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REMOTE VILLAGES AS HETEROTOPIAS AND PLACES OF UTOPICS. ANALOGUE CASE STUDIES IN SWEDEN AND ISRAEL IN PREPARATION FOR FUTURE MARS SETTLEMENT.

PhD thesis, November 2019

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Abstract

While there is a growing body of research on taking people to Mars, as well as on the environmental control and life support systems required to keep humans alive both during the journey and on Mars, there is very little research to support the development of successful new settlements. This research explores the challenges faced by remote villages in harsh environments and how their residents have learned to adapt to these challenges. Accessing this existing knowledge opens opportunities for future settlement on Mars as well as on Earth.

Research into remote villages as a form of settlement separate to rural settlement is a comparably new field within human geography. Recently for example the Carsons (2011; 2014) have identified a list of common features of remote villages. However past indices have used features of marginality as markers in identifying remote villages (Cloke, 1977; Cloke and Edwards, 1986) thus creating or at least strengthening an image of remote villages as chronically troubled and in decline. While there exist a number of different definitions and indices for identifying remoteness none appears to cater to the multi-facetted nature of remoteness. Besides the physical component of remoteness, the phenomenon has been shown to include cultural (Huskey, 2005, 2006; Schmallegger *et al.*, 2011; Ardener, 2012; Gilbert, Colley and Roberts, 2016) as well as political (Harvey, 2000; Huskey, 2005; Rogers and Walker, 2005) aspects.

At the other end of the spectrum remote villages have been associated with utopian ideals, as can for example be seen in the Israeli Kibbutz movement (Zilbersheid, 2007). The proposition was brought forward by this study that rather than being either utopias or dystopias remote villages might in fact be heterotopias. Heterotopias are places of otherness, places that are disconnected from the mainstream by both physical and socio-cultural barriers and where social rules different from the mainstream can exist (Foucault and Miskowiec, 1986; Hetherington, 1997).

This study used an inductive research approach of extreme case studies, using open-ended interviews and qualitative coding techniques. The methodology was most heavily influenced both by Flyvbjergs' (Flyvbjerg, 2006, 2009) ideas on case study research and Birks & Mills' (2011) understanding of grounded theory. During 2015 five villages in northern Sweden and southern Israel were visited for this study. These sites were chosen using a multi-parameter matrix that catered for the multi-facetted and often relative nature of remoteness.

During research in the case studies observations on three types of challenges were found: those challenges that were uncontrollable prerequisites of settlement ("environmental challenges"), those challenges that were brought about by political and social realities outside of the community's immediate control ("infrastructure challenges"), and those challenges that referred directly to the village community ("community challenges"). Overall challenges faced by villages in both regions were remarkably similar though influenced by factors such as the villages' age and settlement history. The data from this study showed four common phenomena characterising village life in remote and harsh regions. Firstly, the harshness of terrain and climate provides residents with a sense of place. Secondly, residents described a strong 'do-it-yourself'-attitude and volunteering culture. Thirdly, there was a high occurrence of different types of self-employment that signified that the lack of employment options was not as significant as expected. Finally, and most importantly, residents were attracted to what life in a remote village could offer, and in particular, the opportunities that could be provided that were different from mainstream society.

Using the findings from this study the phenomena listed by the Carsons (2011; 2014) could be put in relation to each other. In doing so I was able to contribute to explaining the co-occurrence of these phenomena and at the same time I identified a missing link. In the following I proposed that the observed co-occurrence of phenomena can be explained through remote villages being heterotopias. Research findings showed that at least the villages in this study can be described as heterotopias.

If indeed remote villages are heterotopias, then they can be expected to have a two-way relationship with the mainstream. The villages of this study could be shown to conform to Ravens' (2015) and Hetheringtons' (1997) notion of heterotopias as places of utopics, that is places that through their striving towards utopia create a high innovative potential that could be described as that of a 'living laboratory' (Raven, 2015).

The question then follows how to support remote villages in accessing this potential for innovation. This study proposes the use of structure and agency theory for these means: From the case study data we know residents of the case study sites to have strong agency, that is a willingness and capability to self-solve problems that arise from their villages' remoteness. However as suggested by structure-and-agency theory, agents need a supporting structure in order to be able to exercise this agency. For remote villages this means that while local decision-making and resource allocation are to be encouraged this cannot be used as an excuse for removing structure, as structure is vital for agency.

Due to the research design of this study, using a small number of extreme cases, the findings of this study cannot be generalised. However, as the case studies were based on an approximation of a future Martian village the findings of this study are very likely to be applicable to this particular kind of village. Next steps in research need to establish parameters and identifiers of remote villages that enable future research to conduct larger, quantitative studies. Through such generalisable research we will be able to establish whether all types, or just a particular type of remote village are or can be heterotopias.

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1. Introduction

Humans might settle on planets, moons and even asteroids in our solar system within as little as two decades, if recent developments are to eventuate, most noteworthily that of Elon Musk's commitment to the establishment of an inter-planetary railroad (Musk, 2016, 2017). When they do, humanity will enter a new phase of settlement foundation in the most remote of places. Setting aside the technological challenges that are discussed elsewhere in the scientific community, this study aims to assist in founding future extra-terrestrial villages with presuppositions that will allow them to not merely survive until they grow into larger towns and villages, but that utilises the special features of remote villages. To do so, this study looks at existing remote villages on Earth. This approach means that besides preparing for settlement on other planets, this research, maybe primarily, adds to the growing body of knowledge on remote villages on Earth.

Situated in remote and sparsely populated regions, often in inhospitable climates and landscapes, remote villages[1] face unique challenges – but often also offer unique opportunities for development. With long distances to towns and cities, villages have the capacity to offer at least basic services and social infrastructure to their residents as well as surrounding hamlets and homesteads, and are an important part of remote settlement landscapes. Only during the last ten years have researchers started to understand the unique features of remote villages that distinguish them from rural settlement landscapes that are in a direct centre-periphery relationship (Figueiredo, 2009; Carson and Carson, 2014).

Understanding remote villages as a distinct type of settlement signifies a need to re-think policy and planning paradigms. However, with research still in its early stages, more data and more suitable theory are needed in order to create awareness of remote villages as a separate field of human geography, and thus inform a new planning and policy approach for them. In researching the challenges faced by remote villages in harsh environments and how individuals and communities have found ways to adapt to them, this thesis adds to the growing body of knowledge in human geography concerning remote or sparsely populated areas. I want to add to the ongoing discourse on defining remoteness as a separate field of human geography research in order to inform and create a new planning and policy practice that better fits the needs of remote villages – both on Earth and beyond - while at the same

[1] A village is a distinct type of settlement that is "larger than a hamlet, but smaller than a town" (Oxford Dictionary, 2017). In distinction to a hamlet a village usually offers its residents a limited amount of infrastructure such as a small grocery store and social infrastructure such as a village house or church / synagogue. For the purpose of this research a village is defined through the area residents identify with and relate to as their villages, rather than through any administrational units that might only partially overlap with this area.

time offering insights into the impact and importance of self-dependent remote villages even outside their direct area of influence.

As shown in Figure 1 the following chapter introduces and justifies this thesis and the associated research, explains the research question and process, as well as delineates the scope of this research project. The chapter further offers a list of definitions of key concepts used in this study. Background, Research Design, Results, Discussions, and Conclusions chapters follow this introduction chapter.

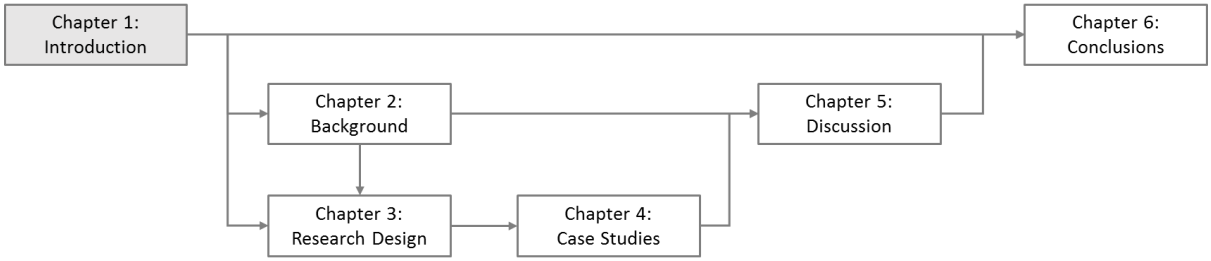


Figure 1: Thesis structure and dependencies

1.1. Background

Dreams and ideas of settling down on Mars and creating a new branch of human civilisation are not new. The German-American rocket engineer behind the Apollo project, Wernher von Braun, conceptualised his ideas of such a journey as early as 1949 (von Braun, 1971). Ever since, it has often seemed as if Mars was within our reach, even within as little as two or three decades. Certainly, the latest development in regards to the settlement plans of for instance the private Mars One initiative (Lansdorp, 2013), or space-entrepreneur Elon Musk's ambitious plans of reaching Mars within the next fifteen years (Musk, 2016, 2017), have generated a new upsurge of interest and development. Settlement on Mars will, by the virtue of small spaceship sizes, initially be a village and it will, of course, be the very definition of what we understand to be 'remote' with the stakes being higher than they are for any terrestrial remote village. Later, if Martian settlement follows terrestrial precedents (e.g. Bylund, 1971a, 2000; Palgi and Getz, 2014) there will be a large number of small outposts complimenting any central port town that grows out of the initial village.

On a methodological scale the Martian village is an extreme case of remoteness. Extreme cases are often richer in information then typical case studies would be, which makes it easier to identify not just the challenges and opportunities behind any given observation, but also the root causes and mechanics behind them (Flyvbjerg, 2006). By using the Martian perspective, I hoped to utilise the advantages of extreme case research when defining research questions, methodology and methods and selecting case study sites. What is more, by looking from a positive vantage point, where remote villages are seen as an opportunity, it was possible to approach the field in considering the potential of remote villages to fulfil a role in our settlement landscape and society thinking.

The understanding of remoteness of as a distinct type of settlement geography is comparably new in scholarly discourse. Historically, remote villages were seen as little more than an extreme manifestation of rurality as understood through the centre-periphery paradigm (Friedmann, 1966). The centre-periphery paradigm describes rural or peripheral regions as in a relationship of high dependency with a clearly defined urban centre. Remote villages were often described as inherently disadvantaged and perceived to be prone to marginalisation and decline. At its worst, some indices developed during the twentieth century quantified remoteness through markers of social marginalisation (Cloke, 1977; Cloke and Edwards, 1986). More recent research understands remoteness as a distinct type of settlement geography that has attributes and relationships that are different from those of rural localities (Figueiredo 2009; Carson & Carson 2014; Gløersen & Dubois 2010). Consequently, a pre-conceived planning paradigm as developed for rural areas might not actually be applicable for all remote villages (Harwood, Schmallegger and Prideaux, 2011). Yet, there is a profound lack of data and basic theory for understanding and addressing the specific challenges and needs of remote areas. This research helps address this gap by generating new theory and proposing a new framework for assessing remote villages' needs and challenges, as well as understanding what new thinking remote villages might offer both in regards to existing villages, and to settling planets, moons or asteroids within our solar system.

1.2. Research questions

The aim of this research is to further our understanding of how remote villages can "function". I will elaborate on the definition of a "functioning" village later in this study, when discussing liveability of remote villages. Remote villages face very distinct challenges (e.g. Behrens et al. 2005; Huskey 2005; Lee et al. 2002). Understanding how individual villages and their communities can overcome these distinct challenges potentially provides insight into how remote villages can be made to "function". The specific research questions employed to gain data about challenges faced and the adaption techniques employed to overcome them used two main questions are:

1. *What are the specific challenges that are faced by remote communities in harsh environments?*

And

2. *How have communities learned to adapt to these challenges?*

The study contrasts results across five remote villages in two regions in order to uncover commonalities and differences. Universalities are of interest for this research since if challenges can be shown to be similar across different geographies and across different cultures, then this is a strong pointer towards a general nature of the challenges. Similarly, an aim is to identify differences in adaptation techniques according to different geographies,

cultures and any other differences. Through such analysis, deeper insights into the capacity of remote communities are expected.

1.3. Justifications for this Research

Remote villages are known for their significant challenges compared with larger population centers. They are a fact of human geography, where humans have chosen to settle in areas that are on the fringe of habitability. If we are indeed to see a new wave of pioneering settlement beyond Earth many remote villages will be founded during the coming decades. Whether or not policy makers want to support remote villages, and whether or not they see them as important for society as a whole is ultimately a question of politics. This thesis assumes that remote villages are an important part of human society and the settlement landscape as a whole, and thus possess distinctive traits. Currently the state of research into remote areas and villages and how best to plan for and support them is lacking. Planning and policy processes threaten to run into the danger of not merely spending resources on measures that do not work, but also making matters worse for villagers in the process. This is especially true in times of economic austerity where a shortage of funding impedes follow-up initiatives or ongoing support. Research into the nature, needs and opportunities of remote villages in harsh environments is needed in order to give planners and decision makers better tools to assist villagers in their own development.

Within the research that has been conducted on remote villages so far, there is a bias towards assuming that there is direct dependency on larger population centers, as well as a pre-conceived idea that remote villages are backwards, marginal and on a trajectory of continuing decline, as portrayed in the core-periphery model (White, Wall and Kristjanson, 2004). Research based on the needs of a Martian village as an extreme case of exotic settlement leads to a definition of a contemporary type of village that is forward- rather than backward looking. Thus, in pursuing research aimed at this exotic settlement type, this study can apply a less biased focus in order to uncover new insights. Through this approach, remote villages on Earth can be studied as a unique, yet not necessarily marginalized, type of settlement, which sets this research apart from much of the earlier body of research on remote villages.

1.4. Delimitation of Scope

This thesis works under the assumptions that the continued existence, or even (future) new or re-settlement of remote villages as part of a post-industrial settlement landscape is desirable. Thus, this thesis works under the assumption that it is a goal to support and develop remote villages rather than involve them in a process of palliative care as has been suggested for instance by White et al. (2004). This research however acknowledges that no such consensus currently exists in human geography, policy or planning (White, Wall and Kristjanson, 2004).

The type of Martian village this research is aimed at is described as a "stage II" settlement. "Stage II" describes a settlement that has moved on or is in the process of moving on from being a scientific outpost to being a permanent settlement. Settlers of a stage II settlement will no longer be transient, but rather will be intending to make Mars their home and, potentially even raise families there. This will bring about a number of changes in settlers' expectations and priorities of as will be described below for example when looking at the pilot study at a mine site versus the case studies in permanent villages. Thus, much of the analogue research conducted towards stage I settlement on Mars does not or might not apply to the stage II settlement that is object of this study.

Although arguably the most remote locations with extreme climates are located in developing countries, this research is targeted at technologically, politically and socially modern villages in remote regions of highly developed countries. It cannot be established from this research whether or not results from this study will be applicable to developing countries or countries with a large marginalised population due to potential additional challenges and differences. Due to the selection of case studies this research is designed to be applicable primarily to populations of western-type culture and social norms. Within the remote settlement landscape this study looks specifically at villages. Therein villages are those settlements that are "larger than hamlets, but smaller than towns" (Oxford Dictionary, 2017).

Recent research has shown remote villages to be more opportunistic in their relationships and more impacted by change than rural settlement (Carson and Carson, 2014). As many of the phenomena observed and discussed in this study refer to these unique features of remote villages it is unlikely the main outcomes of this study will be transferrable to conventional or mainstream rural villages, but only to those localities that can be described as remote in accordance with the understanding of remoteness used in this study. What is more, this study does not claim to describe a typical remote village. A conscious decision was made to work on a positively biased view on remote villages, in the light of the past tendency to view remote villages as marginalised and in decline. Remote villages that show an overall promise for self-sustainability were selected. This is a so far under-represented type of village. These villages are likely not the norm and might in fact even be a minority among remote villages – the current state of research into remote areas does not allow for either conclusion.

As a case study and one with a selective rather than representative sampling strategy, this study does not claim to reliably generate a generalizable outcome. Rather, it seeks context-dependent knowledge (Flyvbjerg, 2006, 2009) and an inductive research approach that can generate new theory and describes under which circumstances this theory might or might not be applicable to villages outside this study. Further research is needed to decide whether or not and to what extent theory generated through this research can be generalised.

1.5. Thesis Structure

This thesis consists of six major chapters including this introduction **Chapter one**.

Chapter two will introduce the current state of research, as well as theories applicable to this research. This chapter will first look at the current state of research on the subject of the stage II Mars village. This literature will later be called upon in chapter three when discussing the attributes of a hypothetical Martian village and its implications to case study selection. Chapter two will then go on to survey and critique the current body of work in regard to the phenomena and attributes of remoteness in villages on Earth. The chapter will particularly look at how to define remoteness and the unique characteristics and attributes of remote villages as far as can be gathered from the current state of research. In doing so this chapter will also establish the gap in research that will be addressed by this research. Finally, this chapter will go on to introduce the main theories and frameworks that will be used in order to collect, analyse and interpret data.

In **chapter three** methodology and research design will be described. This chapter will outline the philosophical background of this research and locate it within contemporary schools of research methodology. In describing the philosophy behind the choice of research design and questions this chapter will help understand the opportunities and limitations of this research. The chapter will then go on to describe the design of this research, the selection process behind the choice of case studies, and the methods used for data gathering and interpretation.

