, write them up into a report and disseminate them to the participants as well as other relevant parties.

Furthermore, the Convergence Process participatory workshops follow the ABCD method of The Natural Step (figure 30).

The workshops begin in step A, Awareness and Vision, where the participants' awareness of the state of their community and the world is raised, and they are given the opportunity to envision a sustainable and socially equal future. This is done in two parts – first with an introductory lecture (see chapter 7.4.2), during which the audience is introduced to the notion of planetary boundaries, the rapidly growing human population and nations' individual ecological footprints, along with the United Nations' projections of diminishing food and water security in various parts of the world. The aim is to familiarise the workshop participants with the bigger system within which humans operate, and to realize that impacts of any action can reach far and last for a long time. The emphasis should be placed equally upon opportunities and threats.

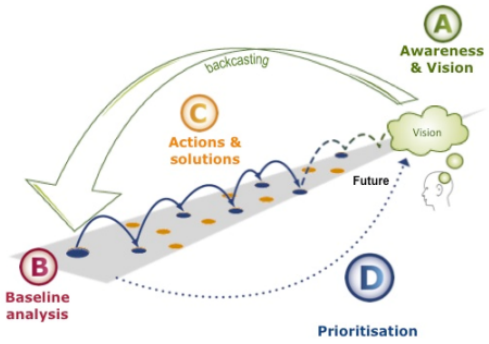

Figure 30 The Natural Step ABCD approach (TNS 2011)

The second half of step A is to lay out a strong vision of the future the participants desire – a more sustainable and socially equal world than they now live in, focusing on the system chosen for the workshops. The workshop participants imagine a future in which sustainability has been reached in their community. They place themselves mentally in that future scenario, and look around and see what has been achieved. It is

important to speak in the present during this exercise, as if the reality people envision is already true.

Step B, Baseline Analysis (see chapter 7.4.4), rises naturally out of step A. The baseline is partly given during the introductory lecture, but after the visioning exercise, an assessment of the present conditions is laid out by listing current flows and practices that either help or hinder sustainability and social equity.

Step C is Actions and Solutions (see chapter 7.4.5). Here, solutions are found using backcasting and causal loop diagrams. The workshop participants imagine themselves in the future and look back to see how they reached their imaginary-present state. They map the system they wish to have, drawing in possible solutions from the system they now live with. All possible actions and solutions are written down, with as little editing as possible, since sorting and prioritizing of ideas comes later in the process.

Step D, Prioritization, is the final stage which includes selecting the most viable solutions (see chapters 7.4.5 and 7.5). Here, an action plan is created and the solutions prioritized, starting with a mixture of easily attainable goals, often called low-hanging fruit, and more complex and longer-term goals. This step is done both at the workshops themselves as well as by facilitators in between and after the workshops, as the final results are analysed by the facilitating team and presented in a written report with causal loop diagrams for explanation (see chapter 7.5).

A detailed explanation of systems thinking and causal loop diagrams is given below, in the appropriate context of the workshop contents.

7.4.1 An outline of the workshops

The Convergence Workshops are explained in detail in the subchapters, but the general outline is as such:

1. **First workshop – Awareness, vision, obstacles and baseline – A and B**
   a. Awareness lecture –the baseline first outlined
      i. State of the world – population growth, rise in consumerism, diminishing resources, etc.
      ii. Future of humankind if business goes on as usual
      iii. Sustainability and social equity explained, Convergence Principles introduced
      iv. Causal loop diagrams introduced
      v. Demonstration of the process of the Convergence workshops

b. Vision, obstacles – large group works together
    i. Spaceship community project (10-15 minutes with the whole group)
    ii. Group focuses collectively on the common vision – the question: "We are in the year __ and our __ system is sustainable and socially equal. What does it look like?" Present tense used, single or plural first person ("I/we are here"). Group stays away from analysing problems but writes a list or flow chart of the obstacles on a separate piece of paper or whiteboard. List of the system boundaries also created, list of assumptions created
c. Baseline mapped with causal loop diagrams – smaller groups work individually and are rotated every 20 minutes to an hour
    i. The question: "What does our system look like today?"
    ii. Facilitators give a short lecture while drawing a causal loop diagram of the current system, explaining the process
    iii. Then divided into groups that continue elaborating causal loop diagram, flow charts and lists of the current baseline

2. Second workshop – systems mapping and systems insight – C and D
a. Short summary of last workshop's work, including an introduction of last workshop's causal loop diagrams and how to draw such a diagram
b. Systems mapping – smaller groups work individually and are rotated every 20 minutes to an hour
    i. Mental models of the baseline mapped in causal loop diagrams
c. Systems insight
    i. Possible solutions begin to appear and are noted down separately or in different colour

3. Third workshop – solutions and action plan – D
a. Systems mapping and solutions – smaller groups work individually and are rotated every 20 minutes to an hour
    i. Work continues with causal loop diagrams
    ii. Solutions identified and prioritized (low-hanging fruit picked first)
b. Action and monitoring plans
    i. Systematic action plan created
    ii. A rigid monitoring scheme created

4. Follow-up – D
a. Systematic action plan and monitoring scheme introduced to and adopted by relevant stakeholders (for example national/municipal governments, educational institutions, grassroots movements etc.)
    i. Systematic action plan followed and revised on a regular basis
    ii. Monitoring scheme followed and revised on a regular basis

For clarification sake, as few workshops as possible are listed here. More workshops may be added as needed, but it is unlikely that fewer than three will suffice.

7.4.2 Step A – introductory lecture on the state of Earth, convergence, systems, and causal loop diagrams

At the beginning of a Convergence Process workshop series, an introductory lecture must be given, where Earth's lack of sustainability is brought to the front, including the current use of the planet's limited resources, over-consumption and population growth. Attention is given to the fact that Earth is a closed system where occurrences in one part can affect events in another section in both foreseeable and unforeseeable manners. Human society is bound within a complex socio-ecological system where changes in one part affect other system parts, and that time lags can have great effects. Therefore, the importance of studying a system as a whole, rather than only individual parts of it, is essential, if viable, dependable solutions are to be found. Furthermore, the lecturer mentions the fact that humans as of yet have no other option than Earth, along with the evident standard of living gap both between and within communities, along with the future prospects of humanity if we continue business as usual.

Then the Convergence Principles are initiated, along with the idea of sustainable de-growth – offering an insight into a more sustainable and equal world, where standards of living have not diminished. In addition to ending the lecture on a hopeful note, this view offers an alternative viewpoint, of a sustainable and socially just society.

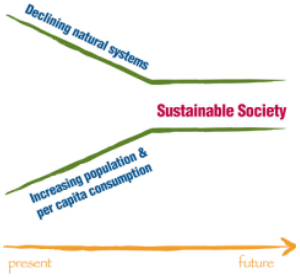

Figure 31 The funnel metaphor (TNS 2011)

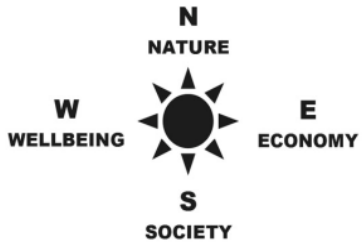

Figure 32 The Sustainability Compass (AtKisson 2008 pp. 142)

Helpful tools to use during the lecture are the funnel metaphor (TNS 2011) and the Sustainability Compass (AtKisson 2008). The funnel metaphor (figure 31) makes the message clear and visual. It shows the workshop participants how increasing population along with increasing resource demand leaves humanity less room to manoeuvre and that the more sustainable actions a society chooses, the better off it is (Cook 2004). The Sustainability Compass (figure 32) is a simple method to help people keep in mind four aspects of sustainability – nature, well-being, society and economy. These are arranged in a compass, making use of the four directions (North, East, South and West) familiar to most people.

Furthermore, as most people have no experience in drawing causal loop diagrams, the introductory lecture must include a session on causal loop diagrams and an explanation on how they are helpful in mapping the system being studied. The lecture can for example conclude on a note that leads into the work ahead, by showing simple causal loop diagrams that depict the work that occurs during the Convergence Process' workshops. Figures 33 and 34 are examples of causal loop diagrams that depict the workshops and show that causal loop diagrams of essentially the same process can vary. Furthermore, they underline that there are no right or wrong answers, and indicate how the question asked at the beginning can alter the diagram. Both give an overview of what occurs at the Convergence Process workshops, but they are quite different.

Figure 33 shows what occurs during the Convergence Process, indicating how flow charts, lists, data and narratives all come together in the first workshop into partial diagrams, which are combined into a complete causal loop diagram that starts the next workshop. That diagram evolves into others, that are combined again and the process repeats itself

until a final report and action plan is generated, leading to both policy changes and changes in social behaviour.

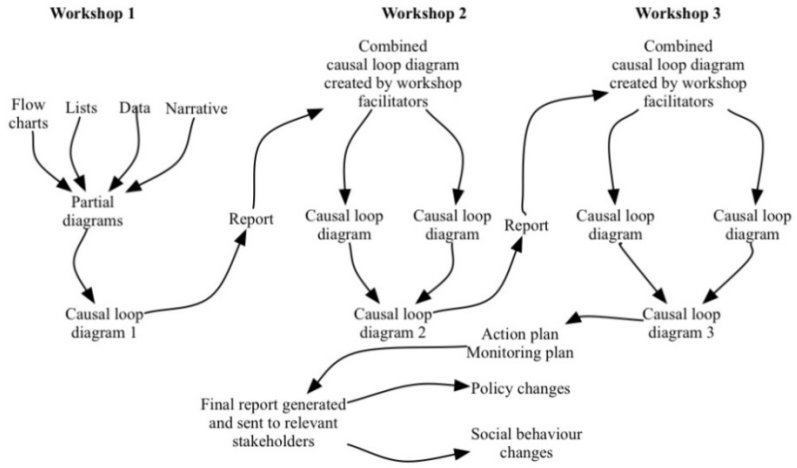

Figure 33 First overview of the Convergence Process

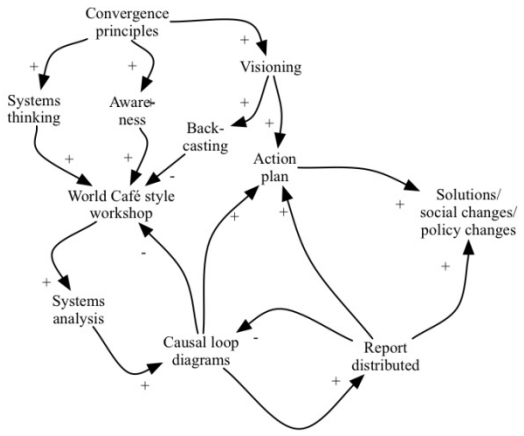

Figure 34 Second overview of the Convergence Process

Meanwhile, figure 34 indicates how the work done at each workshop coalesces into a final result, changes in social behaviour and policy changes. But more importantly, it shows the feedback mechanism that emergences when one draws a causal loop diagram. Feedback is one of

the core concepts in systems analysis, but human mental models often fail to include the essential feedbacks that determine the dynamics of the system being studied. When a causal loop diagram is drawn, those feedbacks quickly become visible. In figure 34 it can be seen that the more the World Café style workshops are held, the more systems analysis occurs, which leads to more causal loop diagrams, which again lead to less need for more workshops.

Most of all, in addition to depicting how causal loop diagrams can be used, these diagrams indicate how a group of stakeholders from various backgrounds in a community's food system coming together under the guidance of a trained systems thinker and creating a map of the current system, using causal loop diagrams, can lead to great changes within their community. The group and facilitators do a systems analysis of the problem at hand, systematically mapping in large system diagrams, recording causal chains in the systems, time lags and feedback loops, thereby identifying viable solutions and key routes the community can take in order to move closer to social justice and sustainability.

Care must be taken with how people sit around the tables. Often, people sit with those they know or group with their own gender. Such arrangements should be broken up in order to get as diverse an outcome as possible. This can be done by allowing the participants to sit where they like for the introductory lecture (Step A) or, in the case of consequent workshops, recapture of what has occurred at former workshops. When individual group work begins, the facilitators should divide the group up either manually (asking each person to sit at a certain table) or by numbering the tables and then giving each person a number (so if two friends sit together, the first sits at table number one and the second at table number two). When the group is rotated, people should be asked to avoid those they know best, and the facilitators can then sort out the groups that form, by for example ensuring that people from different educational or social status sit together, or that the genders are evenly spread out around the room. In some cultures, it is essential that women are no fewer than two to a table for decency's sake.

7.4.3 Step A continued – visioning

After the lecture, a visioning exercise is done to break the ice, start the participants working and lay out a strong vision for the upcoming work. As the ice still has not been broken within the participant group, this is

best done prior to breaking the group up, while the participants still sit in the seats they chose upon entering the room.

Visioning follows the rules of backcasting (see figure 35) and creates a strong common vision of a sustainable and socially equal society, which then leads directly to setting the baseline (see chapter 7.4.4).

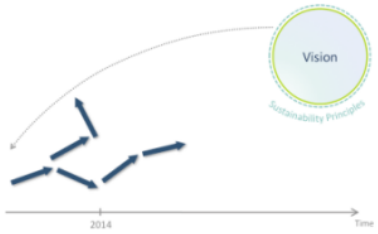

Figure 35 TNS backcasting (TNS 2011)

Backcasting (see figure 35) is a technique attributed to environmental scientist Amory Lovins (1976). The concept is seen as particularly helpful when solving complex problems that are partly rooted in present trends (Holmberg 2000; Holmberg and Robèrt 2000; Robèrt et al. 2002; Quist 2007). The idea with backcasting is based in the traditional way of predicting the future – using forecasting based on current state. Backcasting, in contrast, occurs when individuals decide upon the sustainable future they desire and then find ways to get there. To do so, they analyse policies, trends, traditions and more within the current system that need to be altered so that sustainability can be reached.

If backcasting is to be useful, it must begin with a clear definition of the end goal – that is to say, sustainability and social equity within the system and community at hand. A good way to bring the participants from the introductory lecture to the backcasting process is to offer a scenario where a catastrophe has hit their community. The exercise Spaceship (insert name of the community), where a catastrophe has occurred which has cut the area off any import or export possible and therefore forcing it to be more self-sufficient than it currently is, shifts the participants' minds to focusing on how their community could deal with such a reality. This exercise can be done by the group as a whole, with the facilitators writing down the results on a whiteboard.

After about 20 minutes discussion on this, the participants should be asked to envision the future they desire, still working together as a single group with the facilitators taking notes on a whiteboard or a flipchart, visible to all participants. The group imagines a certain date in the future (such as 50 years into the future) and describes the reality it wishes to see then, writing it all down on a whiteboard or a piece of paper. But more than imagine it, the participants actually place themselves mentally in the future, imagine they have already achieved success and that their community is now sustainable, speaking in the present term. The more details and specific aspects identified here, the easier the continued work is for the group. Therefore, the group should spend time here investigating this sustainable and socially equal reality without wondering just yet how things have become as they are on this imaginary future date.

Separate lists should be written of all system assumptions the group makes, along with another list of the system boundaries decided upon (such as "we assume that on our chosen future date, our community population will be two million people" or "we will discuss import from and export to our neighbouring counties but not between continents"). These lists need not be focused upon separately – items will add to them as discussion progresses well into Steps B and C.

The visioning exercise and the drawing of the baseline (system as it is today) lay the mood for continued work.

7.4.4 Step B – baseline analysis

Now the group could break for coffee and then be directed into smaller groups around tables before the facilitators lead them into individual group work, with four to six people on each table.

The visioning exercise clarified the future the participants want to work towards, and during that work, aspects of the community's current state come to light. Therefore, it is logical to go direct from the visioning exercise to drawing the baseline – the state as it is today, again using simple lists, flow charts and causal loop diagrams. Before beginning drawing the causal loop diagram it is important to set the system boundaries clearly. This means assigning a clearly defined starting point set in current knowledge and science. The results are a conceptual model of how the various components of the system affect each other. But as a model is never a picture of reality, but rather a mental model drawn on a

piece of paper, the system boundaries and all assumptions made must be written down as well, so that corrections may be made at a later time.

First, the facilitators again lead the group through a common causal loop diagram, this time drawing a very simple and crude diagram of the system being worked on. Then the participants work with the information given in the introductory lecture and their knowledge and experience, and continue working with the diagram, adding details to it on a fresh sheet of paper, without attempting to find solutions to their problems just yet.

Here, in steps B, C and D, the World Café begins properly. During the baseline analysis, the facilitators begin moving people about every 20 to 90 minutes, to get as wide a cross-fertilization of ideas as possible, always keeping one person behind at every rotation as the table's memory and introduce the newcomers to what has occurred at the table before. The memory may be kept by the same person throughout or that role can be rotated.

7.4.5 Steps C and D – mapping and analysing the system and finding solutions

Once the visioning and baseline have been written up, the participants continue mapping their current system and begin work on finding solutions that can take their community from their current unsustainable state to their desired state of sustainability and social equity, drawing their system and their goals in causal loop diagrams with coloured pens. The Convergence Process workshop participants do not need to have a deep understanding of systems analysis. They do, however, need to understand that the world is an interconnected system, where occurrence in one part can affect another part greatly, even though at first glance these two parts may not seem related at all. The participants may also need guidance in drawing causal loop diagrams, but the facilitators must stay clear of influencing the discussion going on at each table. Most people quickly get the hang of drawing casual loop diagrams, and with practice, learn to read them and see where feedbacks or gaps may exist. Furthermore, the time that passes in between the workshops can help the participants realize gaps in the diagrams they have already done.

It is very important for the facilitators to remember – and remind the participants – that there are no right or wrong answers during the workshops. Some solutions may be better than others, but many cannot

be weeded out until a proper map of the system exists due to unforeseen time lags or connections to other parts of the system. Therefore, all should be written down.

During this work, the workshop facilitators move around the tables, encouraging those who seem quiet to share their thoughts and making sure the groups write their conversations down on the paper in front of them, as well as assisting the groups in drawing their flow charts and causal loop diagrams on clearly marked pieces of paper (table and session numbers). At certain intervals, people are encouraged to switch tables, while one person stays behind as the table's memory to tell the newcomers what had occurred at that table prior to them joining it. The timing of these intervals should be felt out by the facilitators – appropriate timing may for example be when the group breaks for lunch or coffee, or when the facilitators note a lull in the conversations. As a general guideline, each group session could last for no less than 20 minutes but no more than 90 minutes.

The facilitators encourage the groups to listen collectively to the conversation at their table, paying attention to and writing down themes, patterns and insights.

At the end of each session and/or day, the groups present their causal loop diagrams to each other both by holding up their causal loop diagrams and orally explain them. One of the facilitators takes careful notes meanwhile, and at the end of the day, all the causal loop diagrams and flow charts are gathered by the facilitators, who then assemble them, analyse and write up the results, often combining many causal loop diagrams into a single one for clarification of the system at hand. The reports are then sent to the participants via email when appropriate and participants encouraged to come with observations, thoughts and suggestions, which are then incorporated into the report and diagrams. Each report and diagram is also presented orally at the beginning of the next workshop.

7.5 Step D – solutions prioritized and disseminated, action plan created and implemented

For a public participatory process to be effective, the results of the workshop must be evaluated, written up, distributed and taken seriously by the authorities and citizens of the community. In order for that to work, the workshop facilitators must be capable of reading the workshop

results and communicate them to the public – in this instance, the causal loop diagrams – and the message needs to be reported to appropriate authorities and used when it comes to policy changes and creation. Therefore, it is necessary that the workshop facilitators have some training in reading causal loop diagrams, as such work becomes easier with more experience, and likewise, such knowledge can only be gained by training the eye on reading causal loop diagrams. As the saying goes, practice makes perfect – but more than that, two heads or more are better than one when it comes to reading the diagrams. Furthermore, in order to create a comprehensive report like this, it is necessary that the person writing the report has taken notes at the workshop itself, and that she has a thorough understanding of causal loop diagrams. She does not have to have a university education in systems analysis and causal loop diagrams, but she needs to have studied both and to have experience in reading causal loop diagrams, along with being able to listen and note what has occurred at the workshop.

When it comes to selecting the most appropriate solutions and indicators developed in Convergence Process workshops and depicted in the causal loop diagrams, a decision support protocol can help the facilitators greatly. These are three questions for choosing the creative solutions in a planning process. They are particularly helpful when it comes to forming the action plan and choosing the most attractive solutions and policy changes. The Convergence Process questions are:

1. Does the decision give us an economic, social and/or ecological return on our investment?
    a. If not, are the benefits worth the sacrifice?
    b. Does it fit the monetary means we have?
    c. Can we make the necessary social commitment?
    d. Do we have the necessary physical resources?
2. Is the platform flexible enough?
    a. If not a direct path to success, does it allow for more progress later?
    b. Does it offer more than one solution to our problems?
3. Does the decision take us in the direction we want to go to?
    a. Keep the vision in mind.
    b. Is it possible the decision and solution will backfire?

(Adapted from Cook 2004)

These questions are a simple and effective tool to sort and prioritize possible solutions that may move the community to greater sustainability and social equity. This selection of the most viable solutions (both in the short term and the long term) should be done by more than one facilitator to get as sensible an outcome as possible, but preferably by the participants themselves, and be the base for an action plan.

These are then written up in a comprehensive report with causal loop diagrams, presenting the future envisioned by the group as well as the most appropriate solutions discovered. This report could have a chapter describing the baseline, the vision, the method of drawing the causal loop diagrams and who was involved in that work. It should also contain a realistic action plan with actors linked to each action, along with a monitoring plan, which the community can use at various levels (societal and governmental) to move towards the desired goal of increased sustainability and social equity.

The report must then be generated to all appropriate parties, including the workshop participants, relevant non-governmental organizations, institutions and governmental departments.

8 Discussion

This eighth and penultimate chapter contains a discussion of the lessons that can be gleaned from the creation and testing of the Convergence Process. First, I present several conclusions and observations of importance that were not addressed in the research questions. These observations were not phrased in questions at the beginning of the research, but rather took form as the process developed and as the testing of it took place. They include contemplations on the cultural context, contemplations on the Convergence Process in light of the academic theory, how convergence can better be brought into the process, and a discussion on the importance of a simple presentation.

Second, I address the research questions themselves with an explanation of how the results support the answers and interpretations. Third, I provide some thoughts on the observed weaknesses of this research, and finally, I discuss what further research is needed to measure the effectiveness of the Convergence Process.

8.1 Conclusions and observations

The aim with this transdisciplinary dissertation is to create and understand a public participatory process for communities that wish to move closer to sustainability and social equity, both locally and globally, and which can be used by the communities themselves without the intervention of specially trained consultants. A further goal with this work is to throw light on how the Convergence Process functioned within the three communities it was tested in, that is, how it works in real life situations.

To do so, several academic and social methods and processes were braided together, but the research is located on the border of environmental anthropology and ecological economics. The theories chosen aim to explain how the process works in reality, and are essential to understand what occurred. This chapter contains a few overall contemplations and reflections on several issues that bear discussion.

8.1.1 Cultural context, including gender division and power relations

Cultural comparison is of interest in a multi-sited, multicultural research project, where a single process is being tested. Many similarities could be found between the three communities, but of course, the differences were likewise many. Of note was how the World Café and causal loop diagrams worked; the attention given to prestige and social status in the communities; and power relations when it comes to the gender division within the participants and the effects of habitus.

The World Café conversational process and the drawing of causal loop diagrams within the World Café was well received in all three communities and served its purpose well as discussed in chapter 8.2.1. The participants liked the opportunity to meet with other citizens in their community and discuss at an equal basis a common vision, the problems they see, and to find solutions to move from today's problems towards the future they desire. Especially when gentle hints had been made, such as when the facilitators handpicked people to move between tables to even out genders and to split coworkers and friends apart, and when the presence of the rock had been explained or been reminded of, the conversation flourished in all three communities. Furthermore, the causal loop diagrams appeared to work well in all the communities, but more research is needed to see how simple it is for the participants to identify indicators to intervene in and monitor the system. That said, though more research would be needed to see if the World Café and causal loop diagrams are a universally applicable approach, they certainly did function well together in the three communities chosen to test the Convergence Process.

In order to give a public participatory process the appropriate amount of respect for each community, it is important that the workshop facilitators know the community they are working with and some interesting cultural differences were noticeable in the three communities. In general terms, the class difference in Iceland are not nearly as noticeable as in Britain and in India where the difference between the highest and lowest classes is enormous, which may offer some explanation for these differences seen. The invitation forms (see appendix C) and the venues chosen gave a hint of the cultural difference between the communities.

The invitation letters in Iceland were quite formal, where people were invited to participate on behalf of the University of Iceland. The letter was written on a university letterhead and personally signed by the two University of Iceland professors in the team. In Bristol, the invitation leaflet was written in more catchy terms with coloured photographs, where the team relied upon an already-existing network of sustainability enthusiasts, but the invitation letter sent prior to the second workshop was more formal in terms. In both instances, the Schumacher Institute hosted the event. Meanwhile, the invitation forms in India were very decorative with flowers and coloured writing on printed invitation cards, sent on behalf of Social Change and Development to its staff members and other invitees.

In Iceland, the workshop was held in a university classroom, which gave more weight to the research element of the workshops. The venue where the first two workshops in Bristol were held was chosen to give us more prestige, but the participants complained about lack of public transport and general inaccessibility of the building. The final workshop was then held in a building earmarked for sustainability work, and was much more approachable, but less elegant. The venue where the India workshops were held was a rural agricultural training centre. The setting was appropriate for the system being studied – food – and more prestige was reached by having formal opening and closing ceremonies, where certain procedures were followed, such giving the participants a certificate for having participated and singing the national hymn.

Though it is impossible to gauge how much of a difference in the number of participants, in who chose to participate, and in what took place during the workshops due to the invitations and workshop venues, it is worth observing these differences. That is to say, in Iceland, the invitations were formal and the venue academic, which may have aided in the enthusiasm and professionalism expressed within the group. In Bristol, the venue went from formal to informal, whereas the invitations went from catchy to more ceremonial, and may account for the grassroots-feel to the workshops there. In Indian, the invitations and the venue both expressed formality and education, but the host, the non-governmental Social Change and Development, was probably most influential, the organization is very much respected in the area for the good work it has done in the past few decades.

Another cultural difference worth noting in any public participatory research project like the Convergence Process, is power relations both within the communities studied as well as between the scientists and the workshop participants. Feminist anthropology and post-colonialism offer a view into power relations, both when it comes to the researcher's habitus and gender division. Anthropologist Henrietta L. Moore (1988) stresses feminist anthropology is needed when it comes to a fair and neutral representation of women in anthropological studies. She says women were of course presented in studies before, but that the view of more traditional anthropologists may not have given a realistic picture of their lives, because the anthropologists did not see the women's lives from their point of view. That is to say, the researchers were too tainted by their habitus and probably unaware of the effects thereof, and feminist anthropology offers a more just take on women, when the effects of the researchers and the researchers' habitus are taken into account.

When a transdisciplinary international research project like the Convergence Process is tested in a community, it will undeniably be influenced by the project's researchers, as well as by those who have shaped these researchers' minds and habitus. Many scholars are in agreement that as the researcher's valuations are always with her, disinterested or neutral research cannot occur (Myrdal 1978) and all social scientists can only study their subject from their own social, literary and political point-of-view (Clifford and Marcus 1986). For example, the choice of the survivalism discourse may be due to the habitus of the academics and the social process workers that instigated the Converge Project, within which the Convergence Process is developed. In other words, the effects of habitus can of course never be avoided (Bourdieu 1977), but when the researcher is aware of such a possible influence, her results may be more just and her conclusions better fitted to withstand the test of time (Wolf 1992; Harding 2008). Furthermore, the habitus of the people being studied can also never be avoided – the subjects are always bound by their context (Haraway 1988). When the researchers are from another culture, and in the case of India, where some of the scholars are from a former colonizing power, the results may become somewhat skewed. When added to a recognized cultural aversion to saying "no" in India, the participants' true feelings of their experience may be hard to read. Therefore, during the testing of the Convergence Process in India, as well as while analysing the results, it

has been essential to be aware of the inherent power imbalance when Western scientists work within the developing world and to keep in mind the researcher's status within the society where she conducts her research (Zavella 1996; Hall 2007).

Sometimes a small tool can aid the participants to step out of their comfort zone and let voices other than those who traditionally are in power, be heard. In the Convergence Process, the full participation of women or other groups traditionally considered of lower status, is underlined by placing a rock on the table during the World Café, and when people take the rock in their hand, others must give that person an opportunity to speak and be heard. In the traditional and patriarchal culture in India, for example, the presence of the rock appeared to remind the participants of giving all members of the group the opportunity to speak and to be heard.

The gender demographic within the workshop participants in the communities was of interest, as seen in figure 16. In India and England, the majority of participants were men, whereas in Iceland, many more women than men participated. This difference does merit some comment. India is still a patriarchal society, where men make most of the decisions, and one of Social Change and Development's main goals is to empower women. Therefore, it was interesting how few women the organization had invited despite promises and statements otherwise. Furthermore, it was quite obvious that those women who participated were shy in the beginning. In fact, they had to be guided by other women to participate. In my notes for workshop 2, I wrote: "They start, but the women don't want to leave their group, [female facilitator] gently moves them to other tables, some are uncomfortable with this, but most participate in the diagrams after the English professor ([male facilitator] asks her) walks around to encourage the group to include them and to include themselves." But once the group discussions began, many women's shyness left them and they participated with gusto.

Opposite to Indian women, Icelandic women have for a long time been known for their independence and action. Though men still make up the majority of all leading roles, Icelanders were the first nation in the world to democratically elect a female president in the year 1980 (who served until 1996), a woman served as Iceland's prime minister between 2009 to 2013, and a female bishop was elected in 2012. Given my

background in literature, it is tempting to quote a popular contemporary novel written by an Icelandic female author in an attempt to explain the high level of female participation in Icelandic politics and public life. The scene is a French lesson in Paris shortly after the Second World War, where the teacher, a French lady, tells her Icelandic student off for not being diligent enough at her lessons. Her words illuminate the view Icelandic women have of themselves (because though the speaker is French, both the narrator and the author are Icelandic women):

> I accepted you because I admired you, a middle-aged single mother who tears herself up and moves to Paris with a three-year-old child intending to become a better artist. You know, no one does such things except perhaps Icelanders, but they have always been strange, I remember people talked about them in Copenhagen when I studied there, but women like you do not see the obstacles Simone de Beauvoir has been writing about, your gender is not a hindrance to you, you break away from tradition, do exactly what men do except they would never have had to travel between countries with a toddler like you! (Baldursdóttir 2007 pp. 137-138 translation mine).

These words give an insight into the psyche of Icelandic women – and may also explain why the women were so enthusiastic and willing to participate in a project that aims to make the food system of Iceland more sustainable and socially just.

However, I have no explanation of the lack of women in Bristol. Though men also still have most of the leading roles in Britain, English women do not lack for strong female roles – the Queen is of course a woman and a woman served as Britain's prime minister from 1979 to 1990, to name but two. But as mentioned above, the Bristol participants were more sceptical and less eager to participate than people in the other two communities, probably because of the many sustainability initiatives Bristol has seen come and go. I can only surmise that is a part of the explanation of the lack of women in Bristol's workshops – perhaps British women are slightly more sceptical and wary than British men?

All that said, it must be added that I am not convinced that the gender demographic is of a great importance in the Convergence Process workshops. Of course, this issue should be considered, but perhaps what matters more is who attends, and the social status or position of the

persons participating (which of course is directly related to gender in some cultures). That is to say, it may be of greater importance to have a proper cross-section of the community at hand, where representatives from each link in the system value chain attend along with government officials with power to make changes in policies, institutional representatives, business owners, media people, local citizens whose voices are often silenced or not heard, and so on.

8.1.2 Transdisciplinary studies and systems science

The problems discussed at the Convergence Process workshops are by nature transdisciplinary, and therefore, transdisciplinary thinking is needed to come up with functional solutions. In accordance to transdisciplinary research, the Convergence Process draws together the knowledge and experience of various academic disciplines and social practise (Bruce et al. 2004). As Gabriele Bammer (2005) points out, such integration of several frameworks into a single coherent form is a key research challenge in its own right, useful and often necessary to solve complex societal issues.

Furthermore, the braiding of many different strands of academic theories and fields with social processes and the ideology that drives these processes, means that the scholar must gain a holistic view of her research topic by sifting useful theory out and leaving behind those that add little (Pohl and Hirsch Hadorn 2007, 2008; Ellen 2010). When scientists step outside their discourses' comfort zone and link academic research project with social justice projects the outcome can be more comprehensive to both the academics and the public, and greater social justice may be reached (Harding 2008). However, it may be a fair challenge to both the academics as well as people working for social process organizations to reach a common ground. This became clear to us when one academic refused repeatedly to adhere to the already-decided upon procedures in the methodology being formed; he appeared not to have any interest in swaying from the academic course of action he was used to and into methods formed by and used within established social processes (The Natural Step and the World Café). This proved both unfortunate and confusing to the workshop attendants, and frustrated the Convergence Process' development, because within this research, several social processes and academic work have been deliberately mixed with the intention of creating a single useful and effective public participatory

process, through which the public and government alike can deliberately lead to social behaviour changes. However, it was illuminating to see this clearly some of the challenges that emerge during transdisciplinary work.

Systems science, to see the research topic as a part of a larger system, whose individual parts are interconnected in sometimes unforeseeable ways (Meadows 2008), and where the researcher looks equally at the whole system at hand as well as at interconnections within and between systems, is considered a conceptual basis of transdisciplinary studies (Jantsch 1970, 1972; Bammer 2005; Robinson 2008). This approach helps the researcher compile organized complexity within a single discipline (Laszlo and Krippner 1998). When the Convergence Process workshop participants apply the World Café and causal loop diagrams, it becomes evident that the world is a series of systems including individuals, societies and ecosystems, all of whom interact (Bateson 1972). Using this approach, the participants can be helped to see the system they are studying, such as their community's food system in this research, as a part of both a local and a global system and through that work, they get a different view on the problems the system is facing.