Chapter four introduces the case study sites as well as results from the case studies. The results from five cases in two regions will be described as three categories of challenges and associated adaptation techniques for each case. In the concluding section, these findings will be summarised and the differences between regions and villages, as well as the main themes visible in all case studies will be described in detail.

Chapter five discusses the implications of all data against existing scholarly work and the theories and frameworks introduced in chapter three. This chapter will analyse to what extent the results from the case studies can be explained by existing theory. This chapter then goes on to combine the findings with multiple theories and frameworks in order to arrive at substantive theory derived from this study. In doing so chapter five will answer the research questions of this study.

Chapter six will explore the implications of the findings of this study in the field of human geography, as well as policy and planning practice. In connecting to the hypothetical Martian village at the beginning of this study chapter six will discuss the applicability of findings for future Martian villages. The chapter concludes by giving an overview of the most important remaining gaps in research that should be addressed by future research.

2. Background

2.1. Introduction

The first chapter introduced the research aims and objectives, as well as the motivation for this research.

This chapter will describe the background of this study by reviewing existing literature and theory. As discussed above, this research adds to the growing body of knowledge about remote villages as a distinct type of settlement in order to prepare for the foundation of new remote settlements off-Earth. Firstly, the state of research regarding human Mars travel and settlement will be critically reviewed in order to subsequently gain reasonable assumptions about a hypothetical stage II Mars village for research design and case selection in Chapter 3. Secondly, the current literature regarding remote villages as a distinct settlement type and remoteness as a phenomenon in human geography will be reviewed in order to show the gap in scientific knowledge that this study will address, as well as to locate this research in the existing literature. Finally, this chapter will also introduce the theory and framework that will later, when discussing case study findings in chapter five, be used to make sense of the data gathered in the field.

This background chapter will be followed by the research design chapter three, that will introduce the methodology and research design of this study. Figure 2 outlines the positioning of this chapter in the chapter structure of this thesis. It shows how critically analysing the literature impacted on research design, as well as analysis of findings from the case studies.

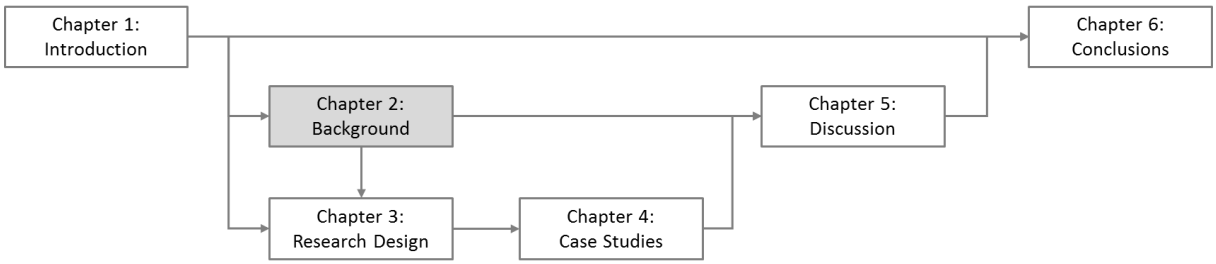


Figure 2: Thesis Chapter structure

2.2. The Martian Village

The dream of founding the first permanent human settlement on Mars is a complex concept. Therefore, this chapter needs to introduce a range of aspects in order to make the notion understandable in the context of this research.

The idea of travelling and ultimately staying on Mars has not come into existence in a vacuum, but as a mirror of each time's ideas, fears and vision. The first part of this chapter outlines the history of the idea of human Mars travel and shows what motivated each epoch's space

pioneers to look towards Mars. It will conclude with a survey of today's motivators for going to and settling Mars.

Next, the specific challenges associated with settling on Mars will briefly be introduced and described. In order to understand the challenges of human Mars habitation the planetary environment itself will be described. As this is a complex topic this chapter can only be an introduction in order to understand the scope of the problem.

Finally, the chapter will conclude with the assumptions behind the stage two Mars village as applied to this study. Later chapters will build upon this description in explaining how terrestrial case study sites can suggest some of the issues associated with remoteness and living in a harsh terrain and why they were chosen.

2.2.1. The history of the idea of human Mars travel from Schiaparelli to Musk

The settlement of other planets has been a dream of humankind since the beginning of the modern era. The relating notion of a manifest destiny, some natural urge for humans to eventually leave Earth for new frontiers (Millward, 1979; Sage, 2008)[2]. Mars, amongst the planets of our solar system, early on obtained a reputation as a planet that could harbour life.

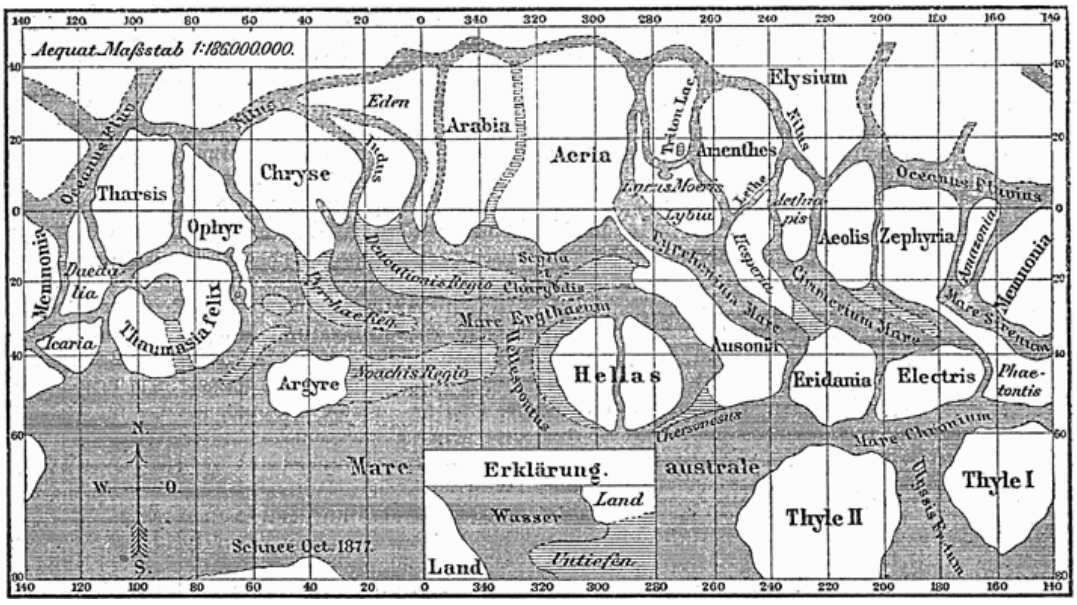


Figure 3: Schiaparellis Map of Mars showing his "canali". He interpreted them as Land (Light) and Water (Dark) (Verlag des Bibliographischen Instituts, 1888, p. 282)

The misapprehension of Mars harbouring a technological civilisation was coined at the turn of the twentieth century. Somewhat simplified, the (natural) canals (*canali*), astronomer Giovanni Schiaparelli (1865-1910) observed (Figure 3) were mistranslated or misunderstood as (artificial) channels. These channels were in turn interpreted as signs of an advanced yet

[2] This concept of a manifest destiny, with its ideological connection to the *Lebensraum*-concept is problematic and has been the subject of a range of studies (i.e. Millward, 1979; Sage, 2008).

dying alien civilisation. This misapprehension, their special scientific-social context, and the long-lasting effect on the study of Mars have been extensively analysed by Lane (2011). Apart from putting the astronomical spotlight on Mars, Lane argues, this period of inept scientific study of Mars keeps having an impact on the field until today.

Amongst the people fascinated by Mars and the prospect of life was German rocket pioneer Wernher von Braun. It is said young von Braun started looking into rocket systems after having voiced his frustration about the lack of a clear image of the red planet (Cadbury, 2005). Thus, Mars became the logical target for von Braun's space ambitions. In his 1949 science fiction novel 'Project Mars' von Braun laid out his vision of reaching Mars with a giant fleet of Earth vessels: an event he saw taking place as early as the 1980s (von Braun, 1971). Mesmerised by Schiaparelli's *canali* von Braun imagined an ancient culture living under the dry planetary surface – a view popular amongst science-fiction writers at the time. In *Project Mars* von Braun justifies the epic effort of a manned Mars mission with finding out whether the Martians are a potential threat for Earth.

These early pioneers, in their belief of finding Mars a habitable world, had much reason to focus their energies on technology for bringing humans to Mars. Both in science and science fiction a lifeless world where humans could not survive without technology was not yet a fully embraced concept. Yet when in 1965 NASA's Mariner IV space probe submitted its first images from Mars these earlier fantasies of a living world were obliterated. The images Mariner IV transmitted showed a barren, dead world. There was no sign of an ancient race of benevolent aliens or, indeed, any life at all. Mars seemed degraded to being merely one among the lifeless planets of our solar systems. Regardless, during the space race, the scientific battle between the Soviet Union and the United States of America for domination of the skies (Cadbury, 2005), Mars continued to be seen as the logical next step after reaching the Moon in 1969. As space race cooled down so did plans for reaching Mars. As the twentieth century progressed, government space programs increasingly concentrated their efforts on low Earth orbits and research and development targeted at human exploration of moons and planets slowed down. Nonetheless, Mars has remained a firm target in NASA's long-term ambitions, remaining a strategic target 20-30 years into the future (Drake and National Aeronautics and Space Administration, 2009).

In 1998 for the first time a rover, i.e., an object able to move on the surface, was successfully landed on Mars: The *Pathfinder* lander's *Sojourner* rover. While on the surface a merely scientific mission, Pathfinder was also a public relations tool in order to boost the faltering public interest in NASA's work (Dittmer, 2007). Through the media reporting on Pathfinder and its successors, Mars, once again, started to stand out amongst the other planets and, once again, it was soon seen as both a potential harbourer of life, and a potential target for human exploration and expansion (Daniels, 2009; von Puttkamer, 2012). The discovery of alien life on another planet has, for at least the last twenty years, assumed a role as the "holy

grail" of planetology. For many researchers, the prospect of finding life alone is a sufficient incentive to get to Mars and establish a permanent research station (Sherwood, 2011; von Puttkamer, 2012).

With these new areas of interest and new knowledge that showed Mars to be less inhospitable then it had appeared for most of the century, Mars once again gained NASA's interest. Aerospace engineer Robert Zubrin was on the forefront first of developing, then promoting a new plan for getting humans to Mars: "Mars Direct" (Zubrin and Wagner, 1996). Though never put into action beyond initial stages "Mars Direct", for the first time, provided a tangible and detailed plan of reaching Mars within as little as a decade. Different from the earlier, monumental projects using large spacecraft in the far future Zubrin and Wagner argued for a simplistic approach using existing technology and aiming for a ten-year timeline, as had been done for the Apollo project. Their plan further differed from other post-Mariner IV plans in that it aimed to utilise in-situ resources, that is resources available on or under the Martian surface or in its atmosphere, in order to provide for both the habitat and the return mission.

Similar to earlier space pioneers, though, Zubrin and Wagner did not consider much beyond the initial stages of Mars exploration. What little thought has been given to housing people on Mars was mostly restricted to utilising a single or small number of self-contained space-worthy habitats (Drake and National Aeronautics and Space Administration, 2009). During the 1990s there were, however, a number of interesting analogue projects in Russia and the US aimed at creating self-sustaining biospheres with a clear outlook towards future space applications. The most well-known among these projects is the US American biosphere II, that was later adapted for climate change research (Nelson, Allen and Dempster, 1992; Allen, Nelson and Alling, 2003). An overview of the project layout with its different ecological systems can be seen in Figure 4.

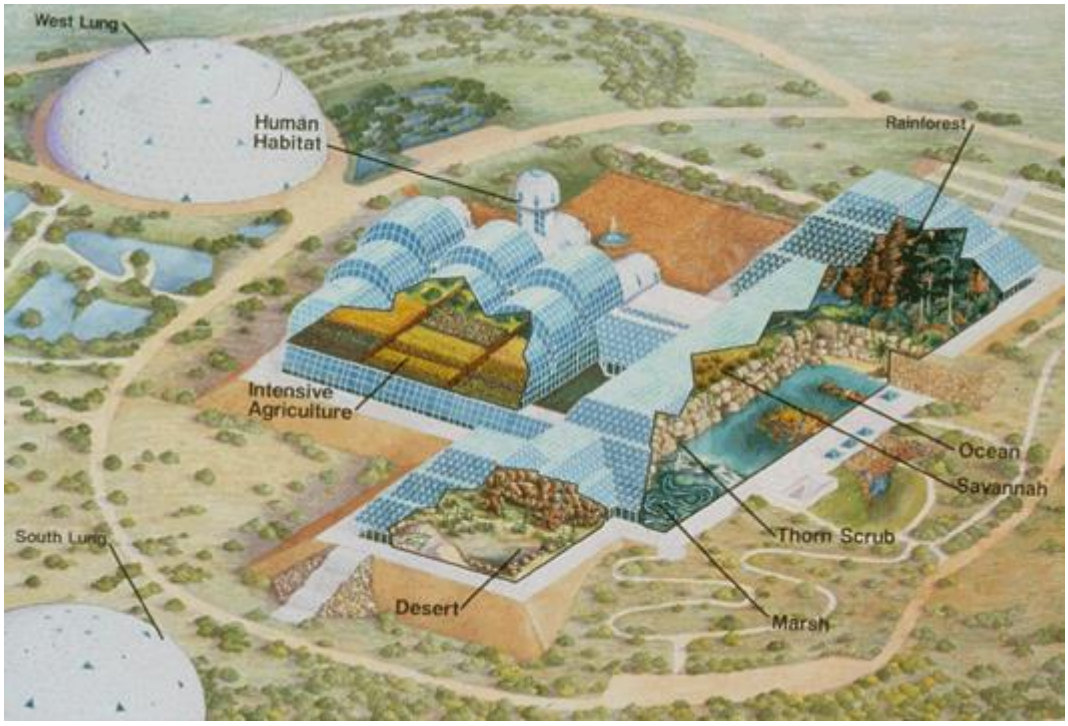


Figure 4: Overview of the biosphere II layout (ArchiExpo, 2017)

Other than these ambitious attempts the realm of long-term settlement was left to science fiction authors. Kim Stanley Robinson for instance, describes in his Mars trilogy – a work clearly inspired by Wagner and Zubrin's work, in rich and scientifically sound detail, the potential settlement of Mars over the course of three centuries (Robinson, 1993, 1994, 1996, 2012).

Scientific discovery remained the main driver in reaching towards Mars – especially as new discoveries about the red planet were made around the millennium. However, for Zubrin and others there was also a natural urge for exploration; a perception that it was in human nature to explore and extend their territory. Mars, it appeared, was the logical next frontier for humankind and one that Zubrin and other space pioneers believe to be within our reach technologically.

In 1998, as a reaction to the lack of engagement towards Mars by the US government, Robert Zubrin founded the Mars Society. The Mars Society, one of a number of similar private initiatives founded during the late 1990s, but the only one remaining influential today, aimed exclusively at promoting Mars exploration and eventual settlement. The society developed an archive of articles both from lay persons and experts investigating the challenges of living on Mars and potential solutions. The group explored topics from trade networks (Sylvan *et al.*, 2009) to special cradles countering the effects of Mars' low gravity on infants (Sylvan, 2002) thus laying a foundation for future work. From the beginning the group had a clear focus towards long-term settlement as a logical consequence of human missions.

Both technology and our knowledge of Mars have improved dramatically during the last decade. Technological advances, such as inflatable habitats (Al Husseini *et al.*, 2009) and 3D printing (Kading and Straub, 2015; Ellery, 2017) change the potential shape and pressurised volume of Mars habitats while reusable rockets dramatically decrease launch-to-orbit costs (Musk, 2016). At the same time, the improved understanding of resources available for settlement on Mars (Bodiford *et al.*, 2005), in combination with technological advances in the field of renewable energy and recycling of resources increase possibilities for self-reliance. These changes imply that while much of the work undertaken in the late 1990s / early 2000s might be inspirational much of it is also outdated due to technical advances.

While the first half century of human space exploration has been dominated by governments, the beginning of the twenty-first century has seen an increased importance of private initiative. At the time of this study a number of private initiatives looked towards Mars settlement. Earlier interest groups, such as the Mars Society, focused on influencing stakeholders, whereas more recent initiatives lean towards a privately funded direct action approach. Further, with climate change scenarios and a growing awareness of the vulnerability of Earth, two more motivators found their way into the discussion about settling Mars: On the scientific stage Mars became interesting because it had itself undergone dramatic climate change. Given the changes Earth might be facing, researching Mars' climate change was seen as important for understanding and eventually influencing Earth's climate. Some (McKay, 1993; Fogg, 1998) even pointed out the possibilities through ecosynthesis, i.e., of "terraforming" Mars. They believed that geoengineering techniques developed for Martian ecosynthesis could ultimately be the only means to mitigate a runaway greenhouse effect on Earth. Another newer motivation for settling on Mars permanently is that of securing humankind's long-term survival through becoming a multi-planetary species. During the last decade high profile scientists like Stephen Hawking (Griffin, 2015), as well as entrepreneurs like Elon Musk (Musk, 2016) have pointed out the vulnerability of humankind on Earth. They argue it is only a matter of time until a global killer event – anything from a major asteroid strike to pandemics or human-induced catastrophe – renders Earth uninhabitable. Only by spreading to other celestial bodies; planets, moons and potentially even asteroids, they believe, does humankind have a future. To those who want to make humans a multi-planetary species in order to secure humanity's survival, Mars is the most obvious stepping stone to humankind's spread beyond Earth (e.g. Musk 2016; Zubrin & Wagner 1996; Salotti & Heidmann 2014).