8.1.3 Ecological economics and environmental anthropology

The transdisciplinary field of ecological economics offers a backdrop against which to study the Convergence Process and the occurrences that took place during the testing of it, in addition to giving the ideology of the process validation. This field offers insights into economic and ecological systems (Common and Stagl 2005), and points out that humans cannot continue consuming Earth's resources at the rate we have been without running into dire straits (Boulding 1966; Daly 1996; Victor 2008; Jackson 2009; Kallis, Martínez-Alier and Norgaard 2009; Latouche 2009; Rockström et al. 2009; Martínez-Alier 2009, 2010). Other methods must be found – and the Convergence Process is a attempt in finding one viable way for communities to move in the direction of sustainability and social equity.

By serving as a bridge between social and natural sciences (Ingold 2000; Johnson 2013), environmental anthropology offers a view on humans within ecosystems and how they influence their environmental surroundings. As a field, it offers a theoretical insight into why the

Convergence Process participants are concerned about the future and well-being of their communities. The two-way relation between culture and environment (Steward 1955) and the fact that Westerners increasingly see themselves as environmentalists while their lives have in fact moved further away from anything to do with nature (Árnason 2005; Moran 2006) underlines people's social need for a habitable Earth – in addition to the basic need for a healthy Earth to support all of her human inhabitants. This need can be seen in the pleasure the participants drew from the networking that occurred at the workshops. The contradicting fact that though more Westerners identify themselves as environmentalists, their consumption continues to rise out of bounds (Árnason 2005; Moran 2006) causes concern for many people. By themselves, they may feel powerless and unable to halt the process, but when a network is formed, such as occurred at all the Convergence Process workshops, people feel more able to react to the trend. In fact, using systems science to realize that *nature* as such is a political term because no boundaries can be drawn between nature and society (Ingold 2005) simply because humans are a part of Earth's system, offers the participants a new insight into how to solve the problems their community faces.

In fact, postmodernism eased the way for disciplines such as ecological economics and environmental anthropology and, by a general questioning and deconstruction of what was deemed of value in former times (Lyotard 1986; Cuddon 1998) and the creation of new values. This questioning of old values is still occurring and it is my hope that the Convergence Process can be used in this as of yet unnamed era after postmodernism to create new values the world over – values that take Earth's boundaries seriously.

8.1.4 Public participatory democratic processes

When the public is asked to participate in sustainability issues connected with their community, the action they perform is political in nature – it is a form of public participatory democracy regardless of whether the government is involved in organizing the action or not. British political scientist Gerry Stoker suggests that governmental politics have moved away from the public and more into specialized political arenas. He sees this move as an unfortunate one and argues that people's interest in politics has not diminished, only changed because during this same period, citizens' critique and demands for answers has been on the

increase (2006). The interest in participating in the Convergence Process seems to support Stoker's theory – many were eager to participate especially in Iceland and India.

Meanwhile, real life efforts to involve the public in issues related to sustainability and environmental matters have proven less than effective – time-consuming, work-intensive and unsatisfying (Few, Brown and Tompkins 2006; Stoker 2006). Scientists at the Tyndall°Centre for Climate Change Research in the United Kingdom studied public involvement in climate-based decision processes. They came to the conclusion that the difficulties in involving the public in governmental decisions evolve around two main issues; the different manners of engaging the public, and the practical and conceptual complications in assuring broad-based public engagement, including defining who participates and why (Few, Brown and Tompkins 2006). Icelandic political scientist Gunnar Helgi Kristinsson suggests furthermore that a problem can arise if the public realizes after the participation process that the authorities have no intention of including their comments and views in their final decision, because the authorities viewed the participation process as an introduction rather than cooperation (2005, 2006).

Therefore, it is invaluable to create a public participatory method that draws citizens in and encourages them as a group to find the solutions to known and unforeseen problems within the community. The Convergence Process may be the method needed, with its carefully selected participants, its marriage of World Café style workshops, systems analysing and causal loop diagram, along with a short and to-the-point summary, action plan and monitoring scheme that is distributed to the relevant authorities. Of course, it can make all the difference if those same authorities are on board from the beginning – a point that is stressed by the careful selection of stakeholder participants. In fact, when the Convergence Process with government involvement is analyzed using Arnstein's Ladder of Citizen Participation (1969) (figure 2), it becomes apparent that the level of participation reaches the sixth rung, *Partnership*, and may even slide up to the seventh rung, *Delegated Power*, depending on the action plan. These are the first two of three rungs Arnstein terms *Citizen Power*, where the ultimate goal of citizen participation has been reached, without going all the way into *Citizen Control*. Theoretically, here, citizens' have direct influence on the

governance of their society – their actions and suggestions are essential in the government's decisions.

It is in fact a part of social equity within a community when citizens are given such an opportunity to participate with government officials in directing their society towards a future they desire, one that is both more sustainable and socially equal than their present society is. Marjan van den Belt (2004) points out that participants in a modelling process enter the room with their own mental models of reality in their mind, that serve as basis for the data used, and the actual data entered into the process may or may not support these mental models. However, just as van den Belt found out, results from the Convergence Process indicate that when the participants work together in small groups to establish a shared vision of the system, then these private agendas can be overcome and the participants left free to focus on the large complex issues at hand – a sustainable and socially equal society.

8.1.5 Focus on convergence

Value-laden terms like convergence, sustainably, sustainable de-growth, and contraction cannot enter a public participatory process unless the participants add them. All these terms must be explained carefully in the introductory lecture, after that, throughout the workshops, the facilitators must ensure that the focus is on convergence – that the move to a sustainable and socially equal community is a part of the discussion at every table. That way, academic research informing sustainability at a local and global scale is translated to the people that can directly inspire local action.

During the workshops, the participants focused mostly on sustainability and contraction, and less on social justice, though awareness thereof rose as time went by. It was as first, the participants needed to get a good overview of their local system before they could begin to contemplate global issues directly and indirectly affecting their system. Once in awhile, someone would discuss the fact that humankind's annual use of many natural resources exceeds Earth's capacity to supply them (Ehrlich1968; Meadows et al. 1972; Meadows, Meadows and Randers 2004; Victor 2008; Jackson 2009; Rockström et al. 2009; Ragnarsdóttir, Sverdrup and Koca 2012). Then, in the third workshop in Bristol, the participants discussed to some length the fact that no sustainability is possible unless social justice is reached within

their community. Both Iceland and Bristol third workshop participants also discussed some global issues related to their local food system, such as the benefits of the Fair Trade organization for both producers in developing countries and consumers in developed countries.

A simple tool to increase the participants' awareness of convergence is to give every participant the Convergence Principles on a piece of paper at the beginning of each workshop. In nearly all the Convergence Process workshops, the participants took copies of the principles with them when they left, but left most other distributed documents behind, which indicates they wanted to study the principles more after the workshop came to an end.

8.1.6 On simplicity and language

If the communities themselves are to be able to use the process on their own, without the intervention of an expensive specialist, the process must not be too complicated. The concepts of sustainability and social equity – both local and global – can be considered very complicated and people are not always in agreement on their meaning. Therefore, the facilitators should present these in simple terms, while avoiding being too simplistic, and make use of the tools offered in this dissertation.

One of our largest problems was the English language – to have non-native speaking workshop facilitators in all the communities, both during the workshops and when it came to analysing the results. We ran into time constraints in India, where a translator had to be used, because the lecture which took an hour in the other two communities obviously took twice as long when everything had to be said twice, even though the translator had familiarized herself with it along with the presenter prior to the presentation. In such instances, it would make more sense to train a native speaker to give the entire lecture at the beginning of the workshop. As such would of course be the case were a community to adopt the Convergence Process on its own, this may not be an issue. That said, it is still worth noting that the contents of the lecture were well received and inspiring to the participants, as can be seen by the participants' comments recounted in chapter 6.6.1. Conversely, it was evident that the systems thinking course offered in Tamil Nadu benefitted the workshop work greatly, not the least because of the language difficulties that arose as very few of the Converge research team speak Tamil.

8.2 Answering the research questions

The process of choosing and braiding together the several academic theories and social processes that backlight the Convergence Process gave rise to several formal research questions, whose answers are meant to address how useful the Convergence Process is and whether it reaches the goals it is meant to. Those questions are proposed at the beginning of this dissertation, and here in chapter 8.2, I recount them and answer in each subchapter.

8.2.1 Question 1 – three approaches combined into a single process

The first question asked is:

> How can systems approach, causal loop diagrams and the World Café method be combined into a single participatory tool that creates pathways to sustainability within a community?

The answer to this question is in essence to be found in this whole dissertation. In creating the Convergence Process, I have made use of various academic theories, concepts and approaches, and mixed them with carefully selected sustainability frameworks and social processes that are already in use in the world.

The systems approach is fundamental to finding solutions that can lead any community to sustainability. Earth is a closed system (with the exception of obtaining energy from the sun) and therefore, what occurs in one section of this system can have previously unforeseen effects upon other parts of the system, effects that were not obvious if we were to see the world as a linear process with cause and effects. Therefore, it is equally important to look to the structure of the system itself as to the system's individual components. When a systems approach is taken and a local community, or an aspect thereof, is studied as a dynamic system, it becomes evident that it is cyclical with internal and external feedback loops and time lags that can affect the behaviour of the whole system or individual sections of it. Such a holistic approach gives the workshop participants a comprehensive view of the system's different sections, interconnections and internal and external feedbacks, and can give a realistic idea of the system's possible future behaviours. By applying systems approach, the Convergence workshop participants can thereby

analyse and identify solutions that can bring their community closer to that ultimate goal and avoid pitfalls that may seem like a good idea until the whole of the system is taken into account.

The World Café method is a public participatory democratic method that begins from the premises that the answers to complex problems already exist in the minds and experience of the locals who live with these problems. Collectively, they can therefore come up with feasible and reasonable solutions. It is necessary to get the right people together and create an atmosphere where they feel secure and respected enough to share their knowledge. When all their knowledge is systematically combined, the workshop facilitators, along with the group, can sift out real and achievable solutions. This approach was well received and the participants mostly appeared to enjoy it, especially after the facilitators had manually moved the participants between the tables to avoid too many or too few of each gender at the tables, or too many from one organization sitting together. In India, the rocks on the tables also seemed to have a good effect; the women looked at or touched the rock gently and then spoke, without actually using it. Only one person, a participant in India, indicated that the World Café style was not beneficial, as it was not possible to discuss all things of importance frankly. This might indicate the workshop facilitators must be aware of and look for social and cultural hierarchy that exists on the tables and rotate people regularly, as is advised in the World Café method. At the same time, other Indian participants praised the World Café method greatly.

At the conclusion of the second workshop in India, some participants gave thanks to the group, saying that the Convergence Process teaches people to listen, as everyone sits at the same level, which makes people realize that everyone faces the same problems. In my research notes from India, I wrote that the conversations were very lively. One of the supervisors in Social Change and Development noted that they had "held many workshops and had problems with engaging people, this is a way to get more people involved and voice their opinions – i.e. mix genders and occupations, so people don't sit in their comfort zone, and rotate part of the group every 20 mins to hour. I.e. the World Café method is working here." In addition, many people came to the facilitators after the closing of the second workshop and thanked for the day, saying that this method had opened new doors to them.

The causal loop diagrams serve as a powerful tool to map the system at hand, as well as to give the workshop participants and facilitators an even better sense of the importance of a systems approach. A causal loop diagram is a conceptual model depicting the cyclical nature of the system studied, thereby identifying feedback loops and time lags that may affect individual sections of the system or the system as a whole. The conceptual modelling process benefits communities that seek solutions to complex matters. In her book *Mediated Modeling*, Marjan van den Belt (2004) describes a larger study where she applies a computer modelling process with a group of citizens, while the Convergence Process focuses upon conceptual models (causal loop diagrams), but the two processes adhere to many of the same procedures. She says that:

> In contrast to an expert dispensing "answers," or a discussion about the perception of a group of stakeholders, mediated modeling aims for a collaborative team learning experience to raise the shared level of understanding in a group, as well as fostering a broad and deep consensus (pp. 11).

As in the Mediated Modeling approach, the Convergence Process participants benefit from establishing a common big picture, along with learning to see the perceived problems in the system, and thereby being able to gauge whether they are of serious concern or not.

However, though these diagrams are simple to use once people have learned the method, they can appear very complicated before an understanding is reached. It does not simplify matters that many different causal loop diagrams can arise from the same problem, depending on the groups' understanding of and take on the original question. This needs to be discussed and explained. Therefore, I found that it is worth taking a few moments to teach the method during the first workshop, rather than trust that the participants will absorb the method over the time span of the workshops. A lengthy lecture on causal loop diagrams is not necessary – it is enough if the facilitators draw up a very simple diagram with the whole group at the beginning of the baseline work on the first day and explain it as they draw it.

8.2.2 Question 2 – function within the communities

The second research question has two sub-questions:

> In what manner does the Convergence Process function within the three different communities: The island of Iceland; the city of Bristol, UK; and the districts of Tirunelveli and Tuticorin in Tamil Nadu, India?
>
> a. Does the introductory presentation, partly based upon The Natural Step's approach, captivate and inspire audiences from many different backgrounds?
> b. Does the systems approach, along with setting a strong vision at the beginning of the participant workshops, work in the communities chosen? (Keep in mind that some participants are illiterate.)

As can be seen in chapter 6, the Convergence Process varied slightly between communities which is unavoidable when working with people within different cultures as well as when the process was still being developed. The Convergence Process' structure is loose enough so that this can be accommodated. The facilitators must be aware that the "number of participants and the level of conflict among them influences the decisions made during the process" (van den Belt 2004 pp. 97), so therefore a broad cross section of the system's stakeholders must be carefully selected to participate in the process.

The introductory lecture sets the stage for the vision and backcasting exercises. The workshop facilitators and participants must begin by having a good understanding of sustainability and convergence. From there, they must set a strong vision to work towards (or rather, backwards from, as the case is in backcasting (Lovins 1976)) and framing the question the workshop is to focus on in simple yet potent terms.

The introductory lecture worked best where the audience had not heard the message many times before – that is to say, the Icelanders and the Indians seemed more receptive than the Bristolians, where some research fatigue was noticed among some of the participants and which may be the reason for how few participants volunteered their time. However, I noted also in Iceland and in India that some participants appeared sceptical or simply uninterested in the lecture – perhaps because its content inevitably is fairly academic and the large picture may seem unimportant or too large for the participants who may therefore not be able to connect it to their own lives. This attitude diminished as time went by – partly because people began to understand the process better but also

of course because some of those most sceptical stopped attending the workshops. I surmise also that the better the facilitators know the community they work with, the better they can engage the participants. The Convergence Process and the introductory lecture are very theoretical, while the atmosphere at Social Change and Development in India is much more hands-on and practical. This was illuminated in how tired and generally un-interested the participants were during the introductory lecture in India, until one of their neighbours, encouraged by the lecturer, began talking of his own farming experience – the Indians were, quite naturally, not very interested and did not manage to connect themselves to examples of owning many computers or cars, but could connect on both an intellectual and an emotional level with the local farmer's success story.

We found that during the introductory lecture, it was important to give people hope – not to overwhelm the participants with the problems facing the world and humankind, but rather inspire them with the possibilities and informing them that there now exists a general movement across the globe to put sustainable development at the top of the agenda. This included discussing issues such as city food production and offering a glimpse into what sustainable food production could look like for the community we were in.

Furthermore, it was of essence to capture in a few words at the start of every subsequent workshop, the issues and work covered previously, both as a reminder to the participants of the vision they had in mind as well as to introduce work already covered to newcomers.

The systems approach was well received, likely in part due to our use of causal loop diagrams and setting a strong vision at the beginning. To define the groups' common vision at the beginning of the workshops was found to be a necessary starting point, and during conversation with one of the groups (in Bristol), the participants clearly stated their desire to spend sufficient time clarifying their common vision. The causal loop diagrams and the systems approach seemed well understood by the participants, and even the illiterate ones seemed able to follow and contribute to the conversations at their table, despite not understanding the words written down on the pieces of paper. Interestingly, though in accordance to my expectations, while drawing the causal loop diagrams,

the participants often realised formally unforeseen causal loops, feedback loops and time lags within the system they were mapping.

The issue of who chose to participate falls under this question of how the Convergence Process functioned within the three different communities, and offers an important insight into the cultural differences between the communities (cultural context is also discussed in chapter 8.1.1). Table 7 shows how many returned to the workshops, where Bristol stands out for the least interest in returning to the workshops, the fewest participants and therefore, the narrowest diversity in participants' backgrounds. In India, mostly Social Change and Development staff or people somehow related to the organization attended, and the participants were markedly uncritical in their responses. We, the facilitators, were told that it is rude to say no in India, which is why they hardly ever shake their head for "no." Without being able to study this aspect of Indian culture, it just might explain the lack of criticism or scepticism in Tamil Nadu.