Two noteworthy privately-funded initiatives aimed at settling Mars with a permanent population in the near future have emerged over the last decade: Mars One (Mars One, 2014a) is a Dutch based initiative aiming to finance itself through private sources, such as private investment, company sponsorships, crowd funding, and even through the sale of TV

rights. Different from the traditional approach of scientific outposts followed by an eventual permanent settlement the initiative offers one-way trips, planning to settle Mars directly following the initial landfall. They rely heavily on in-situ resource usage, basing much of their mission profile on Zubrin and Wagner's ideas (Zubrin and Wagner, 1996), albeit updated with modern technology. Figure 5 shows an artist's perception of the Mars One village consisting of inter-connected habitat modules, as well as inflatable structures.

Figure 5: Artist perception of the Mars one permanent village on Mars with buried inflatable habitat and agricultural dome (Mars One, 2014a)

Billionaire and space entrepreneur Elon Musk has also repeatedly stated his intention of enabling a settlement of Mars in the near future. He claims to have founded his space company SpaceX for the sole reason of bringing people to Mars and has, during the last decade, made significant progress towards developing cheaper, reusable rockets capable of transporting large payloads over long distances. In 2016 Musk formally unveiled his plans for an interplanetary transport system capable of transporting up to one hundred settlers at a time for a cost of only two hundred thousand US dollars a ticket (Musk, 2016). Other space entrepreneurs, like Virgin founder Richard Branson, or Amazon's Jeff Benzos, focus on low Earth orbit for now, but have also voiced their long-term aspirations towards Mars on several occasions (Davenport, 2016; Grush, 2016).

Governmental space agencies have also in recent decades increased their presence on Mars. Their focus is, however, on robotic missions such as orbiters, landers and rovers (NASA, 2014; ESA, 2016). Also, in contrast to private initiatives governmental space agencies such as ESA and NASA have adapted a "first moon, then Mars" approach. This approach is being critiqued harshly by many Mars experts (most prominently Zubrin and Wagner, 1996) due to the lack

of applicability of lunar technology to Mars – two heavenly bodies with significantly different environments and natural resources.

While the plans for Musk's interplanetary transporter appear to be in advanced stages of development with some components already built to scale there are, as of the time of this study, no detailed plans for the actual village. Existing work on potential Martian settlement are often research theses that are highly conceptual and not usually followed up with more work (e.g. Crossman 2010; Petrov 2005; Petrov 2004; Seedhouse 2009). Work is often highly single-disciplinary focusing on a single aspect or idea, such as architecture (Petrov, 2004, 2005) or crew selection and medical issues (Seedhouse, 2009). This research looked at opening up the field in regard to second-stage Mars settlement through research on analogues on Earth in assuming that the technical challenges can be met. While much can be argued for or against the technical possibility of Mars settlement it would be outside the scope of this thesis to go into it in greater detail.

2.2.2. Stage II Mars Village assumptions

The purpose of this section is to achieve an understanding of what a stage II village on Mars might look like in order to identify selection criteria later in this study. Given the early stage of research in this area, in many cases only reasonable assumptions based on past pioneering settlement as well as current trends could be used. The literature cited in this section was complemented with informal interviews with space stakeholders.

The Martian Environment

Settling Mars will pose a considerable challenge to humans. Without technology to protect them, exposure to the Martian environment is immediately lethal to humans. Mars' atmosphere consists mostly (95.3%) of carbon dioxide, 2.7% nitrogen and only 0.13% oxygen and is thus unbreathable and its atmospheric pressure of 0.006 bars (compared to Earth's 1.0 bar) is far too low for human survival. By far the largest challenge for Martian engineering are the long-term adverse effects that are caused by cosmic and UV radiation that is insufficiently shielded by the planet's small atmosphere and magnetic field. Mars' low gravity, about 1/3 of that of Earth, might not be an issue while staying on Mars, however any person returning to Earth will have to prepare thoroughly. We do not yet know the effects of low gravity on mammal gestation and development, even if humans are able to successfully procreate on Mars these Martian-born offspring might be physiologically unable to ever visit Earth. As far as the weather is concerned while Mars' average surface temperature of 210 Kelvin is only slightly colder than Earth's 288 Kelvin the larger orbit eccentricity contributes to a larger seasonal variation of temperatures. While a balmy Martian summer day can see daytime temperatures of up to 20°C a cold winter night can signify temperatures under -120°C (Nicole Spanovich, Michael D. Smith, Peter W. H. Smith, Mike J. Wolff, Philip R. Christensen, 2006).

However, in other regards Mars is remarkably similar to Earth. As one of the terrestrial planets that is a rocky planet, Mars is similar in its basic makeup to Earth (Hester *et al.*, 2007). Mars orbits the sun in 1.88 years and has a rotation period of 24 hours and 37 minutes, bringing it very close to Earth's 23 hours and 56 minutes' rotation period. It is 1.5 Astronomical Units (AU) from the sun, that is on average one half AU, or half the distance from Earth to the sun further away than Earth. Mars is about half as large as Earth when measured by diameter but has only one tenth of the Earth's mass. With an obliquity of 25.3 degrees as compared to Earth's 23.4 degrees the seasonal changes between its hemispheres are only slightly larger than Earths' but due to its larger orbital period around the sun seasons take longer. Also noteworthy is the difference in surface gravity. Where Earth has a surface gravity of 9.78 metres per second Mars has only about a third of that gravity, 3.71 metres per second. Table 1 provides an overview of the physical differences between Earth and Mars.

	Earth	**Mars**
Orbital period	1 year	1.88 years
Rotation period	23 hours 56 minutes	24 hours 37 minutes
Distance from the sun	1 Astronomical Units	1.5 Astronomical Units
Obliquity	23.5 degrees	25.3 degrees
Surface gravity	9.78 metres / second	3.71 metres / second
Surface temperature	288 Kelvin	210 Kelvin
Surface pressure	1.0 bar	0.006 bar
Atmosphere	0.039% carbon dioxide 78.1% nitrogen 20.9% oxygen	95.3% carbon dioxide 2.7% nitrogen 0.13% oxygen

Table 1: Comparison between Mars and Earth after Hester et al. (2007)

Robotic landers have often struggled with Mars' strong winds, which can be as high as 100 metres per second, and with its thin sand, distributed by these winds. Dust on photovoltaic panels, the most used power source for Martian landers and rovers hitherto, limits the mission duration for today's robotic landers.

As mentioned above, most contemporary plans of settling on Mars plan on using locally available resources. Zubrin et al. (1996) have long suspected that Mars has in its soil, or in its atmosphere all the elements that are necessary for eventual self-sustainability of a village. Zubrin describes in some detail the chemical processes and air and soil-mining techniques that can be used to create oxygen, potable water, and even rocket fuel on Mars (Zubrin and Wagner, 1996). Other studies have, for instance, confirmed the usability of Martian soil as a building material (Farrier, 2000). Recent robotic missions, such as the Mars Science Laboratory Curiosity have by and large supported their argument (Sherwood, 2011; Kading and Straub, 2015).

Technologically, keeping humans alive on Mars poses challenges, yet none that are insurmountable. Most of the technologies required already exist – although potentially on a

smaller scale – either in extreme environments on Earth, or aboard the International Space Station: Frozen water is available from the Martian polar caps, from the layer of fine dust covering the planet, as well as potentially even from underground aquifers dependent on the settlers' landing site (Powell, Maise and Paniagua, 2001). Even bringing large amounts of water from Earth might be more feasible then expected as it can double up as protection against solar radiation during the interplanetary travel (Zubrin and Wagner, 1996). What is more, when using a Sabatier reaction to produce rocket fuel, as has been suggested by both Zubrin (1996) and Musk (Musk, 2016), water is a bi-product of the chemical reaction that produces methane. With existing water reclamation and recycling technologies, such as that used for instance on the International Space Station it is at least theoretically possible and feasible to support a settlement or village in its water needs for drinking, food, personal hygiene and even laboratory and small industrial operations (Petrov, 2004; Crossman, 2010).

Habitable spaces will need to be pressurised and sealed from the Martian environment. Oxygen can be generated through chemical reactions from the Martian carbon dioxide (CO_2)-rich atmosphere, while harmful gasses such as carbon dioxide can be scrubbed from the air within the habitat with existing technology like that used in the ISS or other confined spaces. A 1% scale model of such a technology specifically developed for Mars will be aboard NASA's 2020 Mars rover (NASA, 2016). Biosphere II has meanwhile shown the theoretical feasibility even of a biological closed-cycle life support system where, much as on Earth, living organisms convert carbon dioxide to oxygen (Nelson, Allen and Dempster, 1992; Allen, Nelson and Alling, 2003).

Though still in its early stages there is expanding evidence that food can be grown on Martian soils (Farrier, 2000), while existing hydro- and aeroculture techniques pose an alternative option. Current research into growing food in the International Space Station's microgravity in order to understand the effects of reduced gravity on plants is yet to be published but has shown encouraging first results. EdenISS is one such project where a rack-based greenhouse was first tested in Antarctica but is to be used to provide astronauts on the International Space Station with fresh produce (Boscheri *et al.*, 2016; Dueck *et al.*, 2016; Zabel *et al.*, 2016). Existing greenhouse technology as used near the polar circle, for instance in Iceland, shows the possibility of growing food plants even at an industrial scale in greenhouses with an artificial environment (see Figure 6). As a positive side-effect of local food growing a larger ecosystem can potentially even provide partially or fully biological life support – that is the recycling of water and breathable air, as was proven in principle by Biosphere II in the 1990s (Nelson, Allen and Dempster, 1992).

Figure 6: Greenhouse with artificial lighting and automated drip-irrigation systems in Iceland (Pfaffl, 2016)**.**

The technologies required to keep humans alive on Mars depend on large amounts of energy, such that providing enough energy to a Martian village will be the keystone of settlement efforts. By using electric energy frozen water can be melted and purified and oxygen can be created through chemical processes. Lamps can be powered in order to light up greenhouses even if they are situated underground. For energy generation, there are multiple thinkable options from a reliance on renewable energy sources – wind and solar energy – to nuclear power options using either radioisotope generators or nuclear fission as power sources (Zubrin and Wagner, 1996; Seedhouse, 2009; Crossman, 2010).

For building and expansion of a village, even though recent innovations in inflatable habitat technology (Cadogan, Stein and Grahne, 1998) dramatically increase the amount of pressurised space per ton shipped to Mars, the village will ultimately be dependent on utilising local resources as much as possible (Sanders and Larson, 2011). Here too there are several conceptual ideas including underground settlement, using Martian soil as a radiation shield (Lansdorp, 2013), or creating bricks or other building materials from Martian dirt. Advances in 3D printing technologies play a role in enhancing the possibilities of in-situ resource usage (Kading and Straub, 2015).

One often quoted danger of living on Mars is radiation. Due to the planet's small atmosphere and, more importantly, its lack of a magnetic field Mars is bombarded by solar and UV radiation that is harmful to biological organisms (Anderson *et al.*, 2005). The easiest thinkable countermeasure is that of using shielding on habitats and limits to EVAs (extra-vehicular i.e.,outside activities) in order to control daily doses (Lansdorp, 2013; Mckenna-Lawlor, 2014).

As mentioned above when discussing building materials local Martian rock and dirt can easily be used to this effect either by creating an underground village (Al Husseini *et al.*, 2009), or by burying habitat space (Kozicki and Kozicka, 2011; Lansdorp, 2013).

Demography

Likely demographic characteristics for the initial wave of Mars settlers will depend on many factors. The organising body behind the settlement movement is probably the most influential upon these factors. If such an undertaking happens in any kind of organised manner the organising and funding bodies will actively decide on demographic characteristics of their founding population. While historical migration movements into frontier areas have often seen a predominance of young males this does not necessarily have to be the case for Mars due to the social changes during the twentieth and twenty-first Centuries. Settlers' young age, too, is not the only possible scenario. Interest groups have, in the past suggested the choice of a middle-aged population that would be statistically less likely to develop cancer when exposed to higher radiation levels. An older cohort's lower remaining life span means the adverse effects of radiation have less time to affect the human body than they would in a young human with a long remaining life span. This idea seems at least theoretically feasible given that NASA's astronaut John Glenn currently holds the record as the oldest person to fly in space at age 77.

Figure 7 shows an infographic by Mars One describing the demographic distribution of their initial 202,586 candidates. The graphic shows the heterogeneity of nationalities and a surprisingly even distribution of sexes.

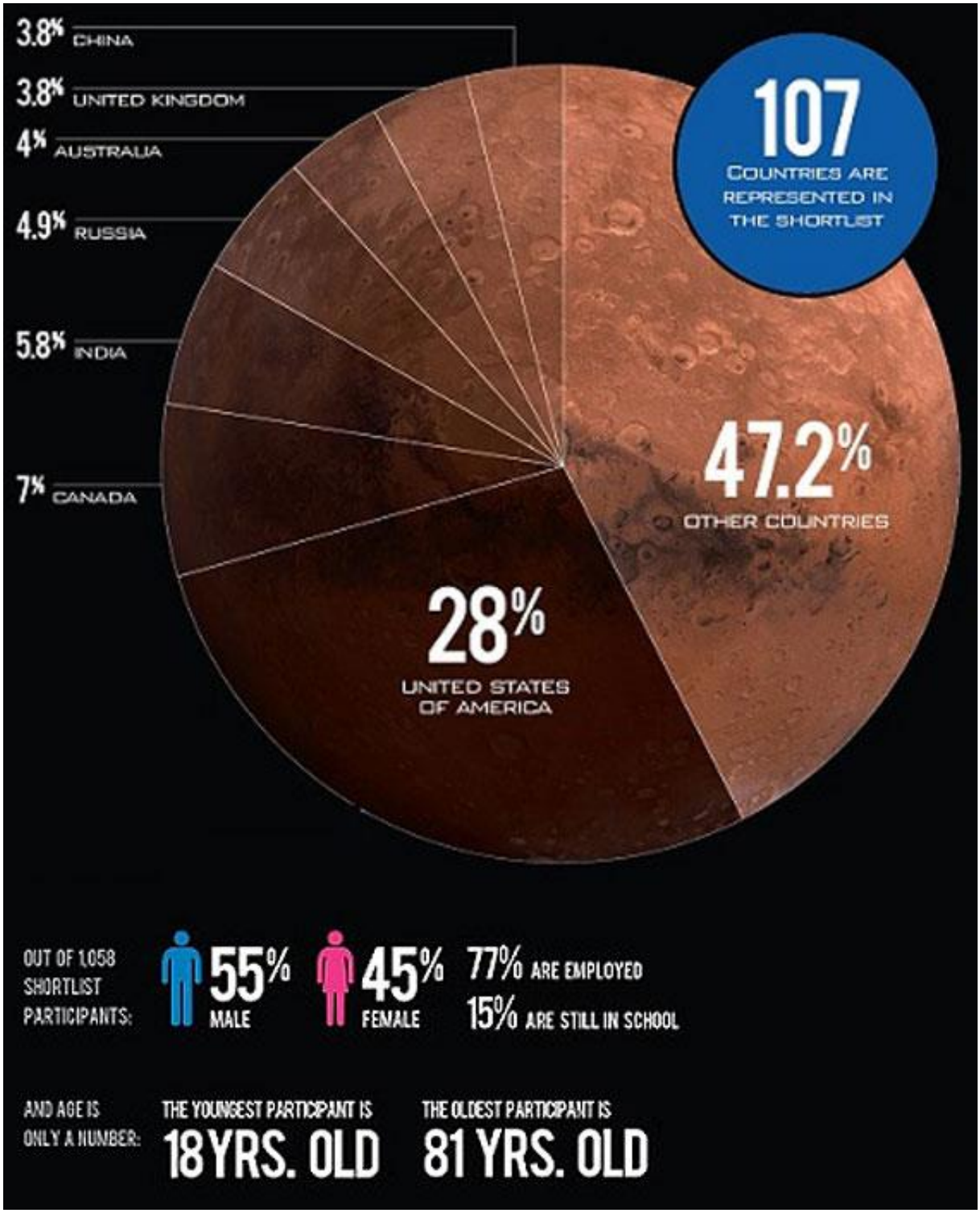


Figure 7: Demographic distribution of Mars One candidates (Mars One, 2014a)

By the time the developing village reaches the second developmental stage the initial population will have started to identify with their new home and commenced settling down. It should be safe to assume, given human nature, that no matter what the initial planning for

the village, couples will at this stage have formed and quite likely the question of founding families will have become imminent.

Whether or not it is medically possible or feasible to give birth and raise children on Mars given its different gravity and high radiation levels is yet to be seen (Sylvan, 2002). However, erring on the progressive side it will be assumed that medical techniques, given the expectable gain in medical knowledge within the initial settlement phase, will allow for having and raising families at this stage. Recent experiences with growing plants (Dueck *et al.*, 2016; Zabel *et al.*, 2016) and even keeping small animals (Boudreaux *et al.*, 2014) in the zero-G environment of the International Space Station point towards a principal possibility of biological procreation in space. This study assumes permanent stage-two village will have to be planned accordingly – taking into account the needs of young families.