The reason for the many primary producers participating in Iceland might be due to the article published in the agricultural newspaper. No such article was published in the fishing industry magazine, and I cannot help but wonder what would have occurred had I written a similar article for that magazine and had it published. In my notes for the third workshop in Iceland, I wrote that "here, people truly believe they can change the system. In Bristol, they're more concerned with changing consumer behaviour, with rationing systems etc." Furthermore, the 2008 economic crash in Iceland along with three volcanic eruptions in the years 2010 and 2011, had awakened the nation to the importance of food security, self-sufficiency and sustainability, which probably eased the Convergence Process work in unforeseen ways and may have been the reason for the diverse group that attended there.

Overall, the participants in Bristol were more sceptical and less eager than people in the other two communities, and fewer showed interest in the project than elsewhere. I assume this has to do with the fact that Bristolians have seen many different sustainability projects come and go (Brownlee 2011), which may have given them a certain sense of fatigue and lack of interest in participating in yet another research project. Also, the recently published report, *Who feeds Bristol?* (Carey 2011), did not ease our way in Bristol as some participant pointed out that this report had in fact discussed in detail parts of the work we addressed in the

workshops. The participants were concerned that the Converge team was attempting to reinvent the wheel and did not always see the difference in or the value of our methods. They asked more critical questions than other participants did, such as "what's the big picture – what are you trying to achieve?" and "where do the biophysical limits come in?" as I quoted in my research notes.

Furthermore, those who participated in Bristol chiefly belonged to marketing or retail business and most were well seasoned in workshops on sustainability. In my research notes, I wrote that the Bristol participants "participate to make their voices heard" – they wanted firm results. "That is partly why some of them were so surprised that this was a research project. The difference is that we are learning as much as they, we are not following an already firm methodology that will lead to something concrete that we'll feed into a certain venue where it will for certain be used – we instead are now forming a methodology with the groups," I wrote. At the first workshop, one person got very upset when he realized that he was participating in a research, and a couple indicated in their questionnaires they had not known this was a research project. This was surprising, as the workshop began with an introduction of the research project, which was likewise mentioned in the leaflet invitation and on the website. However, the workshop was hosted by the non-governmental organizations Schumacher Society and Schumacher Centre, which might have caused the confusion as people may have associated these organizations with action rather than research. This issue did not rise in the other communities – but in Iceland, for example, the workshops were hosted by the University of Iceland, so participants may have been clearer on the link to academic research than in England. However, such confusion is uncomfortable for everyone included, and underlines the importance of scientists stating their purpose clearly.

Several individuals were identified as missing from the workshops – such as fishing industry people in Iceland, people from transport and supermarkets in Bristol, and government officials in all communities. We might still reach the ears of them if we send them the final results of our project. However, that is out of the scope of my dissertation.

8.2.3 Question 3 – mapping as a useful methodology

The third research question asks:

> How can participatory mapping of a system provide a useful methodology for creating scenarios that stakeholders can realistically follow to move their community towards sustainability?

The causal loop diagram mapping of the system at hand and the public participatory democratic method of a World Café, where the voices of those who often have no say in decision-making processes, are given a platform, proved a great and fun-filled method for people to connect and collectively seek solutions. The causal loop diagrams offered visual scenarios of both current problems and possible solutions that the participants could read and analyse, and from there, could create an action plan that their community could follow.

Furthermore, the Convergence Process offered an excellent networking chance between people who had little or no connection before, but now because of the careful invitation process could connect via the workshops. Such networking can result in unforeseen and innovating solutions (such as the business ideas that rose in Iceland), in addition to the personal comfort of local people having support from a larger group when fighting for sustainability and social equity.

That said, however, it is essential to note that more research needs to be done to see if the process works into the future. As the purpose of this research was to develop the Convergence Process, little or no attention and time was spent on follow-up and on designing the monitoring process within each community. Therefore, such a process should be created and followed for many years within at least one community, before it is possible to realistically answer whether the participatory mapping of the system can provide a useful methodology that will move the participants' community towards sustainability.

8.3 Weaknesses of this research

Hindsight allows a researcher the benefits of wisdom she had not gained at the start of her research, such as view on what could have been done more efficiently had another approach been taken or other theorists followed, in addition to regret for what might have been included or what she wishes could have been included. The development and testing of the Convergence Process could indeed have been done differently and a few notable points must be raised on the weaknesses of this research.

The fact that convergence, social equity and sustainability are value-laden terms that may mean different things to different people is a noted weakness in this research. Unless defined by the workshop hosts and discussed at regular intervals during the workshops, the main goal of the workshop – to use convergence to move closer to social equity and sustainability – may get blurred in the work of mapping the system. The participants may get lost in focusing on individual aspects of the system at hand, rather than see the system as a whole. The visioning exercise and the causal loop diagrams are meant to combat this problem, but unless the participants are aided by the hosts to keep the final goal in mind, it is in danger of being lost.

Secondly, the development of the Convergence Process was a researchers-driven research, as opposed to a community-driven process. This is a double-edged sword. The research itself needed an academic approach, where academics and public participatory process specialists created and tested the process itself, but the Convergence Process itself cannot be successful unless it is driven by the community in question, by strong leaders who truly wish to make a change in the social behaviour within their community. So while the outcome of this research is a functioning public participatory process for communities wishing to move closer to sustainability and social equity, the communities we tested in may not change very much for having participated in the Convergence Process. At the end of the research, most of the academics left the communities, and time did not allow for a proper conclusion of the workshop process. In other words, though the workshops resulted in the Convergence Process being developed, the workshop participants did not get the final outcome hoped for; an action plan with identified solutions for the community and a detailed monitoring scheme.

This leads to another weakness of this research – the fact that there is no follow-up within the communities. The participants received the reports, but the workshops had not commenced upon making an action plan or even selected more than a few viable solutions that might be incorporated into the action plan. When it became obvious that more workshops might be needed, financial and time constraints entered and those one or two last workshops needed in each community could not be realised.

Furthermore, had there been a key stakeholder, such as a government official with power to introduce changes, involved in setting up the

workshops, the outcome might have been different. However, that may also not have worked, as this run of the Convergence Process workshops was done to test and develop the process itself, as opposed to directly influence and lead to changes in social behaviour.

Another double-edged sword is the transdisciplinary nature of the dissertation. On the one hand, it would not have been possible to do this research from only one discipline's point of view as the focus and the approach would have been too narrow. But on the other hand, too many disciplines may have been involved, resulting in a too-wide a net having been cast in the beginning when searching for appropriate theories and social practices to guide the development of the Convergence Process, which led to the literature review not being very focused or poignant during the first months. Early on, the need for a social scientist (such as a sociologist or a political scientist) specializing in public participatory democracy became apparent, as the Convergence Process revolves around people and public participation within communities. However, no such academic was on the Converge team and it was not until the final year that an anthropologist was invited to become a main advisor, and entered the research with an abundance of much appreciated good advice and insight. However, in hindsight, I wonder how differently I would have tackled the whole research, had the need for a social scientist been appreciated sooner.

That said, being so very transdisciplinary in my own background and within the research has allowed me to write more for the public, rather than only for academic audience. If people are to be able to use the process, they need to understand the theory and ideology behind it, without first having to spend years gaining academic education and experience. Therefore, a transdisciplinary approach has been crucial in this creation, research and discussion of this public participatory process meant to be accessible to the general public.

8.4 Further research

Ideally, the Convergence Process should be developed further with communities that wish to contract and converge in order to reach both greater sustainability and social justice. That process should and could be a part of a long-term transdisciplinary action research project, where the proposed social behavioural changes would be observed and measured. In

other words, the final outcome of the Convergence Process and its success in the real world should be researched, preferably in a long-term research that could observe the participant-driven implementation of the Convergence Process in a community, in addition to the creation of an action plan and a monitoring scheme, and the effects thereof upon the community at stake.

The research element would evolve around how such a monitoring scheme is created, implemented and fulfilled, and weather the final results are in line with the objective of creating a more sustainable and socially equal community.

Ideally, the citizens of a community – both authorities and the local public – should get together and adopt the Convergence Process in cooperation with academic action researchers. They should hold as many workshops as needed, with a transdisciplinary action researcher carefully noting and analysing the proceedings. The researchers and the community should jointly create an action plan with firmly set steps to be followed.

Furthermore, along with the action plan, a clearly defined monitoring scheme must be created based on indicators identified at the workshops, which allow both researchers and the community to measure if and how the action plan moves the community closer to sustainability and social equity.

The action plan should define who or what institution is responsible for the monitoring and when monitoring should occur, along with a detailed plan on how the results are communicated to the public. The Natural Step framework (James and Lathi 2004) places the onus on the communities themselves to monitor the indicators, and though it might be argued that an outside observer might be more useful, if properly performed, it is not automatically and necessarily negative that a community observe itself – the local authorities and public are in many instances best fitted to measure their community's progress. However, that process should be researched by outside academics who have participated in the implementation of the Convergence Process within the community, to get an objective view on the process results. Therefore, the researchers would follow up on the action plan within the community and study weather and how it influences social behavioural changes within the community and whether they lead to greater sustainability and social equity.

A part of this research could include estimation on how well the causal loop diagrams serve the workshop participants when it comes to

identifying indicators and points to intervene in and to monitor the system, as well as in creating an actual action plan. Furthermore, it could address whether further World Café workshops are needed, where more causal loop diagrams are created, to update the action plan after a few months or years.

9 Final conclusions

In this ultimate chapter, I offer an insight into this dissertation's contribution to academic literature, focusing on how the Convergence Process can act as a bridge between academia and the public. I then take the opportunity to raise an issue that has weighed on my mind during the writing of and testing of the Convergence Process – namely, the importance of humility in researchers' attitude and actions. Finally, I close the dissertation with an anecdote from daily life that gave rise to some contemplations.

9.1 This dissertation's contribution to academic literature – bridging the gap between academia and the public

Much ink has been spent discussing the gap that exists between the ivory tower and the general public – the fact that scores of scientists conduct research all over the world without reaching the ears of those whose lives they most hope to improve; the public. In the transdisciplinary research project focused on developing the Convergence Process, a public participatory process was created for societies that wish to follow a pathway towards greater sustainability and social equity to both individual communities and the world at large. During this process, people from all levels of society got together to speak and listen to each other as equals. The process braids into a single braid strands from several social processes along with academic theory on sustainability, social equity, and involving the public in participatory democratic decisions.

Public participation is commonly believed to be essential when it comes to increasing sustainability within a community, but contrary to this view, policy makers and authorities do not report great success when it comes to involving the public (Few, Brown and Tompkins 2006). Involving the public in these matters is indeed logical, but far from simple. By addressing already identified problems, such as the manner of engagement and the realistic and theoretical difficulties in securing a broad-based public engagement (Few, Brown and Tompkins 2006), the

Convergence Process has made a valuable contribution to academic work that reaches the public and can lead to real social behavioural changes.

In an academic work of this type, it is important not to underestimate the fact that very few, if any, of the participants in the study would normally read it. The general public and government officials often have little to share with academics, and small interest in delving into the complicated matter of sustainability and social equity, let alone reading an academic work on how to go about reaching a desired state of a sustainable society. Therefore, making the development of the process approachable to the public – indeed, going into the field and asking people to participate in the development of this public participatory process meant to lead to social behavioural changes – has offered the participants a view into academia that may too seldom be available to non-academics.

The nature of transdisciplinary research such as the development of the Convergence Process thereby offers an important link between academia and the public.

9.2 "Tread softly because you tread on my dreams"

At last, I must say a few words on research fatigue and the dangers thereof. Researchers who enter local communities must tread especially softly, taking care not to offend the locals who freely give their time and energy in the hope of bettering the world. Researchers must be especially careful not to create what is sometimes called research fatigue (or sustainability fatigue, as the case may be in Bristol), which can lead to "lack of perceptible change attributable to engagement, increasing apathy and indifference toward engagement" (Clark 2008 pp. 953). Such fatigue can enter when the local volunteers see no results rising from the research they participated in, for example when the researchers do not communicate their results to the authorities, or when research seems only to be done for the research's sake, and not with the aim of bettering the community.

When the research focuses on the future of sustainability and social equity, it is especially important that researchers act with care and consideration, in order not to drive people away from all talk of these matters. It seems fitting to quote Yeats' poem *Aedh wishes for the cloths of Heaven* here:

> Had I the heavens' embroidered cloths,
> Enwrought with golden and silver light,
> The blue and the dim and the dark cloths
> Of night and light and the half light,
> I would spread the cloths under your feet:
> But I, being poor, have only my dreams;
> I have spread my dreams under your feet;
> Tread softly because you tread on my dreams.
>
> W.B. Yeats (1899)

Though a love poem, it could easily be quoted by the people who generously offer their time and energy to a research project, without having any guarantee on how or even if they will benefit from the project. They join because they want to share their knowledge and learn from others, and because they hope to better their community for their own sake and for that of their neighbours, children or others. Like the lovelorn narrator of Yeats' poem, they offer their dreams in the hope of benefitting the greater good. Therefore, researchers must take care not to abuse the local's generosity.

Furthermore, researchers must be careful neither to think they have the answers nor to assume they know what the locals will want for their community. Cultural theorist Stuart Hall wrote in 2007:

> The Europeans had outsailed, outshot, and outwitted peoples who had not wish to be "explored," no need to be "discovered," and no desire to be "exploited." The Europeans stood, vis-à-vis the Others, in positions of dominant power (Hall 2007 pp. 57).

Keeping Hall's words in mind, a researcher must question her stand when she applies her methods in order to find sustainable development. The tendency among academics (at least, among Western academics), seems to be to assume that all people want to develop (sustainably or not). But is that so? Do Indians in Tamil Nadu, for example, want to become like Europeans? Perhaps it makes most sense to ask them.

Here the beauty of the Convergence Process enters – it offers the locals a voice that, if disseminated and reported appropriately, can be heard by the relevant authorities.

In sum, a researcher must enter a research project with a humble heart and head, and take care to leave it with no less humility. I personally make no claims to whether I have managed to keep my humbleness – other people are better fitted to respond to that – but I sincerely hope I have.

9.3 Final words

In the novel *The world set free*, author H.G. Wells foretells a great world war, where dangerous weapons are used. Wells wrote the book in the year leading up to the First World War and the book was published shortly before the war began in 1914. This fictional foretelling of an impending real-life manmade disaster affected the author greatly even after the war had ended and in 1921, when the book was republished with a new preface, he said:

> Every intelligent person in the world felt that disaster was impending and knew no way of averting it, but few of us realised in the earlier half of 1914 how near the crash was to us (Wells 1921 pp. iv).

These words echo familiarly in today's atmosphere. The looming disaster we are about to bring upon ourselves does not appear out of the blue. People are aware of the effects of overpopulation, overconsumption, declining natural resources and the release of greenhouse gas emissions. Yet, we seem unable to halt the process.

My feeling is that we must try as we can – and this dissertation is one of many attempts to create a process that communities and laypeople can follow to avert disaster. Because we must try, if for no other reason that we have no other place to live.

The values that we are taught as children might go a long way, if we were to spend more time remembering them. Around Christmas time the winter before I concluded my dissertation, my five-year-old fell at preschool and got a small cut on his head. The teachers called me and I brought him to the emergency room. The cut had stopped bleeding and we mostly had to wait while the doctors and nurses reassured themselves that he did not have concussion. He sat and watched television in the children's waiting room, while I rooted through my bag and realized that in the rush after the phone call from the school, I had forgotten my

academic reading material on my desk. I sighed, and when my son asked what was the matter, I told him.

"Don't worry, mamma, you can read this, this is a very good book," responded the patient and handed me a worn-out copy of the book *Karius and Baktus* by Norwegian playwright Thorbjörn Egner (1949). I sighed again, but for lack of anything else to do, started leafing through the book I used to know more or less by heart as a child. It tells of two tiny characters who live in the mouth of the boy Jens, and enjoy hurting him until he finally gets enough of the torture. The boy brushes his teeth and removes all their food, and then goes to the dentist, who fills in their homes. When the boy gets home, he brushes his teeth again with the results that the now hungry and defenceless characters get caught in the toothbrush and are flushed out to sea.

I sat there in the waiting room, looking at the picture book and thought: "My, my. This message is everywhere. If we don't look after our host, if we cross all the constraints set by the person or planet we live off, if we become too greedy and stop cutting our coat according to our cloth, then our host may simply get rid of us – regardless of whether the host's name is Jens or Earth."

It is my sincere hope that this dissertation can be a small step towards spreading this message that we must live according to our means if we are to bring humankind a step closer to true sustainability and social equity.

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Appendix A – Glossary

Action research is an experimental research, "a participatory, democratic process concerned with developing practical knowing in the pursuit of worthwhile human purposes, grounded in a participatory worldview" (Reason and Bradbury 2001 pp. 1). The researcher participates with the stakeholders in the research with the stated goal to cause and influence a desired change.

Causal loop diagrams use arrows to connect major components of a system, along with indicating feedback loops and time lags.

Contraction and Convergence™ is a suggested way to stabilise atmospheric concentrations of greenhouse gasses while promoting social equity with regards to climate change and greenhouse gas emissions (Meyer 2000).

Convergence indicates a pathway to sustainability where ecological limits to growth are recognised and equity at a global scale is valued.

Developed nations, **developing nations** and **emerging economies**: When discussing sustainability and equal divide of the planets' resources, one wants to divide the world into those nations that have access to resources versus those lacking that access, politically and/or physically. Developed nations, developing nations and emerging economies are both political and problematic terms, but are, for lack of other acceptable options, nonetheless used in this dissertation. Developed nations refer to countries that have built up their wealth and political system in past centuries often using human and natural resources from other sections of the world, such as the USA, old Europe and Australia. Developing nations are those that have been on the other end of that equation, such as most of the countries in Africa. Emerging economies are then those gaining grounds in international commerce and discussions, such as India and China.

Discourse: A discourse is a written and/or spoken text that has influenced society; "a shared way of apprehending the world" (Dryzek 2013 pp. 9).

Ecological economics refers to the interdisciplinary study of economy as part of nature's ecosystems.

Environmental anthropology studies human-environmental interactions.

Environmentalism refers to a field of academic studies and social movements where the focus is upon conserving nature.

Feminist anthropology seeks to make women visible in ethnographic records and in their own worlds. It also seeks to explore, analyze, and theorize power relations (including, but not limited to, gendered relations).

Group Modelling: The Group Modelling method is a participatory systems approach method, used to draw forth local knowledge to reach a widely acceptable solution to a given problem.

Habitus and **Embodiment**: Habitus refers to all events and occurrences in a person's life that form his or her perceptions of life, and therefore their take on research. This includes lifestyle, social status, education of oneself and of one's parents, upbringing, cultural circumstances, and so on. It is created through social processes rather than individual processes, and is not a result of free will or of conscious concentration. Embodiment is central to habitus, meaning that learning occurs via the body rather than consciously via the mind (Bourdieu 1977).

Interdisciplinary studies refer to knowledge gained from two or more academic disciplines, with no impact from outsiders.

Post-colonialism refers to the period after Western countries left the colonies, in particular to power imbalance between the former colonists and the people they used to control, as well as to power imbalance within the former colonies, created by and during colonist times.

Postmodernism is the cultural era that came after modernism (since 1940s or 1950s). It is defined by a non-traditional approach and an uprising against what came before, such as authority and signification. Scholars are not in agreement on whether or not we have left postmodern times.

Public participatory democracy is the process where the public is given, by authorities, the right to have a valid say in matters of importance. It is often used in issues of sustainability.

Social justice refers to justice exercised within and between societies, and includes the study of human rights and equity.

Survivalism discourse: The survivalism discourse originated in the 60s and 70s and focuses on biological limits, the exponential growth in the human population, the planet's carrying capacity and more.

Sustainability: Sustainability is here defined as a system that can continue into the unforeseeable future (AtKisson 2008).

Sustainable de-growth refers to "an equitable and democratic transition to a smaller economy with less production and consumption" Martinez-Ailer 2010 pp. 1741). Sustainable de-growth is both a social grassroots movement and a concept.

Sustainable development is "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (WCED 1987), also described as a "change over time in the direction of sustainability" (AtKisson 2008 pp. 3).

System: A system is an interconnected set of elements articulately organized to form a recognizable and a coherent whole, that carry out some identifiable function. It must consist of these three things: "elements, interconnections, and a function or purpose" (Meadows 2008, pp. 12, italics original).

Systems theory is the study of systems.

The Convergence Process is a public participatory approach developed within this Ph.D. dissertation, for communities that want to use contraction and convergence to move closer to realizing sustainability and social equity on local and global levels.

Transdisciplinary studies refer to it when knowledge is gained with information from both various academic disciplines as well as from social processes such as NGOs, stakeholders and/or the public, with the intention to get more holistic results than can be reached with other, more traditional methods.

Westerners: The inhabitants of developed nations are referred to by this term, despite the problems attached to that word (such as the fact that Australians live in the Southern part of the globe, but are by definition a Western nation).

World Café is a conversational process aimed at enabling stakeholders from different backgrounds to come together and discuss a defined issue in a meaningful way (Brown and Isaacs 2005).

Appendix B – Questionnaires

First workshop

Spurningalisti Samleiðniverkefnisins – lagður fyrir þátttakendur á vinnufundi 28. september 2011.

Vinsamlegast svarið og skilið til einhvers starfsmanns Samleiðniverkefnisins áður en þið farið í dag. Takk fyrir.

Merkja ber við spurningar eitt til fimm á skalanum 5 til 1, þar sem 5 er sammála og 1 er ósammála, en jafnframt þarf að svara skriflega spurningum þrjú til fimm:

5 = Sammála. **4** = Frekar sammála. **3** = Hvorki sammála né ósammála. **2** = Frekar ósammála. **1** = Ósammála.

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1. Eftir þátttöku í dag geri ég mér grein fyrir því hvað samleiðni er.

   5 4 3 2 1

2. Eftir þátttöku í dag geri ég mér grein fyrir því hvað sjálfbærni er.

   5 4 3 2 1

3. Ég tel að þessir vinnufundir og líkanið sem við erum að búa til muni nýtast mér og fólkinu í kringum mig (fyrirtæki, fjölskyldu eða öðrum) í framtíðinni.

   5 4 3 2 1

   3a) Af hverju?

   3b) Af hverju ekki?

4. Efnið sem mér var sent fyrir fundinn gaf mér góða hugmynd um hverju ég átti von í dag.

   5 4 3 2 1

   4a) Af hverju?

   4b) Af hverju ekki?

5. Ég hef áhuga á að finna varanlegar sjálfbærar framtíðarlausnir fyrir matvælaframleiðslu á Íslandi.

   5 4 3 2 1

Spurningum sex og sjö má svara skriflega – nýtið bakhlið blaðsins ef þörf er á, og eins ef þið viljið koma einhverju öðru á framfæri er það vel þegið.

6. Hvaða væntingar hafðirðu til vinnufundanna þriggja áður en þú mættir hér í dag?
7. Fékkstu það út úr fundinum í dag sem þú áttir von á?

   7a) Af hverju?

   7b) Af hverju ekki?

Converge Questionnaire – Workshop 1 Bristol 1. November 2011

Please answer and return to one of the Converge research team members before you leave today.

Key to the scale questions: **5** = Agree. **4** = Agree somewhat. **3** = Neither agree nor disagree. **2** = Disagree somewhat. **1** = Disagree.

Please answer other questions in writing, and don't hesitate to give comments on other issues you think of. Thank you!

---

1. I feel that after participating today, I have a deeper understanding of *convergence*.

   5 4 3 2 1

2. I feel that after participating today, I have a deeper understanding of *sustainability*.

   5 4 3 2 1

3. I believe that the workshops and the model we are creating will help me and the people around me (co-workers, family or others) in the future.

   5 4 3 2 1

   3a) Why?

   3b) Why not?

4. The material I received prior to the meeting prepared me well for today's meeting.

   5 4 3 2 1

   4a) Why?

   4b) Why not?

5. I am genuinely interested in finding long-term solutions that will bring the food system in Bristol towards greater sustainability.

   5 4 3 2 1

6. What did you expect from the three workshops when you arrived here today?
7. Did today's workshop meet your expectations?

   7a) Why?

   7b) Why not?

Converge Questionnaire – Workshop 1 India

15. October 2012

Please answer and return to one of the Converge research team members before you leave today.

Key to the scale questions: **5** = Agree. **4** = Agree somewhat. **3** = Neither agree nor disagree. **2** = Disagree somewhat. **1** = Disagree.

Please answer other questions in writing, and don't hesitate to give comments on other issues you think of. Thank you!

---

1. I participated in the Systems Thinking and Modelling workshop on the 15th and 16th of October?

   Yes__ No__ (go to question 3)

2. Participation in the Systems Thinking and Modelling workshop helped me understand what was expected of me today.

   5 4 3 2 1

   Why/Why not?

3. I feel that after participating today, I have a deeper understanding of *convergence*.

   5 4 3 2 1

4. I feel that after participating today, I have a deeper understanding of *sustainability*.

   5 4 3 2 1

5. I believe that the workshops and the model we are creating will help me and the people around me (co-workers, family or others) in the future.

   5 4 3 2 1

   3a) Why?

   3b) Why not?

6. The material I received prior to the meeting prepared me well for today's meeting.

   5 4 3 2 1

   4a) Why?

   4b) Why not?

7. I am genuinely interested in finding long-term solutions that will bring the food system in my community towards greater sustainability.

   5 4 3 2 1

8. What did you expect from the Converge workshops when you arrived here today?
9. Did today's workshop meet your expectations?

   7a) Why?

   7b) Why not?

10. I participated in the workshop today because:

Second workshop

Spurningalisti Samleiðniverkefnisins – lagður fyrir þátttakendur á vinnufundi 28. september 2011.

Vinsamlegast svarið og skilið til einhvers starfsmanns Samleiðniverkefnisins áður en þið farið í dag. Takk fyrir.

Merkja ber við spurningar eitt til fimm á skalanum 5 til 1, þar sem 5 er sammála og 1 er ósammála, en jafnframt þarf að svara skriflega spurningum þrjú til fimm:

5 = Sammála. **4** = Frekar sammála. **3** = Hvorki sammála né ósammála. **2** = Frekar ósammála. **1** = Ósammála.

---

1. Eftir þátttöku í dag geri ég mér grein fyrir því hvað samleiðni er.

   5 4 3 2 1

2. Eftir þátttöku í dag geri ég mér grein fyrir því hvað sjálfbærni er.

   5 4 3 2 1

3. Ég tel að þessir vinnufundir og líkanið sem við erum að búa til muni nýtast mér og fólkinu í kringum mig (fyrirtæki, fjölskyldu eða öðrum) í framtíðinni.

   5 4 3 2 1

3a) Af hverju?

3b) Af hverju ekki?

4. Efnið sem mér var sent fyrir fundinn gaf mér góða hugmynd um hverju ég átti von í dag.

5 4 3 2 1

4a) Af hverju?

4b) Af hverju ekki?

5. Ég hef áhuga á að finna varanlegar sjálfbærar framtíðarlausnir fyrir matvælaframleiðslu á Íslandi.

5 4 3 2 1

Spurningum sex og sjö má svara skriflega – nýtið bakhlið blaðsins ef þörf er á, og eins ef þið viljið koma einhverju öðru á framfæri er það vel þegið.

6. Hvaða væntingar hafðirðu til vinnufundanna þriggja áður en þú mættir hér í dag?
7. Fékkstu það út úr fundinum í dag sem þú áttir von á?

7a) Af hverju?

7b) Af hverju ekki?

Converge Questionnaire – Workshop 2 Bristol 29. November 2011

Please answer and return to one of the Converge research team members before you leave today.

Key to the scale questions: **5** = Agree. **4** = Agree somewhat. **3** = Neither agree nor disagree. **2** = Disagree somewhat. **1** = Disagree.

Please answer other questions in writing, and don't hesitate to give comments on other issues you think of. Thank you!

---

1. I participated in the workshop on November 1 2011

Yes __ No__ (Go to question 4)

2. Participation in the first workshop earlier this month has affected my attitude towards sustainable food production.

5 4 3 2 1

How?

3. Participation in the first workshop earlier this month made me think about how the Bristol bioregion can be more sustainable in its food production.

5 4 3 2 1

How?

4. The lecture Deniz Koca gave today on systems thinking and causal loop diagrams helped me understand what was expected of me today.

   5 4 3 2 1

   Why/Why not?

5. I am genuinely interested in finding long-term solutions that will bring the food system in Bristol towards greater sustainability.

   5 4 3 2 1

6. I am genuinely interested in discovering ways to lessen Westerners' consumption so poorer countries can have the opportunity to better the lives of their citizens.

   5 4 3 2 1

7. I believe that the workshops and the model we are creating will help me and people around me (co-workers, family or others) in the future.

   5 4 3 2 1

   7a) Why?

   7b) Why not?

8. Participation in the last workshop gave me a good idea of what I could expect from the workshop today (Skip this question if you didn't participate last time and go to question 9)

   5 4 3 2 1

   8a) Why?

   8b) Why not?

9. Did today's meeting meet your expectations?

   Yes __ No__ Don't know__

   9a) Why?

   9b) Why not?

10. Other comments you wish to make:

Converge Questionnaire – Workshop 2 India 18. October 2012

Please answer and return to one of the Converge research team members before you leave today.

Key to the scale questions: **5** = Agree. **4** = Agree somewhat. **3** = Neither agree nor disagree. **2** = Disagree somewhat. **1** = Disagree.

Please answer other questions in writing, and don't hesitate to give comments on other issues you think of. Thank you!

1. I participated in the Systems Thinking and Modelling workshop on the 15th and 16th of October?

Yes__ No__ (go to question 3)

2. Participation in the Systems Thinking and Modelling workshop helped me understand what was expected of me today.

5 4 3 2 1

Why/Why not?

3. I participated in the workshop on October 17 2012

Yes __ No__ (Go to question 5)

4. Participation in the first workshop yesterday has affected my attitude towards sustainable food production.

5 4 3 2 1

How?

5. Participation in the first workshop yesterday made me think about how my bioregion can be more sustainable in its food production.

5 4 3 2 1

How?

6. I am genuinely interested in finding long-term solutions that will bring the food system in my region towards greater sustainability.

5 4 3 2 1

7. I am genuinely interested in discovering ways to lessen Westerners' consumption so poorer countries can have the opportunity to better the lives of their citizens.

5 4 3 2 1

8. I believe that the workshops and the model we are creating will help me and people around me (co-workers, family or others) in the future.

5 4 3 2 1

8a) Why?

8b) Why not?

9. Participation in the last workshop gave me a good idea of what I could expect from the workshop today (Skip this question if you didn't participate last time and go to question 9)

5 4 3 2 1

9a) Why?

9b) Why not?

10. Did today's meeting meet your expectations?

Yes __ No__ Don't know__

10a) Why?

10b) Why not?

11. Other comments you wish to make:

Third workshop

Spurningalisti Samleiðniverkefnisins – lagður fyrir þátttakendur á 3. vinnufundi 10. janúar 2012

Vinsamlegast svarið og skilið til einhvers starfsmanns Samleiðniverkefnisins áður en þið farið í dag. Ekki hika við að nota bakhliðina til að skrifa ítarlegri svör eða fleiri athugasemdir. Takk fyrir.

Merkja ber við skalaspurningarnar á skalanum 5 til 1, þar sem 5 er sammála og 1 er ósammála:

5 = Sammála. **4** = Frekar sammála. **3** = Hvorki sammála né ósammála. **2** = Frekar ósammála. **1** = Ósammála.

---

1. Ég tók þátt í verkefninu 28. september 2011
   Já __ Nei__
2. Ég tók þátt í verkefninu 13. október 2011
   Já __ Nei__
3. Þátttaka í verkefninu hefur haft áhrif á viðhorf mín til sjálfbærrar matværalframleiðslu.

   5 4 3 2 1

   Hvernig?

4. Þátttaka í þessu verkefni hefur vakið mig til umhugsunar um hvernig Ísland getur orðið sjálfbærara í matvælaframleiðslu.

   5 4 3 2 1

   Hvernig?

5. Ég hef áhuga á að finna varanlegar sjálfbærar framtíðarlausnir fyrir matvælaframleiðslu á Íslandi.

   5 4 3 2 1

6. Ég hef áhuga á því að finna leiðir til að draga úr neyslu Vesturlandabúa svo fátækari ríki heims hafi tækifæri til að betrumbæta líf þegna sinna.

   5 4 3 2 1

7. Ég tel að þessir vinnufundir og líkanið sem við erum að búa til muni nýtast mér og fólkinu í kringum mig (fyrirtæki, fjölskyldu eða öðrum) í framtíðinni.

   5 4 3 2 1

   7a) Af hverju/Hvernig?

   7b) Af hverju ekki?

8. Sérðu fyrir þér að þú munir vilja halda þessari vinnu áfram, eða annarri sem byggir á grunninum sem lagður hefur verið hér?
   Já __ Nei__ Veit ekki__
   8a) Hvernig?
9. Mun tengslanetið sem þú hefur fundið hér halda áfram að vera hluti af lífi þínu?
   Já __ Nei__ Veit ekki__
   9a) Hvernig?
10. Fékkstu það út úr fundinum í dag sem þú áttir von á?
    Já __ Nei__ Veit ekki__

    10a) Af hverju?

    10b) Af hverju ekki?

11. Aðrar athugasemdir sem þú vilt koma á framfæri?

Converge Questionnaire – Workshop 3 Bristol 12. January 2012

Please answer and return to one of the Converge research team members before you leave today.

Key to the scale questions: **5** = Agree. **4** = Agree somewhat. **3** = Neither agree nor disagree. **2** = Disagree somewhat. **1** = Disagree.

Please answer other questions in writing, and don't hesitate to give comments on other issues you think of. Thank you!

---

1. I participated in the workshop on November 1 2011
   Yes __ No__
2. I participated in the workshop on November 29 2011
   Yes __ No__
3. Participation in the project has affected my attitude towards sustainable food production.
   5 4 3 2 1

   How?