Thus, at the time of founding of the stage-two village the demography will have or will be about to shift to young and middle-aged singles and families with small children. Whether or not elderly people will be present is hard to answer as it depends mostly on the demography of the initial settling group. Whether, and to what extent the advancement of settlement will bring a change in demography from a dominance of highly-educated scientists and engineers to a larger demographic heterogeneity upon new families arriving, depends mostly on the further development of transport capabilities, i.e.,on whether or not passage to Mars becomes available to private citizens. SpaceX's CEO Elon Musk, for instance, does have plans to provide such a service in the foreseeable future at "the price of an average [US American] home" (Musk, 2016), so it is not entirely unimaginable. Either way, accompanying an increasingly diverse economy, specialists, visiting scientists, mission specialists and potentially even tourists will start to become part of the population (Sylvan *et al.*, 2009).

As far as wealth is concerned this will be a population used to a high- and highly technological standard of living. While they may have endured cramped and at times uncomfortable conditions during stage one of the village, it can be assumed that the Martian population will regard the founding of the stage-two village as a sign of normalisation of their life. Gale and Edwards (n.d.) predict that a shift towards more high-level needs will occur as lower level needs are increasingly met.

Population Size

The few currently existing plans see the village as initially growing at a rate of between four people (Zubrin and Wagner, 1996; Mars One, 2014b) and as many as one hundred (Musk, 2016) every two years, when a transfer window to Mars opens up. Assuming a constant growth rate at the lower estimate of four people per two years, this would see the village at 40 people after a period of twenty years. A far more ambitious project is that of SpaceX founder Elon Musk who formally unveiled plans for his "Mars Colonial Transporter" in 2016.

This massive space ship will be able to carry as many as one hundred colonists (Atkinson, 2016; Musk, 2016). If such a system did indeed become available, it would effectively catapult the fledgling Mars village into stage II within mere years of its foundation.

New resident numbers are still eventually going to increase if the village experiences any amount of success. Larger transfer vehicles might become available or, at the very least, the amount of launches per transfer window might be increased. A very conservative estimate would assume that crew sizes double to eight people per launch window after the initial ten years (five missions). The village would now be at a population size of sixty people after twenty years. Any scenario below this slow growth would effectively lead to a settlement situation more similar to a research outpost, then on a trajectory towards increasing self-sufficiency. Therefore, the assumption of a Mars village of sixty people will be treated as the lower realistic boundary in assessing population numbers for the purpose of this study.

In order to find the upper boundaries of population size at the time of stage-two village foundation, assuming a capacity of four people per launch, a third scenario constitutes a boom scenario. Therein, after the initial ten years, biannual crew sizes increase by one launch (four people) with each transfer window. This scenario sees the village at a population of just short of one hundred people after a total time of twenty years.

A human community of any kind cannot be planned with just the status quo in mind. This is particularly true for the first permanent Martian community to be created. Not only will the village need to house the existing crew but also newcomers and potentially the settler's children. As a result, the hypothetical Martian village of this study will not be designed for the population size at year twenty but based on population projections for the subsequent decades. Assuming the conservative scenario of launches doubling every ten years, a further decade of growth sees the village growing to a population of 300 people – not taking into account births and deaths.

Figure 8 compares the population projections for the first forty terrestrial years of the village for the conservative scenario of ten-yearly launch doublings, the boom scenario of an additional launch per window, and for the proposed 100-crew "colonial transporter". These scenarios provide plausible population sizes for the stage II village, and for projections another 20 years into its lifetime. It shows a plausible design parameter of between 300 and 560 people.

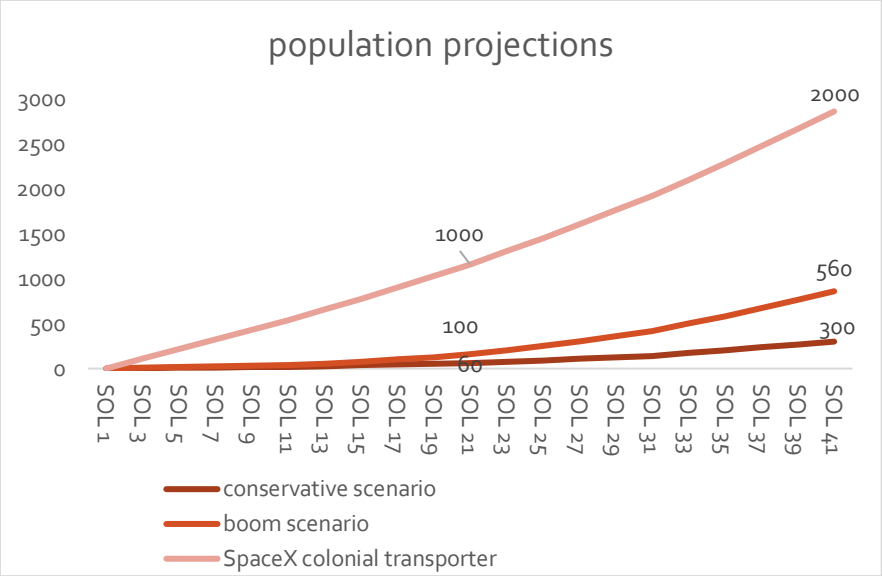


Figure 8: Different population growth scenarios for the Martian village during the first forty years

Industry

Whether it will be using a communal settlement structure, as seen in the Israeli Kibbutz (Rettig, 2010), or an intermediate model, such as the Israeli Moshav (Galor, 2014), the village will need means to support itself and import vital high-tech goods and (remote) services from Earth. A part of the transition to a stage-two village is the increasing establishment of local industries utilising in-situ resources for local use. Whether and to what extent the village will be able to expand this local industry and find resources to export will be vital for further village development. The eventual emergence of a three-way inner Solar System economy (Sylvan *et al.*, 2009) where Mars acts as a support base for mining operations in the Asteroid belt and refuelling station for further travel into the solar system (Musk, 2016) has been suggested but is likely to still be at best in its infancy only twenty years into Martian village. It has, however been suggested (Pizam, 2008; Doule *et al.*, 2012) that space tourism could play an important role for the Martian economy early on.

For the first decades of Martian settlement the most important export good of the Martians will no doubt be knowledge. Knowledge is a good that is hard to classify in terms of monetary value, but the concept of knowledge as an economic export good can be demonstrated by the example of the International Space Station, or the Antarctica stations that have existed as permanently inhabited settlements for decades despite the fact that they do not produce any physical export goods. Effectively, it is the knowledge that gets "shipped" to their sponsoring countries or organisations in exchange for monetary assistance for the upkeep and development of the scientific station. A similar situation is likely to occur on Mars during early settlement.

Assessing the Mars One case of financing Mars missions via turning them into reality TV (Mars One, 2014a) there is also a possibility that this mixture of knowledge and entertainment could become a long-term important export good of the young Martian village. Residents could produce entertainment, such as TV shows, documentaries or books on Mars in exchange for funding or material assistance from their Earth-based employers. Despite its remoteness from Earth information transfer, albeit delayed, between Mars and Earth is already possible at high bandwidths and should not pose a major problem at stage two village.

Goods and services

Apart from information, transport of goods to and from Mars will be slow, hazardous and costly into the foreseeable future. Transport constraints, barring the discovery of a highly valuable resource like the Moon's helium 3, rule out classic export-driven staples-based economies. The young Martian village will need to produce as much as it possibly can locally and import only high-tech goods it cannot produce itself (Zubrin and Wagner, 1996). 3D-printing technology (Kading and Straub, 2015) will assist in this endeavour leading to the possibility that for many goods, information, i.e.,plans, rather than actual goods could be imported where the physical good is produced locally. Such a system can even work in the opposite direction, effectively enabling Martian entrepreneurs to sell their inventions on Earth without having to pay immense transport costs. Some high-level specialist services can also potentially be accessed from Earth in the form of information but most services will be provided by fellow Martians. Primary industries in food production and mining, as well as technical services for life support are likely to be large employers in the young village. The amount of tertiary and even quaternary industries can be expected to rise as the population diversifies.

Infrastructure

The Martian stage-two village will require the same range of infrastructure as a terrestrial city. While even the most remote villages on Earth are often part of a network of villages and small towns, the Martian village will not be able to profit from such a network. Thus, on a per-capita basis, the infrastructure requirements of the Martian stage-two villages will by far exceed that of a terrestrial village of comparable size. What is more, the requirements for life support mean that there will be a high requirement for infrastructure, regardless of whether that support is fully biological (Nelson, Allen and Dempster, 1992; Nelson, Dempster and Allen, 2008), chemical or hybrid.

Layout

As mentioned above early plans for Martian villages were constricted in size through transportation considerations (Zubrin and Wagner, 1996; Petrov, 2005). However, during the last decades inflatable habitats and the possibility of building with Martian resources, especially when also considering 3D-printing (Ellery, 2017), have opened up new possibilities (Kading and Straub, 2015). Even stage-one plans like that employed by Mars One, envision a combination of ready-made space-worthy habitats and inflatable or locally-built structures. Thus, living conditions should be reasonably comfortable, likely including green agricultural,

park or mixed-use areas, personal living quarters and communal areas. Large pressurised spaces will be possible through the use of local building materials or tunnelling into Mars and/or through inflatable habitat technology. Green spaces further have an added bonus in that they can be used for food production and to enhance air quality. However, the need to protect humans from cosmic radiation is likely to limit the exposure of settlers to the Martian landscape.

2.2.3. Summary

Planning towards a permanent settlement on Mars predates even the Apollo project and has, since the 1950s, been part of NASA's strategic planning. However, even though a number of rather specific plans exist for reaching Mars with a human crew, planning for the actual Mars settlement is only very basic and often limited to the initial years of settlement, i.e., the stage I settlement.

As far as constructing a hypothetical stage II Mars village, we can make reasonable assumptions about demography and population size, as well as identify potential early industries as a source of income. It has been suggested that a young Mars village will initially experience a severe labour shortage (Zubrin and Wagner, 1996; Musk, 2016). The stage II village will be a fast-growing village, possibly with as many as 300 - 560 people, i.e., a small village, whose population is dominated by middle-aged and highly educated males and females. Due to the limitations in transport capabilities to and from Mars, imports and exports are likely to be in the form of intellectual property. Space tourism and entertainment might add further income streams.

Even if the second-stage village is similar in infrastructure and services to a comparable remote village on Earth, the Martian village will need to run extensive and expensive life support systems. As a further major difference to terrestrial villages, the Martian village will not be able to profit from sharing infrastructure and services with other nearby villages and hamlets leading to an extensive need for infrastructure per capita.

The Martian village represents an extreme example of remoteness – both culturally and spatially. Not only will it be far away from Earth – at the *very* least two to four months' journey taking into account recent technological development (Musk, 2016) –the Martian village will also be settled by a very distinct group of people who are likely to differ from the average population of terrestrial towns and cities.

While the technological challenges of the Martian village will require the creation or at least transfer of entirely new knowledge and technology, challenges of infrastructure provision and self-dependency might not be as dissimilar from the challenges faced by remote villages in harsh environments on Earth. Thus, the following section will review the notion of remoteness in the context of human geography and analyse the current state of knowledge

about remote villages in harsh environments on Earth. The applicability of research into terrestrial remote villages for a potential Martian village will be discussed towards the end of this study, in chapter six.

2.3. Remoteness

The term 'remote', though easily defined as 'removed from' (Oxford Dictionary, 2014) has a number of different definitions. When, for instance, applied to hiking tourism in Switzerland a 'remote' place can be mere kilometres away from the next town (Boller *et al.*, 2010). At the same time the status of Darwin as a remote town has been disputed in light of its function for the communities surrounding it and its relative proximity to the south-east Asian megacities compared to other Australian towns (Gibson, Luckman and Willoughby-Smith, 2010).

The concept of 'remoteness' is even more problematic than the term. It can be defined via a number of different factors including spatial, demographic and sociocultural ones (Huskey, 2006; Ardener, 2012). The lack of a clearly defined concept has led to individual research teams designing different definitions for remoteness to suit their needs. These definitions can use crude descriptive means, for instance defining remote as "northern" (Carson *et al.*, 2011), or quantitative frameworks such as ARIA (Eckert, Taylor and Wilkinson, 2004).

Remoteness in the human geography context is a more complicated and multi-layered concept then it first appears to be (Huskey, 2006). While preferences exist there is no consensus on defining remoteness (Gould, 1969; Carson, 2011b; Carson *et al.*, 2011). As shown in Figure 9, geographic areas are usually sparsely populated because of a terrain and / or climatic conditions that make the land unsuitable for large-scale industrial activities (Dubois and Roto, 2012). Weeden (1985) describes this limiting of the amount of people a geographic area can support as "carrying capacity". Any landscape's harsh climatic conditions and terrain limit not just the population density of this area, but decrease physical accessibility (Taylor, 2012) while the low population density increases expenditure per capita for any infrastructure and thus acts to decrease accessibility even further (Slack, Bourne and Gertler, 2003).

Both spatial remoteness and low population density are thus caused by terrain and climatic conditions, the physical cause of remoteness. However, as will be detailed in this section, remoteness has even non-physical components that can be described as "cultural" and "political" remoteness and work to increase the remoteness experienced by its residents above merely the levels of physical remoteness.

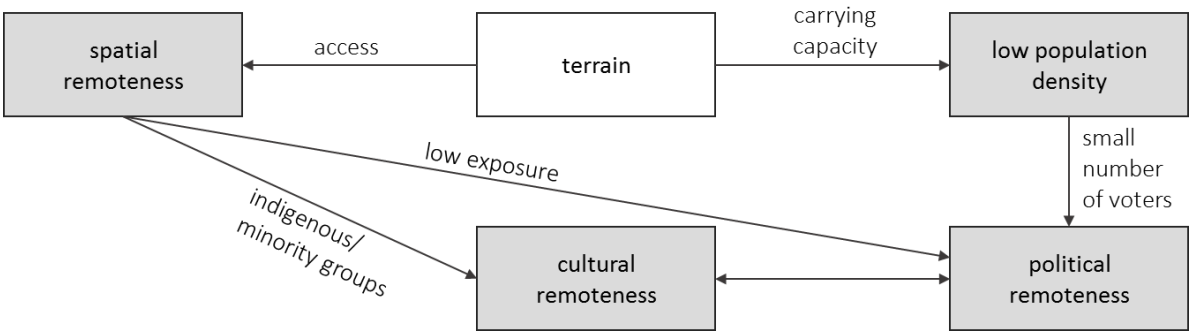


Figure 9: The interconnection between aspects of remoteness

Different terms are used in science and administration to describe the concept of remoteness, often hinting at a predominance of a specific aspect. These terms include 'remote', 'sparsely populated' or 'inaccessible', but sometimes also derogatory terms like 'marginal' or 'on the fringes'. The latter highlights a long-standing tendency in both research and administration to dismiss remote areas and populations as troubled and in decline (Figueiredo, 2009; Gilbert, Colley and Roberts, 2016). A further problem is the distinction between rural and remote areas. Recent research has brought to light an increasing body of evidence (e.g. Carson & Carson 2014; Figueiredo 2009; Gibson et al. 2010; Stafford Smith 2008) that points to a significant difference between rural and remote areas that has not yet found sufficient recognition in research, planning and policy.

This section of chapter two introduces different methods of conceptualising and measuring remoteness, and then proceeds to explain why remoteness needs to be understood as a concept with multiple aspects. The interrelation and causal relationship between these aspects of remoteness will be explained. The chapter then goes on to critically explore the differences between rural and remote geography and subsequently also makes mention of the potential threats of applying the rural planning paradigm to remote villages. Finally, the perception of remote villages as inherently marginal and troubled will be critically regarded in order to explain the importance of looking at positive examples of remote villages.

2.3.1. Remoteness as a lack of spatial access

Spatial access, i.e., the distance between two places is easily quantifiable and, thus, readily used for human geography, planning and administration needs. Two different aspects of remoteness, or a mix therein, are commonly used for defining and measuring remoteness as a lack of spatial access: Either remoteness is classified via distance from a central location, or remoteness is classified via distance of the population from each other, i.e., via a low

population density. Very likely, this understanding is a legacy of the core-periphery paradigm (Taylor, 1988; Wellhofer, 1989) of the rural-remote-central discussion.

Spatial access within the area

European researchers and policy makers especially prefer to use population density approaches when attempting to quantify and compare levels of remoteness (Copust and Crabtree, 1996; Nutley, 2003; Slack, Bourne and Gertler, 2003; Gløersen *et al.*, 2006). In population density approaches remoteness is defined as a large distance between people in the area, i.e., a low average number of people per square kilometre.