4. Participation in the project made me think about how the Bristol bioregion can be more sustainable in its food production.

   5 4 3 2 1

   How?

5. I am genuinely interested in finding long-term solutions that will bring the food system in Bristol towards greater sustainability.

   5 4 3 2 1

6. I am genuinely interested in discovering ways to lessen Westerners' consumption so poorer countries can have the opportunity to better the lives of their citizens.

   5 4 3 2 1

7. I believe that the workshops and the model we are creating will be useful to me and people around me (co-workers, family or others) in the future.

   5 4 3 2 1

   7a) Why/How?

   7b) Why not?

8. Do you envision that you'll continue with the work started here, or build other work on the base that has been laid here?

Yes __ No__ Don't know__

8a) How?

9. Will the networking that has occurred here continue to be a part of your life?

   Yes __ No__ Don't know__

   9a) How?

10. Did today's meeting meet your expectations?

    Yes __ No__ Don't know__

    10a) Why?

    10b) Why not?

11. Other comments you wish to make?

Appendix C – Stakeholder invitations

HÁSKÓLI ÍSLANDS

Reykjavík 29. ágúst 2011

Efni: Samleiðniverkefnið: rannsókn á framtíðarsýn matvælaframleiðenda á Íslandi og sjálfbærni

Ágæti viðtakandi,
Okkur langar að bjóða þér að taka þátt í stóru alþjóðlegu rannsóknarverkefni, Samleiðniverkefninu, sem ætlað er að móta framtíðarsýn matvælaframleiðanda m.a. annars á Íslandi, með sjálfbærni í huga.

Fyrirsjáanlegar breytingar á heimsvísu á borð við fólksfjölgun, loftslagsbreytingar og þverrandi auðlindir munu opna íslenskum bændum og matvælaframleiðendum nýjar dyr, en markvisst þarf að leita leiða til að opna þær. Ætlunin með Samleiðniverkefninu er m.a. að útbúa leiðarvísi sem samfélög geta notað til að færast í átt að sjálfbærni, þar sem dregið er úr notkun auðlinda og ósjálfbærri hegðun á Vesturlöndum á sama tíma og fundnar eru leiðir til að þróunarríkin fái rúm til að auka sína notkun. Leitað er að framtíðarlausnum í matvælaframleiðslu í heiminum öllum innan þeirra líffræðilega marka sem jörðin setur okkur.

Með þátttöku í verkefninu getur þú haft áhrif á framtíð matariðnaðs á Íslandi, aukið hagkvæmni í framleiðslu, og fundið ný tækifæri til markaðssetningar á íslenskum afurðum.

Þrír heilsdags vinnufundir verða haldnir í vetur (28.9., 13.10. og 10.01.), og nauðsynlegt er að mæta á þá alla. Þátttaka er ókeypis og boðið er upp á hádegismat og kaffi. Í lokin fær hver og einn afhent raunhæft tölvulíkan af því hvernig sjálfbær matvælaframleiðsla, með atvinnusköpun, útflutningi, innflutningi og öllu sem til heyrir, getur litið út á Íslandi. Árangurinn verður síðan kynntur með hádegisfyrirlestri á vormánuðum 2012.

Áhugasömum er bent á að skrá sig með því að senda inn nafn, nafn fyrirtækis eða stofnunar og símanúmer með tölvupósti á netfangið converge@hi.is eða hafa samband í s: 525-5286 fyrir 23. september n.k.

Rannsóknin hér á landi er á vegum Háskóla Íslands og er hluti af stærra verkefni sem lýkur haustið 2013. Samstarfsaðilar eru Háskólinn í Bristol, Háskólinn í Lundi, Szent Istvan háskólinn í Ungverjalandi, auk fimm frjálsra félagasamtaka, The Natural Step í Svíþjóð, Greendependent í Ungverjalandi, SCAD á Indlandi, og the Schumacher Society og the Schumacher Institute í Bretlandi. Frekari upplýsingar um verkefnið má finna á vefsíðunni http://www.convergeproject.org/, sem og í meðfylgjandi grein sem birt var í Bændablaðinu í sumar og drög að grein sem birt verður í Þjóðarspeglinum í vetur. Einnig er þér velkomið að hafa samband við okkur og starfsmann verkefnisins, Hrönn Hrafnsdóttur, stundakennara, netfang; hronnhr@hi.is, s: 525-5286.

Það er von okkar að þú sjáir hag þinn í að taka þátt í þessari rannsókn. Jafnframt þiggjum við allar ábendingar um aðra sem þú telur að gætu haft áhuga á þátttöku í verkefninu, og er þér frjálst að deila þessu boði með þeim.

Virðingarfyllst,

Kristín Vala Ragnarsdóttir, forseti verkfræði- og
náttúruvísindasviðs Háskóla Íslands

Brynhildur Davíðsdóttir, dósent í umhverfis-
og auðlindafræðum, Háskóla Íslands

Figure 36 A formal letter distributed to invitees in Iceland

Bristol and the Southwest Food System Research

Bristol and Bath Science Park on the **1st November, 29th November (2011) and 12th of January 2012**.

You are invited to participate in an EU funded modelling of Bristol and the South West's food sector - The CONVERGE project is investigating how we can manage and allocate the earth's resources fairly and make the transition towards a sustainable future. At the core of this research is an exploration of the food system (from soil to post consumer waste) of 3 communities of around 400,000 people. These communities are in India, Iceland and the UK. In the UK Bristol has been selected as the focus for the study – which implies the whole Southwest because a big part of Bristol's food-economy is dependent on food produced beyond the city region.

For this research we will be working with local business and organisations affected by the food sector to investigate the potential impacts of things like climate change, population demographics, and rising oil and fertiliser prices on the food system and related industries. We do this through workshops - our first workshop took place last month in Reykjavik in Iceland - a country with a high dependence on imported goods. Here is a snippet with some photographs from that workshop. Through these workshops we will develop a vision for a sustainable food system, and produce a realistic computer model of how a sustainable local food system could operate in Bristol including production, employment, import, export etc.

If you are interested in taking part, we would prefer (though it is not essential) that you come to all 3 workshops, as each workshop builds on the prior. Through your participation in these workshops you will gain access to the computer models generated by the research enabling you to take a wide view of the connections and interactions between different areas of the food system and giving you insight into how the food sector and related industries can prepare for future changes. You will also leave with a practitioner focused implementation plan for Bristol and the South West aimed at supporting a sustainable future for the food system and related industries.

Please let us know by October 21st if you would like to take part or for more information please contact alice@schumacherinstitute.org.uk / phone 07835262968

CONVERGE

Figure 37 A leaflet distributed in Bristol

Converge - Food System Research: Bristol, 12th January: 10:00 - 16:30: Coexist, Hamilton House, 80 Stokes Croft, Bristol BS1 3QY

Dear [XX],

We would like to invite you to participate in an EU-funded research on the Food System in Bristol and the South West.

I'm emailing in the hope that you or someone from [XX] would be interested in attending. Due to your expertise and experience in the local food sector we feel that you would be able to contribute a great deal to the project. We also think it will provide a good networking opportunity with organisations from across the food sector attending.

Here are some more details – do not hesitate to contact me if you have any questions:

The CONVERGE project is investigating ways in which the earth's resources can be managed and allocated fairly and in order to make the transition towards a sustainable future. One vital component of this research is an exploration of the food system (from soil to post consumer waste) in 3 communities: India, Iceland and the UK. In the UK, Bristol and the South West area that provides much of the city's food has been selected. We will be working with local businesses and organisations affected by and involved in the food sector in order to investigate the potential impacts of drivers like climate change, population demographics, and rising energy and fertiliser prices on the food system and related industries.
This will be achieved through a series of workshops, where the participants will develop a vision for a sustainable food system, and produce a realistic computer model of how a sustainable local food system could operate in Bristol incorporating all sectors and stages: production, employment, import, export etc.

The next Bristol workshop takes place on the **12th of January 2012** from 10:00 - 16:30 at Coexist (Map). Through your participation in these workshops you will gain access to the computer models generated by the research enabling you to take a wide view of the connections and interactions between different areas of the food system and giving you insight into how the food sector and related industries can prepare for future changes. You will also receive a practitioner focused implementation plan for Bristol and the South West aimed at supporting a sustainable future for the food system and its related industries - this may be useful for decision making in your area of the sector.

The first workshop on Nov 1st which tool place at the Science Park got us off to a flying start. Notes from that session are available from the converge website. You can also get a bit more information on these workshops.

If you are interested in taking part in the research or would like more information, please contact me Alice-Marie Archer – alice@schumacherinstitute.org.uk (07835262968.)

Finally, we welcome suggestions for others in the food related industries you think may want to take part.

Kind regards,
Alice-Marie

Figure 38 An invitation letter sent before the second workshop in Bristol

Figure 39 A formal invitation sent in India

Appendix D – Þjóðarspegillinn article

Samleiðniverkefnið – sjálfbærni og jafnrétti innan þolmarka jarðarinnar

Sigrún María Kristinsdóttir doktorsnemi
Kristín Vala Ragnarsdóttir
Brynhildur Davíðsdóttir
Samleiðniverkefnishópurinn[1]

Gríðarlegar breytingar eiga sér stað í heiminum um þessar mundir hvað varðar loftslag, fólksfjölgun og notkun manna á auðlindum jarðarinnar. Í þessum breytingum felast ekki bara takmarkanir, heldur geta þær einnig opnað dyr að nýjum tækifærum sé rétt haldið á spöðunum og stefnan markvist sett á sjálfbærni. Háskóli Íslands er nú þátttakandi í alþjóðlegu samstarfsverkefni sem tekur til matvælaframleiðslu á Íslandi og víðar, Samleiðniverkefninu, en samleiðni í átt að sjálfbærni er leið að jafnrétti mannkyns innan þolmarka jarðarinnar. Verkefninu er ætlað að leita leiða fyrir vestræn samfélög til að draga úr notkun auðlinda og ósjálfbærri hegðun, en auka að sama skapi rými þróunarríkja til slíkra athafna, þó innan þeirra marka sem jörðin setur. Hugmyndin er að útbúa leiðarvísi sem byggir á þeirri hugsun að mannkyn allt eigi jafnan rétt á að nýta auðlindir jarðarinnar. Hlutverk Háskóla Íslands í verkefninu er þátttaka í gerð leiðavísisins og prófunum á honum.

Grein þessi lýsir Samleiðniverkefninu, eða The Converge Project, og hlutverki Háskóla Íslands í því, en verkefnið er þverfaglegt samvinnuverkefni fjögurra evrópskra háskóla og fimm frjálsra félagasamtaka. Verkefnið er styrkt af 7. rammaáætlun Evrópusambandsins.

Þolmörk jarðarinnar

Það eru gömul sannindi að mannkynið hefur bara eina jörð til að lifa á, sem hingað til hefur veitt okkur bæði mat og skjól. En á sama tíma og jarðarbúum fjölgar ört, eykst notkun okkar á endurnýjanlegum sem og óendurnýjanlegum auðlindum hennar. Sífellt meiri kröfur eru gerðar um aukna og bætta matvælaframleiðslu, á sama tíma og við göngum á landsvæði, efni og orku sem nauðsynleg eru framleiðslunni. Fyrir tveimur árum síðan skilgreindi hópur alþjóðlegra vísindamanna níu þolmörk jarðar sem mannkyn verður að halda sig innan ef jörðin á að vera lífvænlegur staður til frambúðar (Rockström o.fl., 2009). Af þessum níu þolmörkum telja vísindamennirnir að við séum komin fram úr þremur (þ.e. köfnunarefnahringrásin, loftlagsbreytingar og æ minnkandi líffræðilegur fjölbreytileiki), og langt komin með að fara fram úr tveimur öðrum (sýrustig sjávar og fosfórhringrásin). Fleiri vísindamenn hafa einnig bent á hættuna sem stafar af minnkandi forsfórbirgðum heims (Ragnarsdóttir, Sverdrup og Koca, 2011; Sverdrup og Ragnarsdóttir, 2011), en fosfór fyrirfinnst í erfðavísum allra lífvera og er höfuðefni í tilbúnum áburði. Hvað menn varðar er hann meðal annars lífsnauðsynlegur fyrir allan frumuvöxt, myndun beina og tanna, samdrátt hjartavöðva og heilbrigða nýrnastarfsemi.

[1] Þátttakendur í Samleiðniverkefninu eru Háskóli Íslands, Háskólinn í Bristol, Háskólinn í Lundi, Szent Istvan háskólinn í Ungverjalandi, auk fimm frjálsra félagasamtaka, The Natural Step í Svíþjóð, Greendependent í Ungverjalandi, Social Change and Development á Indlandi, og the Schumacher Society og the Schumacher Institute í Bretlandi.

Ljóst er jafnframt að loftlagsbreytingar munu hafa víðtækar afleiðingar fyrir matvælaframleiðslu í heiminum (IPCC, 2007). Þess utan er vitað að það land sem hentar vel til landbúnaðar er nú þegar í notkun, og verðum við að nota aðrar leiðir til að auka matvælaframleiðslu en að finna nýja akra líkt og viðgengist hefur um aldabil (World Resources Institute, 1998). Aðferðirnar sem mennirnir hafa notað til matvælaframleiðslu seinustu áratugina eru ekki sjálfbærar til lengri tíma litið (de Schutter, 2010; Karner o.fl., 2010), og fjölmargar viðamiklar rannsóknir undirstrika mikilvægi þess að mannkynið endurskoði hvernig það hefur nýtt auðlindir jarðarinnar (IPCC, 2007; Pollard o.fl., 2010; Reid o.fl., 2005; Stern, 2006; UNDP, 2007, 2009; UNEP, 2007).

Með öðrum orðum, ríkidæmi jarðarinnar á sér takmörk og verðum við mennirnir að finna leiðir til að stýra neyslumynstri okkar, ef mannkynið á að halda áfram að blómstra hér á jörð (Daly, 1997; Malthus, 1798; Meadows o.fl., 1972, 1992, 2005; Meadows, Meadows, Randers og Behrens, 1972; Meadows, Meadows, Randers, 1992; Meadows, Randers, Meadows, 2005; Rockström o.fl., 2009).

Mannfjöldi og misskipting auðlinda

Í hverjum mánuði vex mannkynið um sem samsvarar einni Lundúnaborg (*City of London*) (Office for National Statistics, 2011) – tæp átta milljón börn fæðast umfram einstaklinga sem látast (CIA, 2011; Ehrlich, Ehrlich og Daly, 1992). Þessi öri vöxtur er ekki gamall – fyrir sextíu árum síðan taldi mannkynið tvo og hálfan milljarð einstaklinga, en núna erum við tæplega sjö milljarðar og gerir Alþjóðaheilbrigðismálastofnunin ráð fyrir að við verðum ríflega níu milljarðar eftir fjörutíu ár (DESA, 2009). Eftir sem áður hafa mennirnir enn jafn mikið landsvæði til umráða, þessa einu jörð, og það gefur auga leið að sífellt þarf að finna nýjar leiðir til að metta æ fleiri munna.

Jafnframt er auðlindum jarðar misskipt, líkt og sjá má á þeirri staðreynd að helmingur jarðarbúa lifa í fátækt og að árið 2010 var nær einn sjöundi hluti manna alvarlega vannærður (FAO, 2010). Auk þess sýnir nýleg rannsókn að árið 2000 áttu ríkustu tvö prósent jarðarbúa meira en helming auðs heimila, á meðan fátækari helmingur jarðarbúa gerði tilkall til eingöngu eins prósents af eignum (Davies, Sandström, Shorrocks og Wolff, 2006).

Vistspor jarðarinnar og vísbendingar um ofneyslu

Vistsporamælingum er ætlað að mæla hversu mikið land- og sjávarrými fólk þarfnast til að halda áfram að lifa eins og það gerir í dag og samkvæmt Global Footprint Network getur jörðin staðið undir því að samfélög noti að meðaltali 1,8 hektara á mann (GFN, 2010). Samtökin fullyrða að ef allir jaðarbúar lifðu eins og Evrópubúar, þyrftum við auðlindir tveggja til þriggja jarða til að standa undir slíkri neyslu (GFN, 2010). Í nýlegri rannsókn sem gerð var við Háskóla Íslands kom í ljós að ef allir jarðarbúar lifðu eins og Íslendingar, þyrftum við sex jarðir (Sigurður Eyberg Jóhannesson, 2010). Samantekt Global Footprint Network og Sigurðar Eybergs á vistspori samfélaganna sem til skoðunar eru í Samfleiðniverkefninu má sjá í töflu 1.

Tafla 1. Vistspor samfélaganna í Samleiðniverkefninu

Land	Vistspor
Ísland (2005)	12.77 ha á mann, sjávarútvegur undanskilinn
Bretland (2007)	4.89 ha á mann
Indland (2007)	0.91 ha á mann
Ungverjaland (2007)	2.99 ha á mann
Svíþjóð (2007)	5.88 ha á mann
(GFN, 2010; Sigurður Eyberg Jóhannesson, 2010)	

Taflan sýnir ekki eingöngu mismunandi neyslu, heldur bendir hún jafnframt til mikils misréttis milli samfélaga. Þróunin getur ekki haldið áfram eins og hún hefur gert undanfarna áratugi því það segir sig sjálft að við höfum aðeins þessa einu jörð.

Contraction and Convergence™

Contraction and Convergence™ (C&C™) (Meyer, 2000) hugmyndfræðin, sem liggur að baki Samleiðniverkefninu, var þróuð snemma á tíunda áratug síðstu aldar og er Kyoto bókunin byggð á henni. Hugmyndin er að hægt sé að lækka styrk gróðurhúsalofttegunda snurðulaust með því að úthluta losunarkvóta, sem fylgir höfðatölu. C&C™ lýtur siðferðilegum hugmyndum á borð við alþjóðlegt jafnrétti, því þróuðum þjóðum er gert að draga úr losun sinni, meðan þróunarlöndin fá auknar losunarheimildir. Þrátt fyrir þetta er sjaldnast rætt um samdrátt í sjálfbærnistefnum og -leiðarvísum.

Sjálfbær hjöðnun og mannréttindi

Hugtakið „sjálfbær hjöðnun" (*degrowth*) hefur lítið sem ekkert verið til umræðu á Íslandi, en æ meira fer fyrir því úti í heimi (Jackson, 2009; Latuche, 2010). Það felur í sér lýðræðislega og sanngjarna umbreytingu frá efnahagskerfinu sem við búum við í dag til smærri hagkerfa sem byggja ekki allt sitt á vexti, heldur helst framleiðsla og neysla stöðug og innan þolmarka jarðarinnar. Með öðrum orðum, hugmyndin felur í sér að samfélög færist meðvitað frá hugmyndinni um endalausan hagvöxt og meira í átt að raunhæfu og stöðugu ástandi, og að samfélagið snúist um gæði og samvinnu, fremur en magn og samkeppni (Martínez-Ailer, 2010; Stefán Gíslason, 2010). Þessi hugsanaháttur er leiðandi innan Samleiðniverkefnisins.

Jafnframt byggir Samleiðniverkefnið á Mannréttindayfirlýsingu Sameinuðu þjóðanna (UNHRD, 1948), þar sem þjóðir heims lúta því samkomulagi að allir jarðarbúar eigi rétt á ýmsum borgaralegum, pólitískum, félagslegum, efnahagslegum og menningarlegum rétti, ekki síst 25. grein hans, sem segir að allir jarðarbúar eigi kröfu á lífskjörum „sem nauðsynleg eru til verndar heilsu og vellíðan hans sjálfs og fjölskyldu hans. Telst þar til matur, klæðnaður, húsnæði ... " (UNHRD, 1948).

Þegar sjálfbær hjöðnun og mannréttindi eru tekin saman, auk ofangreinds núverandi ástands jarðarinnar, er ljóst að heimurinn allur verður að breyta um stefnu til að forðast skelfilegar afleiðingar. En áhrifin af fjölda fólks í heiminum, loftlagsbreytingum og þverrandi auðlindum þýða ekki endilega neikvæðar breytingar – ef rétt er haldið á spöðunum geta heilmikil tækifæri falist í þeim fyrir íslenska framleiðendur.

Samleiðniverkefnið

Samleiðniverkefninu er ætlað að leita leiða fyrir samfélög á Vesturlöndum til að draga úr notkun auðlinda og ósjálfbærri hegðun, á sama tíma og þróunarríkin fá rúm til að auka sína notkun, allt innan þeirra marka sem jörðin setur. Spurninguna sem má segja að sé hvatinn að baki verkefninu má sjá í kassa 1:

> Miðað við aðstæður í heiminum í dag, hvernig förum við að því að stýra og úthluta takmörkuðum auðlindum jarðarinnar svo að íbúar jarðarinnar árið 2050 (sem spár SÞ gera ráð fyrir að verði ríflega níu milljarðar) og afkomendur þeirra nái að blómstra á sjálfbæran hátt um ókomna tíð?

Verkefnið byggir meðal annars á hugmyndafræðinni að baki Kyoto-samningnum (Contraction and Convergence™ – samdráttur og samleiðni) og aðferðum The Natural Step samtakanna (Cook, 2004), en hin síðarnefndu styðjast við kerfishugsun. Hlutverk Háskóla Íslands er annars vegar að þróa leiðarvísi og hins vegar að prófa hann ásamt öðrum úr hópnum með starfendarannsókn í þremur samfélögum.

Samleiðniverkefnið er unnið af þverfaglegum hóp sérfræðinga í fjórum evrópskum háskólum og fimm frjálsum félagasamtökum frá fimm löndum (Íslandi, Bretlandi, Ungverjalandi, Svíþjóð og Indlandi), og leiðir saman mismunandi fólk og mismunandi lífsstíla til að finna bestu framtíðarsýnina fyrir hvert samfélag fyrir sig, alltaf með heildarmyndina í huga. Ákveðið var að einblína á matvælaframleiðslu meðan á rannsóknninni stendur og er ætlunin að kanna hvort unnt sé að stíga skrefi lengra en C&C™ gerir og finna leiðir að réttlátari skiptingu á auðlindum jarðar, sem og varanlegar og raunverulegar framtíðarlausnir í matvælaframleiðslu.

Markmið

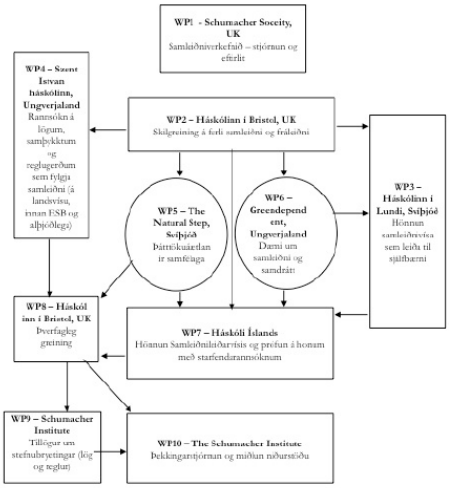
Yfirlýst markmið Samleiðniverkefnisins eru sjö:

1. að þróa hugtakið samleiðni í samhengi hnattvæðingar, þvert á félagsleg kerfi, efnahagsleg kerfi og vistkerfi.
2. að prófa heildræna sjálfbærnivísa í leiðarvísi sem leiðir til samleiðni og sjálfbærrar þróunar.
3. að meta hvernig lög og reglugerðir (á landsvísu, innan Evrópusambandsins og á alþjóðavettvangi) standast samanburð við samleiðniferla, og að prófa samleiðnileiðarvísinn meðal hagsmunaaðila og á reglugerðum samfélaga þeirra.
4. að kanna hvernig mismunandi aðferðir við að auka þátttöku innan samfélaga getur stuðlað að því að byggja upp sjálfbær samfélög, sem styðjast við samleiðnihugmyndafræðina, á norður- og suðurhveli jarðarinnar.
5. að finna dæmi um samleiðniferli innan mismunandi landa.
6. að greina niðurstöður fyrstu fimm markmiðanna og færa í heildrænan leiðarvísi – Sjálfbærnileiðarvísinn.
7. að leggja til leiðir sem færa samleiðni inn í innri og ytri stefnumótun Evrópusambandsins (Converge, 2009).

Aðferðafræði

Rannsóknin er viðamikil og fer fram rannsóknarvinna í öllum löndunum fimm sem aðild eiga að henni. Við undirbúning leiðarvíssins er notuð umfangsmikil gagnasöfnun

og greining annarra hópa rannsóknarteymisins á efninu sjálfbær samfélög, sem styðst bæði við staðlaðar spurningar og djúp viðtöl (blanda eigindlegra og megindlegra aðferða (Ary, Jacobs og Sorensen, 2006/2010; Taylor og Bogdan, 1998). Auk þess fer mikil heimildaröfni fram í öllum löndunum, meðal annars á umhverfisvinnu, sjálfbærnivísum, öðrum leiðarvísum til sjálfbærni, á reglugerðum landanna fimm auk annarra og á kerfishugsun og notkun hennar í samfélögum, svo fátt eitt sé upp talið. Á mynd 1 má sjá hvernig vinna annarra teyma innan Samleiðniverkefnisins fellur inn í gerð leiðarvísisins (sem er á ábyrgð Teymis 7 við Háskóla Íslands):



Mynd 1. Samvinna teymanna í Samleiðniverkefninu.

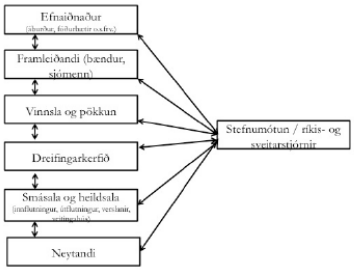
Heimildaröfni teymisins við Háskóla Íslands miðast að því að skoðað er á markvissan hátt (samanburðarrannsókn) hvernig aðrir leiðarvísar að sjálfbærni eru samsettir og hvernig þeir hafa virkað, svo sem The Natural Step (Cook, 2004; James og Lahti, 2004; Robert o.fl., 2002), The Five Capitals (Porrit, 2007), The AtKisson Group Sustainablity Compass (AtKisson, 2008), og núverandi sjálfbærnistefnur landanna fimm. Enginn þessara leiðarvísa inniheldur samleiðni, og leitað verður leiða til að fella samleiðni inn í Samleiðnileiðarvísinn, sem er þróaður meðal annars út frá ofangreindum leiðarvísum. Einnig eru notaðar niðurstöður annarra teyma við hönnun hans, líkt og sá má í mynd 1, svo sem athugun á því hvernig samfélög virkja fólk til þátttöku (Teymi 5, The Natural Step í Svíþjóð) og samantekt Teymis 6 á raunverulegum dæmum um hópa sem nota samleiðni og/eða samdrátt (Greendependent í Ungverjalandi).

Vinnuteymið sem staðsett er í Háskólanum í Lundi (Teymi 3) mun sjá um að hanna grunn að sjálfbærnivísum sem síðan eru útfærðir frekar í hverju samfélagi fyrir sig og eru mikilvægur hluti af leiðarvísinum sjálfum. Hér er stuðst við þekkta sjálfbærnivísa, svo sem DPSIR sjálfbærnivísana, sem notaðir eru meðal annars af Evrópusambandinu í ýmis konar verkefnum sem tengjast sjálfbærni (Converge, 2009).

Leiðarvísirinn og líkanasmíðin verða prófuð með starfendarannsóknum (Ary o.fl.,

2006/2010; McNiff, 2010; NSW Department of Education and Training, 2010) á Íslandi, í Bristol borg á Bretlandi og í tveimur litlum þorpum á Suður-Indlandi veturinn 2011 til 2012, og jafnframt verða niðurstöður rannsóknarinnar kynntar í hinum löndunum tveimur sem þátt taka í henni, Ungverjalandi og Svíþjóð. Í eiginlegu prófuninni munu um 20-50 einstaklingar taka þátt í þremur heilsdags vinnufundum á hverjum stað fyrir sig, sem haldnir verða með nokkurra vikna millibili, nema á Indlandi þar sem vinnufundirnir verða allir haldnir á tveimur vikum. Þessum rannsóknum fylgir blanda af eigindlegum og megindlegum rannsóknum, þar sem meðal annars er stuðst við staðlaða spurningalista og djúp viðtöl (Ary o.fl., 2006/2010; Taylor og Bogdan, 1998). Tvenns konar spurningalistar verða lagðir fyrir þátttakendur, annars vegar stuttur spurningalisti sem fólk fær í upphafi rannsóknarinnar þar sem leitast verður við að meta væntingar og upplifun þátttakenda af vinnufundunum sjálfum og hins vegar lengri spurningalisti sem lagður verður fyrir þátttakendur um það bil ári eftir þátttöku, til að meta árangur starfsins. Unnið verður úr spurningalistunum í SPSS forritinu, og notast jafnt við lýsandi tölfræði sem og ályktunartölfræði eftir því sem við á (Ary o.fl., 2006/2010). Jafnframt verða tekin djúp viðtöl við þátttakendur meðan á vinnufundunum stendur og þau greind með þemagreiningu (Taylor og Bogdan, 2008).

Þátttakendur í vinnufundum hagsmunaaðila (starfendarannsóknin sem HÍ stendur að) verða bæði handvaldir og valdir með snjóboltaaðferð, en allir munu þeir koma úr gildiskeðju matvæðaframleiðslu, líkt og sjá má í mynd 2. Hugað verður að því að bakgrunnur þátttakenda verði sem breiðastur, svo raddir sem flestra fái að heyrast. Gert er ráð fyrir að um helmingur þátttakenda verði valinn úr gildiskeðjunni, en að hinn helmingurinn komi með snjóboltaaðferðinni, og að hópurinn verði það víðtækur að hann innihaldi jafnt grænmetisbændur og sauðfjárræktendur sem smásölu- og stórsöluaðila, auk ráðamanna á borð við sveitarstjórnir og starfsfólk ráðuneyta.

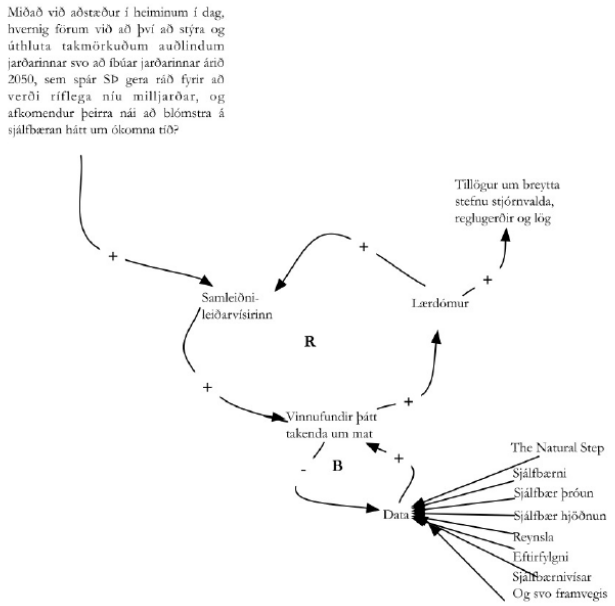


Mynd 2. Gildiskeðja notuð við val á þátttakenda.

Við prófunina verður notast við aðferðir Marjam van den Belt (2004) auk annarra (Haraldsson, 2004/2010; Sterman, 2000). Á fundunum verður starfendarannsóknum beitt ásamt markvissri kerfishugsun (Ary o.fl., 2006/2010; McNiff, 2010; NSW Department of Education and Training, 2010; van den Belt, 2004) til að tryggja að raddir allra heyrist. Starfendarannsóknirnar, kerfishugsun og kvik kerfislíkön verða notuð til að hanna nýja framtíðarsýn þátttakenda þar sem þolmörk jarðarinnar eru höfð í huga. Byrjað verður á því að nota aðferðafræði sem á ensku kallast *backcasting*, og

sem má þýða á íslensku sem afturspá eða spáð aftur í tímann, þar sem þátttakendur eru hvattir til að ímynda sér tíma í framtíðinni og leysa vanda nútímans út frá nýjum (ímynduðum) veruleika með því að finna skref afturábak. Í raun er þessi aðferð öfug við þá sem oftast er notuð, það er, þegar fólk lítur til vanda dagsins í dag til að leysa vanda framtíðarinnar þar sem lausnarskrefin eru tekin frá nútíðnni. Afturspá hefur reynst vel í grasrótarvinnuhópum sem ætlað er að vinna úr flóknum vandamálum sem eiga rætur sínar að rekja til núverandi ástands (Cook, 2004; Holmberg og Robert, 2000; Lovins, 1976; Robert o.fl., 2002).

Út frá afturspánni hannar hvert samfélag fyrir sig sitt eigin líkan af framtíð matvælaframleiðslu sem færir það í átt að hinni nýju sýn. Jafnframt verða búnir til sjálfbærnivísar á hverjum stað fyrir sig, sem samfélagið getur notað til að fylgjast með því hvernig það færist í átt að sjálfbærni. Við þessa vinnu verða orsakatengslamyndir notaðar (mynd 3) til að byggja upp kvik kerfislíkön með tölvuforritinu STELLA®.



Mynd 3. Lærdómsferli Samleiðniverkefnisins.

Eins og sést á mynd 3 hefst rannsóknin í spurningunni sem liggur að baki verkefninu. Spurningin er í raun innblásturinn að baki leiðarvísinum, sem notaður í starfendarannsókninni sem fram fer á vinnuhópafundunum, en þar nýtist einnig bakgrunnsvinna rannsóknarteymisins og reynsla og þekking þátttakenda. Vinnuhópafundirnir leiða síðan til bæði tillagna um breyttar reglugerðir og lög, sem og til frekari útfæslu á leiðarvísinum sjálfum.

Í lokin er ætlunin að hafa útbúið ákvarðanatökuferli, sem nýst getur stjórnvöldum við að skilja afleiðingar ákveðinna lagasetninga og reglugerða.