While population density seems to be a quick, uncomplicated tool for identifying remote or "sparsely populated" areas it is equally problematic. The problem herein lies in boundaries and borders delineating the area for which population density is calculated: that is in the statistical distortion of large units with sparse populations (Holmes, 2009), or, to put it in quite fitting words from Gløersen and Dubois (2010):

> *The regulation has not taken into account the fact that the way in which borders are drawn has as much effect on population densities as settlement patterns. Theoretically, one could therefore construct sparsely populated areas in any part of Europe by delineating regions that exclude the main settlements.* (Gløersen and Dubois, 2010, p. 12)

Further, at a lower resolution population density approaches can fail to identify remote places within an otherwise rural area (Gløersen, 2012). Landscapes in less populated areas often consist of mid-sized or even large cities and an almost empty hinterland which appears as a single area of average settlement density on density maps. This problem is exaggerated by a predominance of large political areas (municipalities and shires) in remote landscapes that hinder small-scale data availability. Figure 10 shows a population density map as used for the Nordic region with population density modelled on a municipality scale. As can be seen in this example population density models on a municipality scale do injustice to both the large towns and cities with their high level of service provision, and to the extensive sparsely populated hinterland by displaying an average value that does not reflect either of these very different types of settlement.

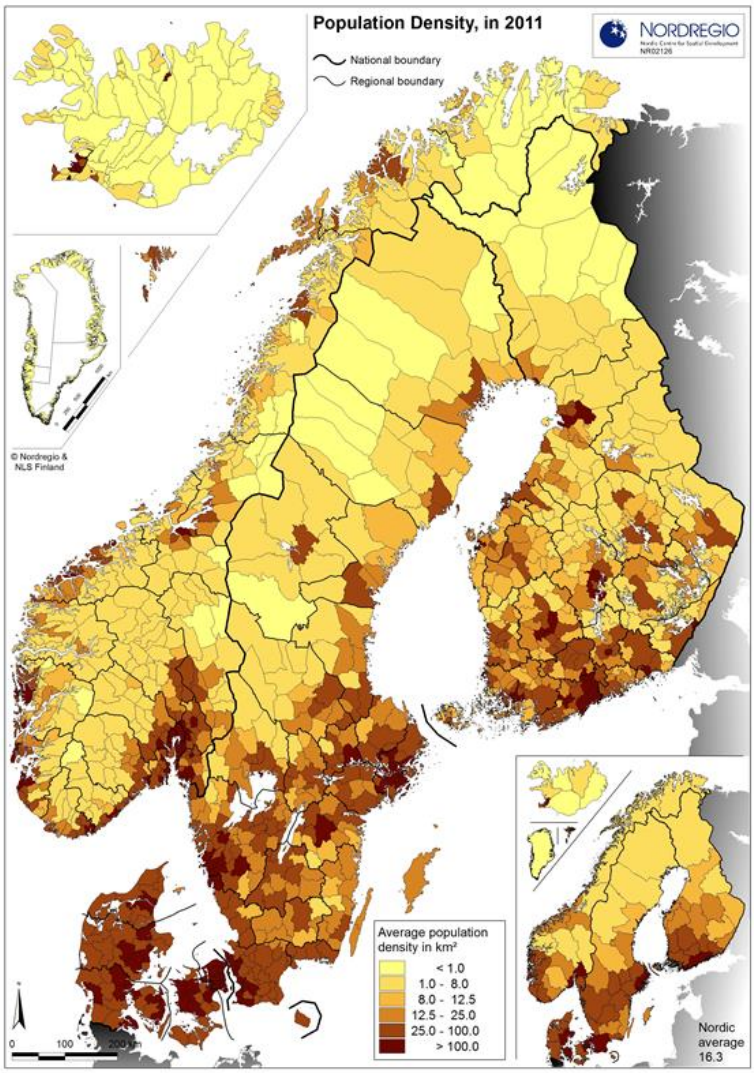


Figure 10: Population Density in the Nordic region in 2011 (Grunfelder, Rispling and Norlén, 2016)

Spatial access from the centre

Another possibility of defining and calculating remoteness is distance-from-centre. Herein, remoteness is understood as a lack of access to goods and services typically available only in larger towns and cities. The Accessibility / Remoteness Index of Australia, or ARIA, is probably the most sophisticated and well-accepted index measuring remoteness through distance from service centres. Already in the 1980s Australia moved away from earlier population density approaches by calculating remoteness by the square root of area divided by population (Holmes, 1988; Zhao and Guthridge, 2008). Early distance based models, such as Faulkner & French's (1983) model determined remoteness by straight-line distance from major service centres. Commonly used frameworks included the Rural and Remote Area Classification (RARA) and its successor, the Rural, Remote and Metropolitan Area Classification Index (RRMA). The development of computerised GIS technology from the

1960s saw the notion of distance-from-centre remoteness refined through measuring distance based on roads, rather than in a straight line (Dunne, Bamford and Taylor, 1999).

The Accessibility / Remoteness Index of Australia (ARIA) calculates remoteness as road-based distance to service centres. Service centres herein are determined through a correlation between services availability and population size (Dunne, Bamford and Taylor, 1999). In ARIA there are four categories of service centres at more than 250,000 inhabitants, between 48,000 and 249,999 inhabitants, between 18,000 and 47,999 inhabitants, and between 5,000 and 17,000 inhabitants. In a further step the results are interpolated on a 1 km grid map of Australia Utilising this map all locations in Australia can be classified into one of five categories:

- Highly Accessible (ARIA score 0 - 1.84)
- Accessible (ARIA score 1.84 - 3.51)
- Moderately Accessible (ARIA score 3.51 -5.80)
- Remote (ARIA score 5.80 - 9.08)
- Very Remote (ARIA score 9.08 - 12)

Another, more simplistic example of calculating remoteness by distance is the threefold Urban and Rural Classification used by the Scottish government. The model identifies remote rural areas as those of settlements of less than 3,000 people, with a drive time of over 30 minutes to a settlement of 10,000 or more inhabitants (Gilbert et al. 2016).

ARIA is unique in its acceptance level within academia and administration in Australia, but it is not without critics. Carson (2011b) for instance notes the significant differences between different 'remote' settlements. Settlements with a similar ARIA remoteness classification can include settlements as different as purpose-built mining settlements almost indistinguishable from an urban suburb, pastoral settlements and small regional supply centres, or even highly marginalised Aboriginal townships. A planning and administration approach seeking to apply the same policy to these different villages is problematic.

A further weakness of even the more sophisticated distance-based models are quality and reliability of roads. Taylor (2012) highlighted this issue by conducting a vulnerability analysis of the road networks that is so defining for remoteness in ARIA. The study found the breakdown of just one major transportation axis could alter the ARIA rating of some places significantly. These findings are especially significant in the light of weather extremes in many remote areas that can impact on seasonal accessibility of places. What is more, the reality of accessibility of remote sites is a complicated combination of means of transport including different types of cars, smaller motorised vehicles and even airborne transportation. Boller et al (2010) for instance pointed out, in the example of hiking tourism, how a change in mode of transport can dramatically increase perceived remoteness levels.

The classification of service centres, too, can be problematic. While Dunne et al (1999) could show a correlation between service provision levels and population size, local differences, for instance in relation to localism, can cause immense differences in service provision.

However, even with its inherent flaws spatial remoteness from service centres is a readily quantifiable and somewhat comparable means of describing and classifying remoteness. If its flaws and biases are taken into account it can be a valuable research tool, especially when indices are as readily available as in Australia.

The role of harsh environments

It is no coincidence that remote areas usually coincide with especially challenging terrains and environmental conditions. Some, like Ardener (2012) or Slack (2003) argue that topography and remoteness are inseparably linked. In Australia, remote settlements are found in the vast, arid and hot hinterland and along the continent's humid tropical northern coast. In Europe remote areas are found in alpine and circumpolar areas, as well as in arid hinterlands and on islands (Gløersen and Dubois, 2010).

Historic settlement patterns into new settlement areas usually moved from more fertile and accessible lands into the more challenging hinterland (Bylund, 1960). Factors such as population pressure, external support and the availability of new technology determined how far into the hinterland such population expansions reached. Remote areas are those on the fringe of habitability where resident populations often have a specific historic reason for their presence in the area. While in Australia, the availability of mineral resources has often been an important reason for settling in an otherwise nearly uninhabitable hinterland, in other regions considerations of exercising sovereignty also play a role (Drory, 2014). This uniqueness of motivations is one of the reasons for the discontinuity of villages within a geographic area that sets remote areas apart from rural areas (Carson and Carson, 2014).

Aggravating factors of extreme terrain, climate or lack of infrastructure (Wezel and Ohl, 2006; Ardener, 2012; Taylor, 2012) can increase the level and the ramifications of remoteness in an area. They, rather than the mere distance or lack of population density can be the cause of the lack of access to goods and services seen as typical if not defining for remote settlements (Ball, 1992). At the same time, however, there are indicators that this challenging environment might attract a distinct group of people with different personality traits to the central population (Murray *et al.*, 2005; Gilbert, Colley and Roberts, 2016). This effect of socio-psychological selection will likely be especially influential in the most extreme remote villages, such as potential extra-planetary settlements, for example on Mars, that will attract a very distinct group of people.

2.3.2. Remoteness and cultural aspects

Populations of remote areas are often culturally different from populations in a country's more central regions. Apart from the effects of selection of specific personality types as described when discussing the role of environment above, remote areas can be a harbour for indigenous populations who were pushed away from more fertile, central lands during colonialization. This signifies that, whether or not a remote population is a cultural minority group, differences in culture and values are often observable between remote village populations and the populations of urban centres where policy for them is made. The ramifications of these differences are an increased remoteness from the centre because remote populations often feel estranged and disconnected from the central mainstream culture.

Remoteness in personality and culture

Indigenous populations differ from the colonial majority by culture and language (Huskey, 2005). There is a tendency for indigenous populations to live in remote areas (Huskey, 2006; Harwood *et al.*, 2011). However even populations of the same ethnicity can be subject to tangible cultural difference to the central population due to a different history and lifestyle choices (Gilbert, Colley and Roberts, 2016). Whether remote areas attract such a different population or create it is not yet known (McKenzie, 2011) but it is likely acting in a positive feedback loop.

Either way cultural remoteness adds an additional layer onto the phenomenon of spatial remoteness through increasing the disconnection between central and remote populations (Ardener, 2012). Huskey (2005) describes this phenomenon as classified by a relationship to place that transcends the possibility for monetary gain by relocation. Literally or as a figure of speech residents of remote areas often do not speak the same language as the central population making it hard for the two of them to communicate. For remote populations, this disconnect can lead to a disconnection between needs and actual provisions by central authorities.

Political remoteness

The concept of political or institutional (Huskey, 2005) remoteness describes the observation that remote populations can be inhibited from accessing democratic decision making. Next to a certain influence of the cultural aspects of remoteness political remoteness is caused by a lack of voter numbers through their low population density and a lack of exposure of the ruling class to remote areas (Huskey, 2005; Rogers and Walker, 2005; Walker, Porter and Marsh, 2012). These two aspects are interconnected because the low number of potential voters is a clear disincentive for elected officials to spend time in remote areas. Political remoteness both increases the feeling of disconnection and remoteness from the centre and can have tangible implications in answering to residents' needs and concerns. In its most extreme form political remoteness can take the form of or at least support suppression,

wherein one – more remote and less developed – region is used by another in order to ascertain continuing growth and prosperity (Harvey, 2000).

The phenomenon is aggravated by the discontinuity, i.e., the differences of settlements in the same area (Carson and Carson, 2014) that is typical for remote areas. This discontinuity, that will be explained in more detail in remoteness versus rurality, below makes it hard for remote settlements to work together on political issues in order to pool their resources.

2.3.3. Remoteness versus rurality

Traditionally, the relationship between urban centres and their rural periphery is often described in the light of Friedmann's (1966) centre and periphery model that described a lesser developed periphery as being dependent on more highly developed centres wherein the more powerful centre exploits the periphery. This perception of marginalisation through exploitation made possible by dependency is prominently visible in many older studies on rural areas that understand remoteness merely as an extreme manifestation of rurality (e.g. Department of the Environment 1971; Cloke 1977). However an increasing number of studies observe differences between rural and remote settlements' nature and their pattern of dependency (Carson and Carson, 2014), as well as indicate difference in remote residents' motivations and expectations as compared to the paradigm traditionally applied to remote populations (Murray *et al.*, 2005; Gilbert, Colley and Roberts, 2016). Carson and Carson (Carson *et al.*, 2011; Carson and Carson, 2014) in particular have shown major differences between rural and remote settlements summarised in what they describe as the 'Ds of remoteness':

> ***Disconnected***: remote settlements lack a strong core-periphery dependency with an easily defined centre. They are more opportunistic in their relationships with central towns and cities.
>
> ***Discontinuous***: rather than displaying a continuous settlement pattern, remote areas often display a discontinuous settlement history where individual settlements emerged at different times due to individual reasons.
>
> ***Diverse***: due to settlement history and settlements emerging in different places for different reasons settlements in the same area can display large diversity within the same area.
>
> ***Detailed***: small changes can have a large influence on the settlement.
>
> ***Dynamic***: Carson and Carson describe change as a "more normal state of socio-economic systems in sparsely populated areas then *(sic)* stability" (2014, p. 341) due to a large flow-through of resources and people.
>
> ***Distanced***: remote settlements are geographically distanced from the central towns and cities, and from each other.

> ***Dependent***: remote settlements are dependent on over-regional decision making in centres. Their state of dependency is often aggravated by their strategic position near resources or associated with the exercise of sovereignty over large, sparsely populated areas.
>
> ***Delicate***: some characteristics of the socio-economic system can be hidden from view with socio-economic reality obscured by misinterpretation. (Carson and Carson, 2014, pp. 341–342)

It appears through this new research that remote areas are not merely an extreme form of rurality and can thus not be planned for with the same policy and paradigm as rural villages. Traditional planning and policy paradigms, developed for rural areas, need to be questioned in regards to their applicability when applied to remote areas. Unfortunately, this literature review has shown awareness of these differences between rural and remote areas to be lacking in geography and thus also in policy and planning as is a scientific body of knowledge that would allow for the development of a new planning paradigm that is tailored to the specific needs of remote settlements. This study will assist in creating a starting point in human geography for such a planning paradigm that is specific for remote settlements.

2.3.4. Remote villages as marginal

Remote villages have a reputation as being inherently marginalised and in decline. The notion of marginalised remote village has gone as far as for social marginality markers such as unemployment to be used to identify remote areas in the first place (Cloke, 1977; Halfacree, 1993; Clout, 1995). Such an approach turns marginality in remote areas into a self-fulfilling prophecy and excludes from view those villages that do not conform to the idea of remote as marginal. Fortunately, the utilisation of marginality as a defining factor of remoteness is being challenged (Figueiredo, 2009; Gibson, Luckman and Willoughby-Smith, 2010; Carson, 2011a). Instead, the notion of remoteness as different from the urban and rural normality, rather than necessarily inferior seems to be becoming a reoccurring theme in recent research such as the publications cited above.

The often-observed negative migration numbers, too, have been interpreted as a sign that remote areas are unattractive, although, as Gløersen and Dubois note this is not necessarily the case either. Rather, they note "this population decline is often the result of minor imbalances in considerably larger in and out flows, and could be reversed through relatively small changes in the numbers of migrants, e.g. among returning young retirees or foreigners seeking an alternative lifestyle" (Gløersen and Dubois, 2010, p. 13). Johansson (2015) as well as Rauhut & Littke (2014), albeit on the example of rural not remote villages, have pointed out the importance of understanding migration as a life-cycle event (Geist and McManus, 2008). They describe that while young people might indeed be moving away from their ancestral villages in their early 20s some do come back at a later stage in their life, bringing with them additional populations in the form of partners and children. Gilbert et al (2016) in particular have pointed towards a positive experience of liveability in remote villages that can

attract new and former residents. However this re-flow of families is a threat according to Müller (2015), who points out that while remote villages might well pose an attractive lifestyle choice, the retreat of service provision and lack of employment means individuals and families might be prevented from moving there.

The notion of remote villages as necessarily marginal has also led to a perception that growth, i.e., the reduction of remoteness through a higher population density, is the only sustainable solution for remote villages' problems. There are two main problems with this approach. For one it discounts the attractiveness of remoteness to some groups of people. Gilbert et al. (2016) for instance described positive as well as negative effects of remoteness and at least some advantages of remote areas over rural areas. These positives of remoteness go beyond the appreciation of wilderness (Höchtl, Lehringer and Konold, 2005), but also include a stronger social cohesion, identity (Gilbert, Colley and Roberts, 2016) and perception of place (McShane, Quirk and Swinbourne, 2013). Looking at Gilbert et al.'s results that see remote villages as, in some areas, superior to rural villages in their liveability, there is even a question as to whether transitioning remote into rural regions could indeed increase their marginality. Secondly, transitioning villages and regions out of remoteness might not be possible for many of these villages. Weeden (1985) approached this phenomenon from the carrying capacity perspective arguing some places could simply not sustainably support more than a given number of people.

Certainly, with recent research a picture is emerging of remote villages as desirable to at least a specific cohort and less marginalised then they appeared in earlier research. This highlights an opportunity to research remote villages not merely in regards to their challenges, but also in regards to their advantages in order to both help remote villages overcome problems and utilise their opportunities.

2.3.5. Remoteness as a distinct kind of human landscape

The understanding of remoteness as a multi-faceted phenomenon (Dubois and Roto, 2012) is still in its infancy. Traditionally, remoteness was seen as an extreme manifestation of the centre-periphery paradigm wherein the rural periphery was in a relationship of direct dependence upon a clearly defined urban centre. However newer research (Figueiredo, 2009; Carson and Carson, 2014; Gilbert, Colley and Roberts, 2016) has cast doubt on this traditional understanding of remoteness. Rather it appears remoteness needs to be understood as its own kind of human landscape that has both features and needs that are different from those of rural landscapes. In particular, remote villages lack the clearly defined dependency structure with a single urban centre but possess a more opportunistic approach in their relationships. The fact that remote villages are often discontinuous even within their immediate surroundings and the detailed delicacy brought about by their small population size (Carson and Carson, 2014) makes planning in remote villages hard.

If we accept remote villages as different in their needs and character from rural villages then, consequently, new theory and new planning paradigms are needed in order to adequately

plan for the future of remote villages. Such paradigms can only be built on a solid theoretical basis on remote villages. This approach is, however, still very much in its infancy and thus presents a clear gap in research that can be addressed by this study.

While measuring remoteness through geographic metrics can help us delineate the scope of research and policy questions it is problematic through its excessive simplicity. Even the most complex quantitative remoteness indices lack international and interdisciplinary comparability. What is more, they can also judge remoteness wrongly for individual cases. Remoteness as a concept includes both geographical and political-cultural components that work to impact on each other and, in turn, on the individual perception and impact of remoteness on communities and individuals. This can be problematic when using quantitative methods in research or when deciding on policy. In a qualitative study such as the current research, one has the advantage of describing remoteness not through metrics, but in an analytical way that considers both aspects of remoteness, as well as their inter-relations.

2.4. Liveability

When researching how to create "functioning" villages one needs to first determine how to identify a "functioning" village. The concept of liveability[3] is one possible answer to this question with the term attempting to describe the extent to which a place, usually a city or town, is worth living in, and is enjoyable to live in (van Kamp, Leidelmeijer and Marsman, 2003). However, especially when working with settlement forms different from the urban mainstream, as was established when introducing remoteness above, liveability can be an elusive concept. Understanding villages as a form of settlement and community that can be influenced by local distinctions, especially when taking into account Carson and Carson's (2014) ideas of remote villages as inherently diverse, means that residents are also likely to be diverse in their expectations and wishes for the village space.

There are a number of liveability indices, often found online (American Association of Retired Persons, 2016; Partners for Livable Communities, 2016; The Economist, 2016), that claim to identify the "most liveable cities". Variables for calculation of these indices vary widely. For instance, the website livability.org[4] uses population growth, income growth, ratio of residents to jobs, retail and office vacancy rates, home vacancy rates and the affordability of housing in their calculation. Another site, liveable.org, sees liveability as manifest through social stability, educational opportunity, the natural environment, entertainment and recreation options, economic prosperity, cultural possibility and a desirable built and natural environment. While the first index uses clearly defined quantitative parameters the second can be hard to define and measure. Both indices, however, are strongly modelled on city-centric and culturally specific ideas of desirability of a place.

[4] Note the US American spelling of the term

Newton (2012) offers a scholarly definition of liveability that appears to be less culturally specific. He uses key concepts of happiness, personal satisfaction, human capital, human health, social capital, residential amenity, human wellbeing and the built environment quality. A rather different approach is that of Veenhoven and Ouwell (1995) who, when comparing the liveability of welfare-states to those states that put a larger emphasis on the free market economy utilized what they call the "biological output" of humans. By "biological output" Veenhoven and Ouwell mean indicators of whether or not human populations as a whole thrive under any given conditions, for instance life expectancy and health, or the appreciation of life as measured by incidence of suicide or mental illness. This proposition mirrors the approach of looking at villages through a demographic lens, i.e., by looking at the development and trend of their population numbers.

What the above models of describing liveability have in common is that they were developed for metropolitan areas, thus according to city-centric ideas about desirability and quality of life. Remote villages are different from urban areas. Research even points to different personality types being predominant in remote settlements (Murray *et al.*, 2005), which reinforces the assumption that expectations, too, are likely to be different between urban and remote populations. Gilbert et al (2016) argue that differences in subjective wellbeing are to be expected even between more accessible rural and less accessible remote areas. In short, while some of the city-centric models might be applicable to remote villages the current state of research does not provide enough evidence to safely apply such models.

Liveability can also be based on accessing village resident's needs as per Maslow's hierarchy of needs (Maslow, 1943) as shown below in Figure 11.

Maslow postulates that categories of needs need to be met occur in a hierarchical order. The approach of defining liveability through Maslow's hierarchy of needs is troublesome. One problematic aspect is a disconnection between an increased standard of living, i.e., the increased satisfaction of needs, and subjective wellbeing (Gilbert, Colley and Roberts, 2016) known as the 'paradox of affluence'. Further, the hierarchical nature of needs itself has fallen under scrutiny in recent years.

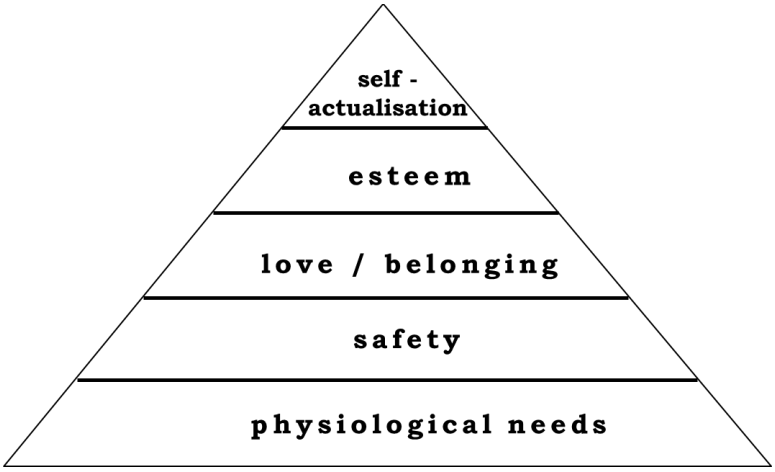


Figure 11: Maslow's Hierarchy of Needs, based on Maslow (1943)

For when planning, reliance on Maslow's hierarchical approach to needs provision is especially problematic. If needs need to be met in a hierarchical order, in theory, resources spent for high-level need provision would be wasted as long as there is a lack of basic needs provision. For assessing liveability due to Maslow's hierarchy of needs this would signify a bottom-up approach where in reality high-level needs can be met and increase satisfaction with place, i.e., "liveability" levels even though there appears to be a shortfall on a more basic level. Thus, from the current state of research it is almost impossible without comprehensive research to create a definition of liveability that is applicable to remote villages.

2.5.Utopia – Dystopia – Heterotopia

Remote places can be the result of utopianism, i.e., of the attempt to create an ideal or at least better form of society. Utopianism will almost certainly influence any Martian village as utopian ideas can act as a strong motivation for migration into territories on the edge of habitability – a connection that can, with others, be seen in the example of the kibbutz movement (Zilbersheid, 2007; Rettig, 2010) that will be explained in more detail in the results section when describing a kibbutz. It is because of this tendency towards utopianism, a concept that has fallen out of favour in the twentieth century (Levitas, 2003a) that remote villages in particular are sometimes seen as unsustainable. However, utopianism has been described as a flawed ideal that is unsustainable in reality due to its inflexible nature (Foucault and Miskowiec, 1986). It is not the only way of looking at the concept, nor has it been without development during the last decades.

This section introduces the concept of utopia and its development especially during the twentieth century and then goes on to introduce two concepts inherently connected with utopia as illustrated in Figure 12 below. While utopia is a concept heavily contested and discussed in research, the discourse on its opposite concept of dystopia is confined almost exclusively to the realm of science fiction literature. In literary science, virtually all research available uses dystopia primarily a phenomenon surrounding utopianism (Knights and Willmott, 2002; Claisse and Delvenne, 2014; Isaac, 2015). Finally, I will introduce a less-known

concept within the realm of utopia and dystopia, namely, that of heterotopia; a *place of otherness*.

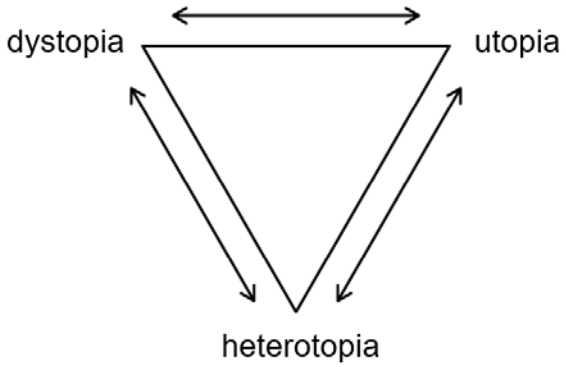


Figure 12: Dystopia and utopia are ideas that are in a tension to each other. Heterotopia, as the possible place, is in a relationship with both of them (Foucault and Miskowiec, 1986; Hetherington, 1997)

Utopia

Though the concept of utopia was first described in Plato's *Republic* the term itself was introduced by Sir Thomas More's 1516 account of a fictional city-state of U*topia* (More, 1516). In this volume More describes a perfect place where justice and equality are paramount – at least when compared to the predominant living conditions at the time. In Utopia residents lived in equal but similar-looking houses, wore the same kind of clothing and were allocated work duties according to their capabilities. In its incarnation as physical development, utopianism, through More's description of large garden cities, has undoubtedly inspired town planners of the twentieth century (Harvey, 2000). However, utopianism lacks a common agreement on the form of utopia. Rather, utopia is defined by each organisation according to their personal beliefs and ideals. Utopias can be seen either as built environments, or as social constructs that can even be independent from physical representations – i.e., built environments (Harvey, 2000). The more radical social ideals of Utopia were later pursued within socialism whereby the concept of utopia subsequently fell out of favour due to its association with Russian modernism (Levitas, 2003a). We often tend to forget, however, that even if we do not use the term, utopianism is at work whenever attempts are made to change or improve our society, i.e., attempts to build a *good place* are made. Contrary to utopia's connection to socialism, in this understanding of utopianism even capitalism and globalisation can be understood as deeply utopic (Levitas, 2003b) in nature.

While many, often remote, societies proclaimed having achieved utopia, one example that can claim at least some success in running a utopian-resembling society over many decades are the Isareli kibbutzim (Spiro, 2004; Zilbersheid, 2007). Ultimately, however, even the Israeli kibbutzim gave up on most of their more extreme utopian ideas in favour of a more normalised and privatised form of village. One aspect that led to this decline in utopianism

was that of *sabra*[5] *discontent* (Spiro, 2004), i.e., the increasing reluctance of subsequent generations to accept the negative side-effects of utopianism. This observation goes along with Harvey's (2000) assumption of utopias as dependent on a strong readiness to contribute an idealism that is likely to wane within a number of generations thus ultimately dooming any utopia .

The English word "utopia" in itself incorporates two very different notions of utopia: the eu-topia; the good place, or the u-topia; the no-place, or the place that cannot exist. While early twentieth Century scholars focused on ways of achieving utopia, in the closer past utopia has increasingly been understood as unattainable or, what is worse, a direct route to dystopia with scholars such as Isaac (2015, p.1) arguing that "every utopia turns into a dystopia."

Dystopia

If a utopia is understood as a *good place* the notion of dystopia describes its opposite, the undesirable, bad place. Dystopias, best known through their description in science fiction literature such as *1984* (Orwell, 1949) or *Brave New World* (Huxley, 1932) are the places in which we do not want to be living, places that are unjust and where people are oppressed. In literature, dystopias act as warnings of the kinds of societies we should strive to avoid.

Dystopia is even more elusive within the scientific literature than utopia (Levitas, 2003a). Often, dystopias are simply seen as a result of utopianism (Isaac, 2015) be it the example of utopic communities such as the kibbutzim (Zilbersheid, 2007), or as a logical function of utopian town planning (Macleod, Ward and Ward, 2002). A more fitting observation is that utopianism itself creates dystopias for those not fitting their utopia. Similar to utopia, dystopia can be relative where for instance a shopping centre can have dystopian qualities for those excluded from it (Macleod, Ward and Ward, 2002). However, it can also be argued that dystopias are indeed our rendering of the humanly flawed places we live in. That is, dystopias are not just the places we go to once utopia fails, but also describe the imperfect reality we want to flee when we attempt to create utopias. This understanding helps us better understand the close relationship between dystopia and utopia wherein both act to create the other.

Heterotopia

The notion of heterotopias as "effectively enacted utopias" (Foucault and Miskowiec, 1986, p. 22) is introduced into social scientific discourse by Michel Foucault. Whereas Foucault himself understands utopias as *u-topias*; no-places, that is as places that cannot exist in the real world, he sees heterotopias as real, physical localities. Foucault describes heterotopias as places removed from normality, often through some kind of a barrier where entry is controlled. That is entry is either mandatory, or requires a kind of purification or permit. These heterotopias provide places of different social ordering, and thereby a place for those

[5] The term *sabra* refers to a Jew born in Israel.

that deviate from mainstream social norms. That is, heterotopias can be expected to house a population that is deviant when compared to any society's mainstream population and social norms. However, heterotopias are not entirely divided from mainstream society, rather they can be found to fulfil a function towards it (Figure 13). Foucault offers a broad list of potential heterotopias. *Heterotopias of crisis* are for instance sacred sites or sites set aside for rites of passage – such as the boarding school or men's military service. *Heterotopias of deviation* on the other hand are locations that house a population deviating from mainstream social norms, for instance prisons or mental asylums (Foucault and Miskowiec, 1986). Although heterotopias can be almost infinitely different from each other, they are all divided from normality by a barrier that controls access, house a socially deviant[6] population, and interact with and fulfil a function for mainstream society.

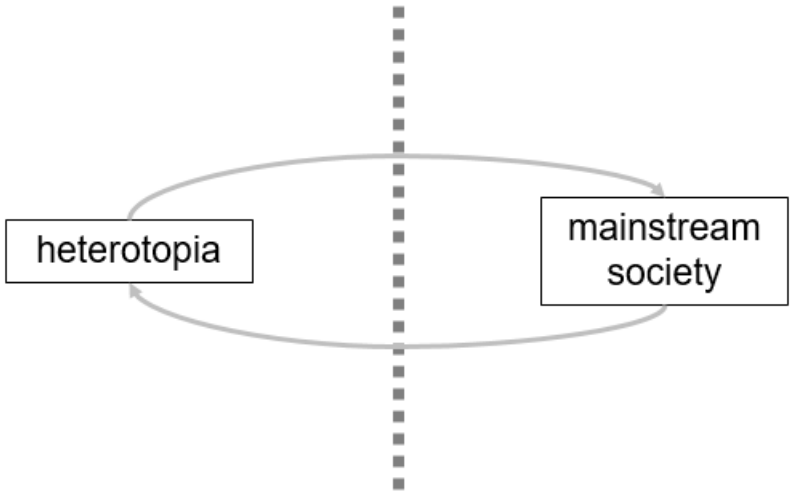


Figure 13: Heterotopias, albeit separated from it by a barrier that regulates entry fulfil a function towards mainstream society (Foucault and Miskowiec, 1986; Hetherington, 1997)

Hetherington (1997) builds upon Foucault's notion of heterotopias by describing them as "places of social ordering" – or simply as *places of utopics* (Hetherington, 1997). *Utopics*, herein, describes the process of striving *towards* utopia, creating new approaches of social ordering in the process. This understanding of utopic ideas and communities as a tool for development *towards* a changed society, rather than utopias as a physical, obtain- and preservable place was also employed by Harvey (2000). It is important to understand the distinction between *utopia* and *utopics*: utopics is the sometimes perpetual *process* of reaching *towards* utopian living conditions, while an utopia is, as per its definition an ideal society, a *static* state (Raven, 2015). *Utopics* can, thus, be seen as an explanation of spatiotemporal utopianism (Harvey, 2000; Levitas, 2003b), that is an understanding of utopianism that is rooted in time, as well as in spatial space.

[6] The term deviant, in this context, refers to a population that is departing from usual or accepted social standards of the mainstream population

The pursuit of *utopics*, i.e., striving *towards* utopia, whether or not utopia is ever reached, or indeed even can be reached, is, in the context of *utopics* insignificant. It is the process that produces a tangible result by mirroring and questioning the old order (Foucault and Miskowiec, 1986) in order to propose a new one. To illustrate the point Hetherington (1997) describes the impact of the mall area constructed around the Royal Pavilion in Paris, which he identifies as such a heterotopia. The coffee houses of the Royal Pavilion provided a forum for debate removed from normality and, seemingly, protected. Other historic examples of such heterotopias are for instance market places – places where the social classes could mingle freely – or festivals (Foucault and Miskowiec, 1986; Hetherington, 1997).

In human geographic discourse the concept of the *third place* (Oldenburg and Brissett, 1982) with its capability for people to mingle outside of their usual social implications is, though less extreme in its understanding, somewhat reminiscent of Hetherington's ideas of heterotopia. However, the concept of heterotopia has not yet been used on a macro scale in order to understand the characteristics of settlement types.

If remote areas and villages can be linked to specific features and qualities, as described by the literature discussed above, the question remains of how to utilize these theories in planning practice. The following section will introduce and analyse selected theories and observed phenomena that are relevant to this study.

2.6. Structure and Agency Theory

Structure and agency theory encourages a look at the relationship between external and internal factors that influence a village's state. In looking at the problematic quality of the externally-provided structure for remote villages in many studies concerned with remote villages (eg. Figueiredo 2009; Huskey 2006; Walker et al. 2012) it becomes obvious that structure and agency theory might be important in order to better understand remote villages.