Fyrstu niðurstöður

Fyrstu skrefin í rannsókninni innihéldu samanburðarrannsókn og heimildarýni á leiðarvísum að sjálfbærni sem þegar eru í notkun. Bornir voru saman mismunandi sjálfbærnileiðarvísar, og var sérstaklega leitað svara við því hvort þeir tækju til hluta á borð við þolmarka jarðarinnar, samdráttar, jafnrétti milli kynslóða og jafnrétti innan samfélaga, og hvort þau notuðu heildræna kerfishugsun. Hæstu einkunnir hlutu leiðarvísar The Natural Step (TNS), og áætlun ríkisstjórnar Filippseyja (Fortnam, 2010). Sú vinna leiddi af sér frekari vinnu á þeim leiðarvísi sem skoraði hæst, frá TNS, en þau félagasamtök eru einmitt hluti af Samleiðnirannsóknarteyminu. TNS, sem voru stofnuð árið 1989 af sænska lækninum Karl-Henrik Robèrt, stefna að því að auka vitund um sjálfbærni innan fyrirtækja og samfélaga (Cook, 2004). Ekki var þó hægt að nota TNS leiðarvísinn óbreyttan, þar sem sjálfbær hjöðnun (Stefán Gíslason, 2010), eða *degrowth* á ensku, er mikilvægur hluti af Samleiðniverkefninu og hugsuninni þar að baki. Þar af leiðandi er verið að hanna nýjan leiðarvísi, sem byggir á TNS leiðarvísinum. Sá byggir á sex grundvallaratriðum, í stað fjögurra hjá TNS, auk aðferða eða tækja sem nota má í vinnuhópunum þremur til að fyrst og fremst auka vitund þátttakenda á málefninu, og því næst til að útbúa raunverulega og varanlega stefnu í matvælaiðnaði og prófa hana með STELLA® tölvuforritinu.

Kassi 2 sýnir tillögur rannsóknarteymisins að grundvallaratriðunum sex.

Kassi 2 - Tillögur að sex grundvallaratriðum Samleiðniverkefnisins

1. Samleiðni í átt að sjálfbærni er ferli að jafnrétti mannkyns innan þolmarka jarðarinnar.
2. Í þjóðfélagi sem hefur samleiðni að leiðarljósi hafa allir jarðarbúar rétt á sanngjörnum hluta auðlinda jarðarinnar og möguleika á að tryggja velferð sína.
3. Í þjóðfélagi sem hefur samleiðni að leiðarljósi hefur fólk tækifæri til að mæta grunnþörfum sínm.
4. Í samleiðniþjóðfélagi er kerfisbundið hlúð að náttúrunni, hún uppbyggð og henni komið í samt lag aftur eftir röskun.
5. Samleiðniþjóðfélag veit að allt sem maðurinn á og notar kemur frá náttúrunni. Í samleiðniþjóðfélagi er þekking á flæði náttúruauðlinda til samfélaga, og auðlindir eru notaðar á eins skaðlausan máta og unnt er.
6. Samleiðnisamfélag höndlar útflæði (úrgang) með því að nota regluna: „minnka, endurvinna, hafna og endurnýta. " Það er hringþjóðfélag (andsætt við þjóðfélag sem hendir) sem hefur lært af náttúruni.

Við undirbúning að fyrstu prófunum Samleiðniverkefnisins hefur uppkast að leiðarvísinum verið útbúið. Það inniheldur grundvallarreglurnar sex, auk aðferða við að virkja þátttakendur í vinnuhópunum og aðstoða þá við að leggja fram raunhæfa framtíðarsýn sem einstaklingar, fyrirtæki og stjórnvöld geta notað við ákvarðanatökur.

Af hindrunum sem teymið hefur mætt má nefna þýðingar á orðum og hugtökum – oft er um að ræða óþjál orð eða orð sem Íslendingar (og fólk almennt) skilja lítið eða illa (sbr. „sjálfbær hjöðnun"). Mismunandi skilning er hægt að leggja í orðið „jafnrétti" og erfitt getur reynst að finna skilgreiningu sem allir sætta sig við. Mataröryggi samfélaga er atriði sem fæstir þjóðfélagsþegnar huga mikið að, og rannsóknin er enn fremur óhefðbundin (starfendarannsókn og kvik kerfislíkön). Jafnframt má gera ráð fyrir að þó fólk hafi áhuga, þá geti reynst erfitt að fá þátttakendur til að verja þremur heilum dögum og einu hádegi í verkefnið, án þess að unnt sé að greiða þeim fyrir þátttökuna. Rannsóknarteymið sjálft samanstendur af fólki af mörgum þjóðernum og með afar

mismunandi bakgrunn, enda er um alþjóðlegt þverfaglegt teymi að ræða. Slík samsetning gefur verkefninu óneitanlega styrk, en á sama tíma getur misskilningur vaknað þegar menningarleg norm og gildi einstaklinga innan teymisins eru ekki þau sömu. Listi þessi yfir hindranir er ekki tæmandi, en að lokum ber að geta þess að líkt og í mörgum rannsóknum væri það af hinu góða að hafa lengri tíma til að kanna niðurstöður og notkun tölvulíkananna.

Hagnýtt gildi rannsóknarinnar er hins vegar ótvírætt. Ef vel tekst til munu þátttakendur í vinnuhópunum hanna tölvulíkan sem byggir á framtíðarsýn þeirra af sjálfbærri matvælaframleiðslu, sem tekur til greina jafnrétti mannkynsins og þolmörk jarðarinnar, og sem stjórnvöld geta nýtt sér við reglugerða- og lagabreytingar.

Niðurlag

Matvælaframleiðsla og matvælaöryggi heims stendur frammi fyrir miklum breytingum á komandi árum vegna ört vaxandi mannfjölda í heiminum, skorti á nothæfu ræktunarlandi og þverrandi auðlindum jarðarinnar. Samleiðniverkefnið er enn að taka sín fyrstu skref hvað varðar leiðarvísinn sem Háskóli Íslands hannar í samvinnu við teymið allt. En ætlunin er að útbúa leiðarvísi sem nýst getur bæði einstökum samfélögum sem og heiminum öllum við að færast í átt til sjálfbærrar hjöðnunar og stuðla að jafnari skiptingu auðlinda meðal jarðarbúa. Leiðarvísinum er ætlað að auðvelda grasrótinni að hafa áhrif á ákvarðanatöku stjórnvalda, svo þau íhugi þolmörk jarðarinnar, sjálfbærni, jafnrétti og heildarútkomuna, þegar kemur að breytingum og setningu reglugerða og laga.

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Appendix E – Bændablaðið article

14 Bændablaðið | fimmtudagur 7. júlí 2011

Tækifærin felast í breytingum í matvælaframleiðslu

Breyttar aðstæður í heiminum öllum þýða að íslenskir bændur og matvælaframleiðendur verða að líta í eigin barm og ákveða framtíð sína. Háskóli Íslands tekur nú þátt í alþjóðlegu samstarfsverkefni sem ætlað er að auðvelda venjulegu fólki að hafa áhrif á breytingarnar og afleiðingar þeirra og leitar eftir þátttakendum í vinnuhópa sem taka til starfa í haust.

Í hverjum mánuði vex mannkynið um eina Lundúnaborg – tæpar 8 milljónir barna fæðast umfram einstaklinga sem látast. Þessi öri vöxtur er ekki gamall – fyrir 60 árum síðan taldi mannkynið 2,5 milljarða einstaklinga, en núna erum við tæplega 7 milljarðar og gerir Alþjóðaheilbrigðismálastofnunin ráð fyrir að við verðum nær 10 milljarðar eftir 40 ár. Eftir sem áður hafa mennirnir enn jafn mikið landsvæði til umráða, það er að segja þessa einu jörð, og það gefur auga leið að sífellt þarf að finna nýjar leiðir til að metta æ fleiri munna.

Til viðbótar er ljóst að loftlagsbreytingar munu hafa víðtækar afleiðingar fyrir matvælaframleiðslu í heiminum. Áhrifanna mun gæta í íslenskri matvælaframleiðslu, verðlagi innfluttra matvæla og auknum tækifærum til útflutnings íslenskra matvæla.

„Við þurfum að sjá heildarmyndina og geta staðsett okkur í þessari stóru mynd sem við erum hluti af," segir Kristín Vala Ragnarsdóttir, forseti Verkfræði- og náttúruvísindasviðs Háskóla Íslands, sem er í forsvari fyrir alþjóðlegt samvinnuverkefni sem ætlað er að finna leiðir fyrir samfélög til að aðlagast þeim breytingum sem fyrirsjáanlegar eru í matvælaframleiðslu heimsins.

„Íslenskir matvælaframleiðendur verða að finna leiðir til að aðlagast þessum nýja veruleika," segir Brynhildur Davíðsdóttir, dósent í umhverfis- og auðlindafræðum við Háskóla Íslands. „Ef við hefjum vinnuna nægilega snemma, þá geta falist gífurleg og afar spennandi tækifæri í þessum fyrirsjáanlegu breytingum. Íslenskir bændur hafa hér tækifæri til að hafa sjálfir mikil áhrif á eigin framtíð."

Bændablaðið hitti þær stöllur fyrir á dögunum til að ræða Samleiðniverkefnið, auk Norðmannsins Haralds Sverdrup, en hann er prófessor í efnaverkfræði við háskólann í Lundi í Svíþjóð og


Íslenskir matvælaframleiðendur verða að finna leiðir til að aðlagast breytingum sem fyrirsjáanlegar eru í heiminum, segir Brynhildur Davíðsdóttir dósent við Háskóla Íslands.

sérfræðingur í kerfislíkanasmíðum, og tekur þátt í verkefninu fyrir hönd skólans.

Tækifæri í sjálfbærni

Samleiðniverkefnið er unnið af fjórum evrópskum háskólum og fimm frjálsum félagasamtökum frá fimm löndum.

„Ætlunin er að útbúa leiðarvísi sem samfélög geta notað til að færast í átt að sjálfbærni, þar sem Vesturlönd draga úr notkun auðlinda og ósjálfbærri hegðun á sama tíma og þróunarríkin fá rúm til að auka sína notkun – allt innan þeirra líffræðilegu marka sem jörðin setur okkur. Með öðrum orðum, við leiðum saman mismunandi fólk og mismunandi lífsstíla, til að finna bestu framtíðarsýnina fyrir hvert samfélag fyrir sig, alltaf með heildarmyndina í huga. Samleiðni í átt að sjálfbærni er leiðin að jafnrétti mannkyns innan líffræðilegra takmarka jarðarinnar," útskýrir Kristín Vala. „Þetta byrjaði allt saman í Bristol í Englandi, þar sem ég vann áður og þar sem töluverður áhugi er meðal almennings á að jafna rétt jarðarbúa til auðlinda jarðarinnar. Og það er mikilvægt að muna að við erum ekki að tala um samdrátt hérna, við erum að tala um leiðir til að finna réttlátari skiptingu og varanlegar og raunverulegar framtíðarlausnir í matvælaframleiðslu," bætir hún við.

„Allt þetta tekið saman, áhrifin af fjölda fólks í heiminum og loftlagsbreytingar, auk þverrandi auðlinda, mun setja okkur stólinn fyrir dyrnar hvað varðar matvælaframleiðslu, en við megum ekki gleyma því að á sama tíma munu þessar breytingar opna nýjar dyr sem nú eru lokaðar eða sem við komum ekki auga á eins og staðan er í dag. Einmitt þess vegna er svo áhugavert að sjá tækifærin í þessum breytingum og gera það nægilega snemma til þess að við höfum raunverulega möguleika á að hafa áhrif á eigin framtíð," segir Brynhildur.

Ástand jarðar

Fyrir tveimur árum síðan skilgreindi hópur alþjóðlegra vísindamanna níu þolmörk jarðar sem mannkynið verður að halda sig innan ef jörðin á að vera lífvænlegur staður til frambúðar. Af þessum níu þolmörkum telja vísindamennirnir að við séum komin fram yfir þremur (þ.e. köfnunarefnahringrásina, loftlagsbreytingar og æ minnkandi líffræðilegum fjölbreytileika), og langt komin með að fara fram úr tvennum öðrum (sýrustigi sjávar og fosfórhringrásinni). Kristín Vala og Harald birtu nýverið rannsókn sem undirstrikar fyrri rannsóknina og sýnir að birgðir heimsins af fosfór fara nú ört minnkandi. Fosfór fyrirfinnst í erfðavísum allra lífvera og er höfuðefni í tilbúnum áburði. Hvað menn varðar er hann meðal annars lífsnauðsynlegur fyrir myndun beina og tanna, allan frumuvöxt, samdrátt hjartavöðva og heilbrigða nýrnastarfsemi.

„Þar fyrir utan er vitað mál að nær allt land sem hentar vel til landbúnaðar er nú þegar í notkun, og við verðum að nota aðrar leiðir til að auka matvælaframleiðslu en að finna bara nýja akra," segir Harald.

„Maðurinn er orðinn að náttúruafli, jarðfræðiafli. Við höfum haft svo gífurleg áhrif að á bara þremur áratugum erum við búin að eyða 30 prósentum af öllum skógum jarðar, höfum tapað 25 prósentum af jarðvegi, erum búin að brenna meira en helmingi allrar olíunnar, helming alls fosfats og málmar fara þverrandi. Fjórðungur spendýra er í útrýmingarhættu og vistkerfi bæði í sjó og á landi eru víða hætt komin. Ábyrgðin liggur mestmegis hjá okkur Vesturlandabúum, neyslumynstur okkar hefur valdið þessu," segir Kristín Vala. „Sem dæmi má nefna að ég sá krækling frá Asíu til sölu í íslenskri verslun núna í vor, og rökin þar á bak við eru óskaplega undarleg – við eigum gnægð af kræklingi hér og engin ástæða til að flytja hann yfir hálfan hnöttinn með öllum þeim tilkostnaði og orkueyðslu sem því fylgir. Það er einmitt svona tilgangslaus flutningur matvæla sem við þurfum að hugsa upp á nýtt."

Samleiðniverkefnið

Albert Einstein sagði á sínum tíma: „Það er ekki hægt að leysa vandamálin sem fyrirfinnast í heiminum í dag með sama hugsanagangi og skapaði þau." Í samræmi við þá hugsun er takmarkið með Samleiðniverkefninu að nota aðferðafræði sem heitir kvik kerfislíkön, þar sem hópur fólks býr til sitt eigið líkan af framtíð matvælaframleiðslu með aðstoð sérfræðinga. Við vinnuna verður stuðst við ákveðinn leiðarvísi sem Háskóli Íslands hefur hannað með samstarfsaðilum í verkefninu.

Leiðarvísirinn og líkanasmíðin verða prófuð í haust í þremur samfélögum, á Íslandi, í þorpi á Suður-Indlandi og í borginni Bristol á Bretlandi. Á hverjum stað fyrir sig verður leitað að fólki sem tengist matvælaiðnaði í víðasta skilningi – allt frá innflytjendum tilbúins áburðar til kokka á veitingastöðum og allt þar á milli.

„Það borgar sig að fá sem breiðastan hóp til að ná sem bestum árangri, og þá erum við að tala um grænmetisbændur og sauðfjárræktendur og allt upp í smásölu- og stórsöluaðila. En mikilvægt er að hafa ráðamenn með líka, til dæmis sveitarstjórnaraðila og fólk frá sjávarútvegs- og landbúnaðarráðuneytinu, til að geta haft sem mest áhrif á lög og reglugerðir," segir Harald.

Áætlað er að 20-50 manns taki þátt í vinnufundunum á hverjum stað fyrir sig.

„Við byrjum út frá framtíðarsýn þátttakenda, og á þremur heilsdags vinnufundum munum við búa til raunhæft tölvulíkan af því hvernig sjálfbær matvælaframleiðsla, með atvinnusköpun og útflutningi og öllu sem til heyrir, getur litið út í þessum þremur samfélögum. Árangurinn verður síðan kynntur á hverjum stað fyrir sig með hádegisfyrirlestri. Við bindum miklar vonir við verkefnið hér á landi. Tilgangurinn er að sjá heildarmyndina í stóru samhengi og búa til framtíðarsýn sem íslenskir matvælaframleiðendur geta lifað við. Hér er gríðarlega gott tækifæri til að láta að sér kveða," segir Kristín Vala.

„Ef bændur og aðrir matvælaframleiðendur taka ekki sjálfir þátt í að móta framtíðarstefnu landbúnaðarins á Íslandi, þá gera bara einhverjir aðrir það og það er auðvitað ekki jafn ákjósanlegt. Það er einmitt þetta sem gerir þátttöku í Samleiðniverkefninu svo áhugaverða," segir Brynhildur að lokum.

Frekari upplýsingar má finna á heimasíðu verkefnisins, http://www.convergeproject.org, eða með því að hafa samband við Sigrúnu Maríu Kristinsdóttur í netfanginu smk5@hi.is, en hún tekur einnig þátt í verkefninu fyrir hönd Háskóla Íslands.

/Sigrún María Kristinsdóttir


Harald Sverdrup og Kristín Vala Ragnarsdóttir vinna nú að stóru alþjóðlegu verkefni, sem ætlað er að útbúa líkan að vænlegri og sjálfbærri matvælaframleiðslu á Íslandi í framtíðinni.