Structure, in this context, is what is pre-defined and provided to the community by both internal and external forces, or in other words: structure consists of schemes and resources (Sewell, 1992). Structure can mean both formal and informal rules and regulations of social and political interaction, and both human and non-human resources. However, it is important to keep in mind that structure is not merely a constricting factor to the exploitation of agency, but is also a vital framework and prerequisite for it (Bakewell, 2010). When looking at structure from a remote village's perspective we need to ask what structure is necessary and beneficial, and what structure is less important or even detrimental to the village. Currently, scholarly consensus as a necessary structure in remote planning is derived either from some variation of the periphery-and-centre theory, or from urban planning theory. However, our understanding of the applicability of the core-periphery paradigm or urban-normed planning for remote villages is insufficient in light of newer research that points to very specific

features of remote villages (Carson and Carson, 2014; Gilbert, Colley and Roberts, 2016). Indeed, in at least some cases neither urban planning, nor periphery and centre considerations might be useful for remote villages.

Agency, on the other hand, describes residents' possibilities to take charge and shape their own environment. In remote villages individuals' agency, i.e., the actions taken by individuals can have a significantly stronger influence on the village than they do in larger settlement types (Carson and Carson, 2014). However, while agency provides remote villages with opportunities it also introduces risk. For instance, not only can a limited number of agents negatively influence a village, but in a situation where the number of agents is small a temporary or permanent shortfall of only one agent can pose a problem for the community (Skerratt and Steiner, 2013; Carson and Carson, 2014).

Structure and agency theory in applied geography is not without criticism (Chouinard, 1997). The past emphasis on structuralism i.e., the limiting power of structure, rather than the opportunity brought about by agency is a concern (Chouinard 1997). However, an over-emphasis of agency also can be potentially harmful. Agency is a complex phenomenon that is dependent on structure to support it, thus the possibilities of agency in a system that lacks structural support or even has counter-active structure is limited. A lack of understanding of this dependence on structure for effective use of agency can lead to what has been described as 'neo-liberal victim blaming' (Connor, 2011). Finding the right balance between structure – or external support and agency, i.e., internal taking-charge might be of the core keys to improving how we support remote villages. Yet, the relationship between structure and agency is not a mere balancing act; the concepts also inform and influence each other. As the individual's agency is supported by and influenced by the structure that surrounds them, so structure itself can be changed by or even be a product of agency (Sewell, 1992; Bakewell, 2010). The latter is important to keep in mind when discussing the possibility, i.e., agency, of actors to utilise heterotopias in order to induce active social ordering (Hetherington, 1997).

2.7. Localism

When researching the potential of villages to be self-sufficient and employ a large amount of agency, localism is a phenomenon of interest. Localism is concerned with how and to what extent locales, i.e., the geographic area that is an individual's "main space of routines and tacit knowledge" (Osti, 2013, p. 293), can and/or should be self-contained and self-governing (Evans, Marsh and Stoker, 2013). Localism further offers an opportunity for differentiation between locales according to their needs and resources (Dare, 2013). Frowned upon as promoting backwardness through a closing in of locales until the 1980s (Osti, 2013), localism has become an important part of the administration strategies for urban and non-urban troubled regions under the term 'circular economy'. In a circular economy resources are meant to remain in the region as long as possible, that is are being 'circled' through the local economy. In doing so it is hoped that the "leaking" of resources such as salary outside the regions is reduced. The traditional Israeli kibbutz is an extreme example of such an approach. Localism is seen as promoting efficiency (Dare, 2013), knowledge and loyalty (Osti, 2013). It

is seen as a way of stabilising communities and building adaptive capabilities (Evans, Marsh and Stoker, 2013). Osti (2013) further reported on the positive effects of strong internal relationships.

Hildreth (2011) described three major forms of localism, namely, those of 'conditional localism' (i.e., conditional on the local body supporting the centre's objectives), 'representative localism' (i.e., devolution to locally elected bodies), and 'community localism' (i.e., devolution to citizens and communities). Herein Hildred describes different pathways of devolving centralised power structures and services. In discussing localism in the background of remote communities the tension between community and representative localism is noteworthy. While representative localism simply transfers decision making to local power elites, community localism aims to involve the community directly. Dare (2013) has shown how the latter can improve the odds of localism to succeed while an overly representative or conditional localism approach might be dismissed by the very community it was targeted to help.

Though the localism discussion appears to be centred on its political aspect, in a remote context the economic aspect of localism, that is the concept of containing resources within the community is an important opportunity. Localism is discussed in the remote context as a means of strengthening the local economy through the containing of resources within the community (Dare, 2013). The Israeli idea of kibbutz is one of the more extreme interpretations of the concept. The traditional kibbutz envisioned a self-contained world where labour, goods and services were obtained from within the kibbutz to the largest extent possible (Zilbersheid, 2007). Many less extreme villages, too, underline the need for keeping resources within the community.

Localism is occasionally discussed in conjunction with subsidiarity (Ingamells, Holcombe and Buultjens, 2011). Subsidiarity describes the concept that problems should be dealt with at the closest local level available. Centralised powers may only act if the problem cannot be resolved by local agents. Both concepts have a multitude of levels and implementation strategies ranging from the social and political to economic aspects (Osti, 2013). In its political incarnation localism is also seen as a means of strengthening local democracy (Osti, 2013) and democratic engagement (Evans, Marsh and Stoker, 2013). However, as Pratchett (2004) points out, local autonomy exists in an uneasy balance between national sovereignty and the local need of self-determination. Pratchett therein highlights an important aspect of localism, namely, that its levels and gestalt can vary in different policy areas. Evans, Marsh and Stoker (2013) distinguish between two main forms, managerial and representative localism. Herein in managerial localism decision making at a local level is enabled as long as it confirms to policy that is decided at a central location. In community localism, in contrast, both decision making and policy are delegated to a local level.

While it is true that localism can prevent the leaking of resources outside the community, thus helping to widen the range of services available at a local level it is not a panacea for remote communities. Osti (2013) is right in cautioning about the need of grassroots engagement that might not be present in all kinds of localism, as does Dare (2013) in pointing out the potential threat of excluding other, more fitting solutions, increasing of existing inequality, or concentration of power in the hands of local elites. Further, especially when applying localism to remote communities, smaller local structures are usually more resource-intensive than larger, regional structures; thus, costing more money and resources in upkeep. Localism is important for fostering agency within communities, as well as community cohesion. Once again, however, the large differences between remote villages must be taken into account when assessing the type and extent of localism that can be beneficial for any single village. Fortunately, localism can be applied in different forms and to different extents in different policy areas (Pratchett, 2004) making it a highly helpful and interesting approach for at least some types of remote village.

2.8. Transition towns

The phenomenon of transition towns is in some parts reminiscent of and even connected to the ideas of localism. Some, if not most of the more successful remote villages appear to have adapted some form of a localist-environmentalist "ecovillage" (Bang, 2005) philosophy that is similar to what is described in the transition town movement (Connors and McDonald, 2010; Kenis and Mathijs, 2014). The transition town movement is a comparably new environmentalist phenomenon in which towns and cities declare themselves to be at the forefront of "transitioning" from a carbon-dependent and hence unsustainable past to a sustainable, green future (Connors and McDonald, 2010; Kenis and Mathijs, 2014).

Localism, diversification and circular economies, in which goods and resources are preferably sourced locally and kept within the economic circulation for as long as possible are often part of transition towns' efforts, as are green technologies, architecture and smart town planning. Transition towns can also have an element of heterotopia if not even utopianism in questioning the norms of social ordering, such as norms of governance, the relative weighting of structure and agency, or the economic system (Connors and McDonald, 2010; Kenis and Mathijs, 2014). As such transition towns can be fertile grounds for different kinds of attempts of utopic change in their dynamism reminiscent of heterotopias, but seemingly lacking the clear spatial and social delimitation of space that Foucault (1986) described for heterotopias. That is, transition towns while striving for change do so within their system or network, instead of, like some localist remote villages or regions, withdrawing from it to create a new system.

However it is important to note that the transition town movement, originally developed in the village of Kinsale (Connors and McDonald, 2010), is an example of how innovative potential in villages can be transferred to towns and cities. The example of the transition town movement thus highlights the importance of better understanding and supporting remote villages as being potential places of innovation.

2.9. Summary

This chapter described the current state of research both in regards to human Mars settlement and in regards to the concept of remoteness. It then went on to introduce theoretical concepts that will assist in analysing and understanding the case studies and their implications.

A critical review of the current state of research in regards to remoteness and remote villages and villages not only provided a background for this research and identified the scholarly work this study can build upon, but also identified a clear lack of knowledge in the field. Research on remoteness and remote villages is still in its infancy; we are only just beginning to understand remote villages as a unique type of settlement geography with characteristics that do not adhere to the classic centre-periphery paradigm. Remote villages are more opportunistic in their relationships with central locations and can also be hard to plan for due to their discontinuity and delicacy. There are currently only the bare bones of a framework that could inform planners and decision makers when planning for both future and already existing remote villages.

If we want to research "positive" or "liveable" remote villages we first need to understand "liveability" and how it applies to remote villages: Liveability is a term used to describe and compare the quality of life in different places. However, current liveability indices are often inherently city-centric and based on urban cultural norms that do not necessarily apply to remote village populations that often appear to have somewhat different expectations and requirements. Structure and agency theory describes the relationship between structure, i.e., norms and external factors and agency, and the capability for self-driven change.

Some remote villages, such as the Israeli kibbutzim have historically sometimes been associated with utopianism. Indeed, the kibbutzim have been regarded as a primary – at least intermittently – successful example of manifested utopia in the scholarly literature (Spiro, 2004; Zilbersheid, 2007). However, utopianism is often understood as inadvertently causing dystopias; flawed, undesirable states of society. Utopianism is rightfully a contested notion. One of the ways of understanding the concept is in seeing utopia as an unobtainable idea that can only be striven towards, but that cannot be reached, or sustained. Out of this understanding of utopia stems the notion of utopics; i.e., the process of reaching utopia, and heterotopia; the 'other place' that makes some aspects of utopics possible. For this study this poses the question whether remote villages might, in fact, actually be heterotopias, which will be discussed in chapter five.

In remote villages, where, due to their small size, single actors or events can have a large impact, understanding the mechanisms of structure and agency becomes paramount. Structure and agency theory allows us to examine the interrelation between individual initiative ("agency") and larger, often externally created systems. Localism is an approach that favours agency over structure by proposing small, self-sustaining structures and production cycles. The concept is interesting especially when considering exotic villages that

are too remote to form extensive (material) network relationships. While frowned upon as a "local trap" (Kenis and Mathijs, 2014), localism is currently making a comeback as a part of the new-ecologist transition town movement (Connors and McDonald, 2010; Kenis and Mathijs, 2014) where it is seen as a potential solution for keeping resources within the community for longer, a process which many hope might reduce the "leaking" of resources outside the region. Transition towns, that is towns or villages that declare themselves as actively striving against climate change and resource exploitation, do not merely appear to correlate with successful "ecovillages" (Bang, 2005), the movement is, indeed, an example of village-created innovation extending into urban areas (Connors and McDonald, 2010).

The following chapter will make use of the defined notion of remoteness created by this study in order to develop research methodology and methods. Later, in chapter five, the theoretical concepts as introduced in this chapter will be revisited and utilised in order to explain findings from the case studies, which will be described in chapter four.

3. Research Design

3.1. Introduction

This chapter describes the research design of this study. Earlier, chapter one introduced the research question, namely: "What challenges do remote villages in harsh environments face and how have communities and individuals adapted?" In chapter two the theoretical background of this study was established by reviewing the state of research so far, as well as some of the important theory and frameworks that could be useful in addressing the research question. Figure 14 shows the positioning of this chapter within the thesis.

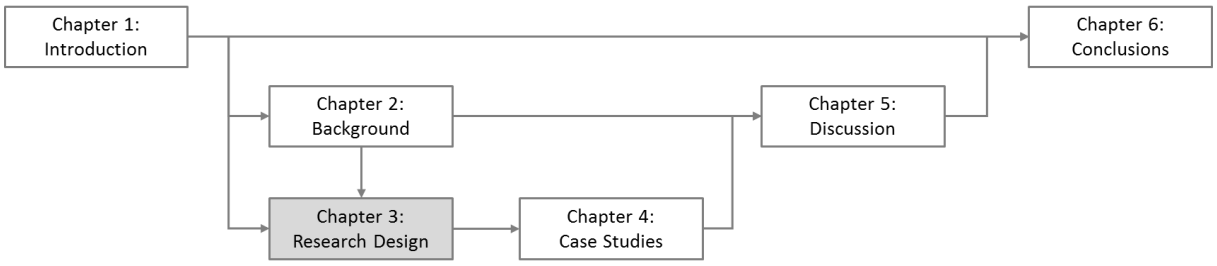


Figure 14: Thesis structure

The methodology of any research is based on the philosophical background of the researcher, leading to different positions within scholarly discussions (Grix, 2002). This chapter will thus start by introducing the theoretical position behind this study before going on to describe the methodology and methods that make up the study design.

3.2. Theoretical position

As Grix (2002) states "it is our ontological and epistemological positions that shape the very questions we may ask in the first place, how we pose them and how we set about answering them" (Grix, 2002, p. 179). The ontological foundation of this thesis can be described as pragmatic. Pragmatism, in this context, looks at knowledge as something that fulfils a function. That is, the questions posed at the beginning of this thesis, as well as methodology and methods were chosen and formulated primarily with the expectation that answering these questions would yield an advance in knowledge that could help understand remote villages.

Researching remote villages poses specific challenges to a pragmatic research strategy because remote villages with their delicate inter-dependencies of variables, and the lack of entirely comparable cases (Carson and Carson, 2014) limit generalisation as necessary for predictive theory creation. This issue has been observed before, by Flyvbjerg (Flyvbjerg, 2009) who advocates for the large potential of context-dependent knowledge. What is more, with a research strategy tailored to the individuality of the field (Flyvbjerg, 2009) and individual study (Cooper, 1997) both Cooper (1997) and Flyvbjerg (2006) argue that at least context-dependent generalisation is achievable even in the social sciences. Both advocate for

the use of a research strategy that is essentially post-positivist (Cooper, 1997) in embracing qualitative methods and context-dependent knowledge (Cooper, 1997; Flyvbjerg, 2009).

Although sharing many of positivism's critical paradigms, ontological and epistemological assumptions, post-positivism criticises the naïve duality of positivism (Cooper, 1997). Post-positivism allows and encourages attention to individuality. That signifies that post-positivism, in contrast to the earlier positivist paradigm, embraces the use of multiple paradigms (Cooper, 1997) in order to improve research methodologies and methods and to pragmatically match them to research objectives (Wildemuth, 1993). Post-positivism however also cautions about the possibility of researchers influencing participants through their own predispositions or "bias". That is post-positivist research strategies put an emphasis on designing research in a way that works to reduce the influence of researcher bias (Cooper, 1997).

This study thus attempts to gain applicable knowledge about remote villages by adopting a post-positivist research design that allows us to not merely manage but actively utilise the highly individual nature of the case study sites and their inhabitants.

3.3. Research design

The research strategy is based on an inductive approach. Inductive research creates theory from small areas of knowledge and strives to add depth and breadth as research progresses. In this research, issues of remoteness are explored using individual case studies and taking into account their distinct circumstances. By triangulation between the different villages, different sources and research techniques, the findings become increasingly rich and dependable and, as far as achievable, more generalisable in nature.

Grounded theory is an inductive approach, inspiring this research design because it offers strategies both for inductive research and for the reduction of bias[7]. Grounded Theory refers to the research strategy of creating theory that is grounded in observation (Birks and Mills, 2011). Field work is thus a central aspect of theory building, often commencing earlier than other research strategies, with the literature review conducted only later during theory building in order to reduce bias introduced from earlier research. It is common for grounded theory research not to have a clearly defined research question early on. Instead, grounded theorists develop their research question during field work and define it to fit their findings. With grounded theory, data gathering takes place alongside coding. By doing so, methods such as interviewing techniques, can be refined during field work. Coding in this context means the attribution of primary data using one-phrase terms (Saldana, 2013; Silver and Lewins, 2014). These "codes" allow for the identification of common themes. As shown in

[7] Bias, in this context, means the possibility of a researcher influencing participants through their own predispositions (Cooper, 1997).

Figure 15 multiple rounds of coding and subsequent categorising are used to reach a point where a theory emerges from the data (Birks and Mills, 2011).

In this study an early pilot study was used for refining research questions, site selection criteria, interviewee recruitment strategies and interviewing techniques, as well as for testing coding strategies. The research design was adapted in accordance with the experience and preliminary findings from this pilot study as described in more details below, in section 3.5.1.

Grounded theory uses an approach of continuous improvement of coding and interviewing techniques (Birks and Mills, 2011). This approach was identified as potentially helpful for designing a detailed questionnaire ahead of field research, given that only a small pre-existing body of knowledge was available. Coding techniques were also likely to employ grounded theory techniques of ongoing improvements as the data unfolds. The research design did not however, embrace grounded theory entirely.

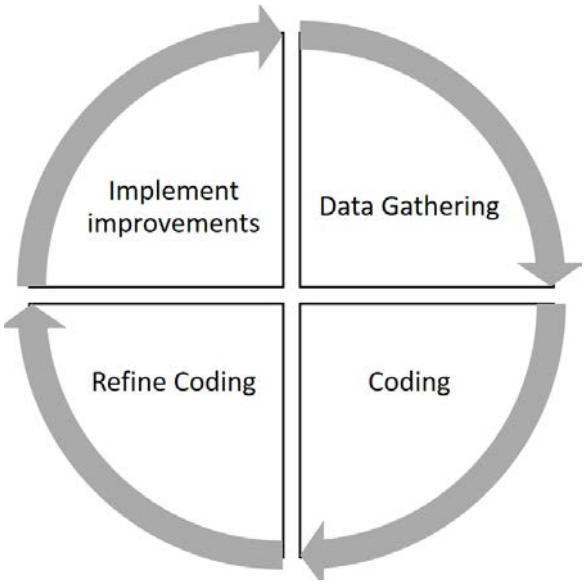


Figure 15: The grounded theory approach after Birks & Mills (2011)

In principle both quantitative and qualitative data gathering and analysis techniques can be utilised for inductive research designs. In this case, while initially considering a quantitative/ qualitative multi-methods approach for improved triangulation, qualitative techniques were ultimately favoured over quantitative techniques. Graebner et al. (2012) describe qualitative data as "open ended", that is, as data that does not need predetermined measures. Bernard (2002) further finds qualitative data to be "richly descriptive", and agrees with Graebner et al. (2012) in that qualitative data have a potential to gather more detail than data gathered using more prescriptive, quantitative techniques. It was this open-endedness and capability to capture detail, even without a detailed pre-defined measure that made qualitative methods a good match for the inductive research design chosen for this study.

The best sampling approach in order to meet the research objectives was deemed a multi-case study. While there is criticism of the use of case studies because of a potential lack of generalisability, pragmatically it may be concluded as suggested by Flyvbjerg (2006) that quantitative knowledge based on large statistical datasets is not superior to practical, context-dependent knowledge.

In a multi-case study approach a number of individual case studies are conducted. Each individual case study is its own research project. However, for multi-case studies individual cases are chosen on the basis of a common research question or objective that allows for a concluding analysis of material from all individual cases (Stake, 2006; Merriam, 2014). The multi-case study approach should identify themes that transcended regions, cultures and climate zones, while at the same time allow for differences between the studies. In choosing sites with various characteristics and circumstances a more complete understanding of the challenges that each faced, and the adaptation techniques that were devised might be gained.

For this study, as a first step, regions or meta case studies were chosen according to shared characteristics such as their (relative) remoteness, harsh climate and terrain. From these regions, individual villages were then identified as case studies. While the villages had most areas of interest in common according to the research objectives and selection matrix there were also special areas of expertise for each case study village. This is in accordance with Stake's (2006) understanding that case studies in multi-case studies can have only one or a few research questions in common and separate questions for each specific case.

Data from the individual case studies were, at first, analysed on a village-by village basis. The data were then re-assessed independent of each data point's village of origin and both analyses combined.

The use of case studies is not without critique in scholastic research. Especially in the positivist tradition case studies are seen as having a limited value because their outcome cannot be generalised in the way necessary to build predictive theory that is independent of context. Flyvbjerg (2006; 2001; Flyvbjerg & Stewart 2012), however argues, that it should not be the aim, neither is it realistically achievable for social sciences and their related fields to produce this kind of context-independent, predictive theory:

> *Social science has not succeeded in producing general, context-independent theory and, thus, has in the final instance nothing else to offer than concrete, context-dependent knowledge. And the case study is especially well suited to produce this knowledge*(Flyvbjerg, 2006, p. 223).

Using case studies in combination with a qualitative in-depth descriptive approach, social science's strengths in using rich, context-dependent knowledge can be utilised. This is not a new perspective to take, but rather one that other researchers, such as Flyvbjerg (Flyvbjerg, 2009) or Bernard (2002) have already advocated for. Theory in social science can only be a guide for real life application as individuals and, in this case, individual villages and communities, are not a controlled laboratory situation (Raven, 2015), but different from each other – especially so for remote villages (Koch and Carson, 2012; Carson and Carson, 2014) – which makes any one-size-fits-all theoretical approach practical only as a guide.

The nature of this study, researching towards the extreme Martian village as a "functioning" remote village meant those villages that were in most points similar to the hypothetical Martian village were naturally extreme cases, i.e., examples that are likely to be even more deviant than other remote villages (Flyvbjerg, 2006). This does not necessarily signify that all cases were most remote according to common definitions, but that they were outliers within their cohort of villages for example by having adapted to their environment extremely well.

An extreme case sampling strategy can "maximize the utility of information from small samples" (Flyvbjerg 2006, p.230), which is likely to work well in this study. Extreme cases, through their nature of displaying a somewhat exaggerated image of phenomena make it easier to identify and describe features that might otherwise, in a less extreme case, be missed. At the same time, while extreme cases might not mirror the typical living conditions for less extreme examples, one can nonetheless deduct that what works even for an extreme example will likely also work for less extreme places (Flyvbjerg, 2006; Stake, 2006). For the purpose of this study, this quality of extreme case sampling points towards a high probability of outcomes of the study being applicable even to a large number of less remote villages in less harsh environments.

3.3.1. Research questions and objectives

The intention of this research was to learn about how remote villages and their population have found strategies to adapt to their harsh environment, as a precursor of knowledge for "starting from scratch" for future remote villages on Mars (Pfaffl, 2017). In order to identify these strategies this research asked two main questions:

I. What are the specific challenges that are faced by remote communities in harsh environments?

   In order to understand;

II. How have communities learned to adapt to these challenges?

To answer these questions four areas of interest were identified; that is, four objectives that needed to be met in order to answer the research questions:

I. Identify specific problems experienced in remotely located villages in harsh environments: *What are the problems faced by remote village in harsh environments?*

II. Identify the range of adaptation strategies undertaken by remote villages in harsh environments: *What strategies have remote villages in harsh environments and their inhabitants developed in order to adapt?*

From this:

III. Show how remote villages in danger of marginalisation can benefit from this knowledge: *How can this research benefit remote villages in harsh environments on Earth?*

And finally:

IV. Explore the potential application of these adaptation strategies to a stage two Mars village.

The following sections 3.4 to 3.6 describe in more detail how data gathering methods, as well as site- and interviewee selection were used in order to answer the research questions.

3.4. Data gathering Methods

3.4.1. Literature review and content-analysis

As in a conventional study the literature review was used to establish the current state of the field and to identify the interconnections with prior research. To meet these ends a two-part literature review was conducted. The first part assessed the current state of knowledge on stage II Mars village planning, as well as the history of planning for human Mars travel. This first part was targeted first and foremost at informing the choice of samples most suited to being analogues for the hypothetical Martian village. The second part of the literature review looked at the fields of human geography and planning for remote villages. In order to be able to better understand these fields and define "remoteness", a content-analysis of over 70 publications was undertaken. Means of defining and assessing remoteness levels were analysed against other variables, such as the region researched or the field of research. The analysis gave a fair overview of the varieties in use of the term and the different aspects of remoteness.

3.4.2. Semi-structured interviews – design and administration??

Semi-structured one-on-one interviews were the main source of data gathered to address the research questions. Observations were also used to triangulate data. While allowing for flexibility, semi-structured interviews still "[demonstrate] that you are fully in control and know what you want to achieve" (Bernard 2002, p.205) in comparison with entirely unstructured interviews. Questions used were a combination of trigger questions and special area questions. Trigger questions are a set of generic questions designed in order to get the

interviewee to talk in a way that would encourage them to set their own emphasis. A pilot study was used in order to refine the interviewing techniques, as described in more detail in 3.5.1.

The main trigger questions used were:

1. *What is the most remote site you ever worked at and/ or lived in? Why do you think that one is more remote than the others?*

This question was used in order to assess the interviewees' relative remoteness, and in order to confirm the case site's perceived remoteness. Further, interviewees could weight factors of remoteness against each other, thus giving an insight into why interviewees perceived one site to be more remote than the other.

2. *What do you think are the biggest pros and cons of living in a remote area?*

This question, querying the positive and negative aspects of living in a remote area was the core question of the study and, usually, provoked the longest and most detailed answers. It directly corresponds to research objective #1 **"***Identify specific problems experienced in remotely located villages in harsh environments***".** The questions were deliberately open in wording in order to allow interviewees to set their own emphasis, and in order to reduce researcher bias as far as possible (Cooper, 1997). The expectation in using this trigger question was that interviewees would report on what was desirable and what was problematic in living in remote areas – i.e., what problems, and what opportunities they experienced.

The pilot study confirmed that in the majority of cases interviewees reported problems together with their solutions. Thus, this question, through its open-endedness, allowed the addressing of research question #2 *"Identify the range of adaptation strategies undertaken by remote villages in harsh environments: What strategies have remote villages in harsh environments and their inhabitants developed in order to adapt?"*

3. *Can you recall any particular moment that really 'drove home' that you were in a remote location?*

This question was designed in order to query for circumstances that could enhance relative remoteness. It further corresponded to an interest in emergency management as an extreme case within the case study. Use of this question was, after the pilot study, largely discontinued due to concerns the question might trigger any traumatic memories and poor performance when compared with the other trigger questions.

4. *What else do you think people in the cities need to know about life in the [remote] villages?*

This question was an invitation to the interviewee to add to the interview according to what they regarded to be important. Its positioning at the end of the interview meant the interviewee was usually in a mindset focused on the area in hand. This additional question to the original three was introduced during the later stages of this study in response to noticing the re-occurrence of themes of political and cultural remoteness. It had two functions. The question queried into political remoteness as experienced by the interviewee. It was further utilised in order to obtain additional insight into how interviewees thought new populations could potentially be attracted from cities.

The second type of question probed for the interviewee's special knowledge. This approach was informed by the grounded theory strategy of adaptation methods (in this case questions) according to data already collected (Birks and Mills, 2011). At first potentially problematic areas within the village were chosen based on findings from the literature review. As research progressed more data were available through interviewees identifying areas of interest, i.e., areas of problems and opportunities within the village. Interviewing of experts in fields already identified as interesting in the sense of this research allowed for a better understanding of the area in question. Thus, for instance, a member of the local fire station might be asked questions specific to fire fighting in the area or a parent-of-three might be asked regarding child care and education. Where time allowed, this group called "subject area experts" were still also interviewed using the generic set of trigger questions outlined above.

Interviews where usually performed in a one-on-one setting but there were cases where a partner was present as a secondary respondent and took an active part in the interview. These partners were both male and female. Spouse contributions ranged from a sentence or two to almost equal contributions.

Interviews were recorded by hand-written notes after careful consideration with advisors and mentors. While recording might have preserved details, analysis of details like choice of words or breaks in talking was not possible within the scope of this research. Others such as Hall and Callery (2001), as well as Bray (2008) point out that not relying on audio recording can actually enhance the depth and quality of data gathered. I opted for hand-written notes in order to limit problems with interviewees feeling inhibited with running microphones, as well as in order to foster an environment that showed the researcher as an active listener. Being seen as writing down their responses provided ongoing feedback and encouragement to the interviewee and thus often facilitated the interviewing process. This too is a phenomenon that has been observed before (Bernard, 2002). The approach of foregoing

taping for hand-written notes was found to work well both during the on-site phase and during analysis.

Notes during the interviews were complemented by a separate memory protocol for each interview written as soon as practical after each interview – typically directly after or at least on the same day as the interview. These protocols allowed for the inclusion of the environment surrounding each interview, as well as impressions and non-verbal cues that were given. They also provided a means for recording demographic information and information on the sources of each contact that helped understand relationships within the village community.

While the primary investigator speaks Swedish fluently, she has only limited Hebrew skills and, at the time of the case studies, at most intermediate Swedish skills. Therefore, all interviews were conducted and transcribed in English.

3.4.3. Observation

Bernard (2002, p. 85) states that "A great deal of research has shown that about a third to a half of everything people report about their behaviour is not true". That is, they caution that interviewee's self-reporting as an isolated source can be an insufficient source in a qualitative study. Triangulation between data obtained from different interviewees in different villages was one strategy employed to address this potential for issues with data integrity. The second source for triangulation was data gathered from observation. Although it was not possible within the limitations of this study to spend extended periods of time in target villages, observations were an important part of data gathering during field research, producing almost as much data as interview transcripts.

Interviews were accompanied by a written account on observations made throughout the interviewing process including a memory protocol of the interview itself. This included biographic data, the recruitment process and any observations made about the interviewee and their environment. Some interviews, especially where talking to subject area experts, were further accompanied by walk-throughs and visits of sites such as local fire-fighting sheds. These visits were documented through research diary entries and, where practical through digital photography.

General observations made while in the field were included in the field diary in a free-writing format. Observations included notes about community cohesion, road condition or the selection at the local supermarket. It is this category that is the closest approximation to an anthropological field diary. There were further private diary entries, mostly reflecting on aspects of field work, although this last diary category did not usually yield, nor was it meant to yield, any data for later analysis alongside the other data categories. Having lived in

remote (Roxby Downs) and semi-remote (Charters Towers) sites myself there was also a certain kind of participant observation (Bernard, 2002) that, albeit not a formal part of this study, nonetheless informed it.

3.4.4. Other sources

Other data sources included photography, flyers and plans selected during field research, as well as literature. In Sweden the primary investigator's Swedish skills helped with the gathering of such data. For two villages, Yahel (Elad, 2000; Miles, 2007) and Glommersträsk (Bylund, 1947, 1960, 1971b; Edström, 1993) there had been prior research activity which could be used in order to make sense of data gathered. For the other villages, no such prior literature was available.

For Sweden the photo exhibition 'inland' (Lundgren, 2015b, 2015a), as well as the associated publication provided an introduction into the region and its villages. Websites, too, were consulted as supporting material. These were for example websites of partnering organisations, villages, local stakeholders and companies or service clubs.

3.5. Site selection

After familiarisation with the state of research in human geography, remote settlement planning and theory as well as the state of research on Mars village planning and architecture the next phase of the research project constituted the determination of applicable study sites. Whilst it is important to be familiar with the state of the research in remote village planning and theory, site selection was driven mainly by the comparability to a stage II Mars village.

As a first step, the prospective village was defined and described. An initial list of criteria for case studies was derived from this theoretical village. With this early understanding of site selection criteria an initial pilot study was conducted. This pilot study allowed for review and fine-tuning of both site selection and stakeholder engagement, and for a review of the data gathering methods as described above.

3.5.1. Pilot study

A pilot study was conducted in the early phases of site selection at Osborne mine, a western Queensland mine site. The aim of the pilot study was to inform site selection, as well as confirm the choice of research method and the practicability of the proposed target group of community stake holder and special knowledge residents. The field study took place during five days in August 2014.

A pilot study needs to confirm the selection criteria imposed on all other sites, but it also needs to cater to the specific needs of a pilot study. Table 2 shows selection criteria and their

use for the pilot site. In addition to these selection criteria a pilot site needs to foster a (psychologically and physically) safe environment where new methods and approaches can be tried with low risk. Further, typically funding available for a pilot study is limited. This means criteria for a pilot study can deviate considerably from those for major case studies. It was thus decided early on to utilise the opportunity to conduct the pilot study in a location and type of village well known to the primary investigator who has a background in mining engineering. Not only would this allow for a concentration on the vital tasks of familiarisation with methods and techniques but also cut down on travel time and cost.

Criteria	Criteria met?
Located in a remote area	Yes Remote as well as accessibility problems However easy access via aeroplane
Located in an extreme (i.e., harsh) environment or terrain	Yes High summer temperatures Frequent floods and wildfire events
Purpose-built within the last 50 years	Yes Purpose-built as mining camp
A modern western village, as opposed to traditional native-built	Yes
A stable or non-declining village	n.a.
A comparably low population size, the ideal being 400 – 800 people	Yes Population c. 400

Table 2: Site selection criteria for Pilot Study

The site chosen for the pilot study is a mining camp about an hour's flight from Townsville. It is located in an area of Australia well known for its hot summers –often peaking above 45°C – and classified as "very remote" by the Department of Health (Australian Department of Health, 2017). In addition, the site struggles with the regular occurrence of wildfires in the dry and flash floods during the rainy season.

The next small town, Cloncurry – itself classed as "remote" (Australian Department of Health, 2017) - is about three hour's drive on a gravel road with an additional hour-and-a half to the next regional but also "remote" classed (Australian Department of Health, 2017) centre, Mount Isa. The initial two hours' drive of gravel road often becomes impassable due to floods or wildfires in the area. Townsville, while accessible via aeroplane five times a week, is about eight hours' drive from the site, the first two hours of which are on unsealed roads. There are a further five flights per week from and to Brisbane. There is no railroad connection. The population at any given time is about 400 people who commute from and to site on different rosters, most commonly eight days on and six days off. Being a mining camp, the village was purpose built for the task of housing mining staff during on-site days and, of course, also qualifies as a modern, western village with all the associated amenities. Technically it also has a stable population size but since population size is dictated by the number of staff rather

than quality of life and availability of a stable economy it is hard to quantify even in a descriptive way.

The pilot study showed large differences between permanent and fly-in fly-out (FIFO) populations mainly because FIFO populations, aware of the temporary nature of their lodgings and knowing their families to be living in comfort were willing to accept a large lack of infrastructure and services. In addition, the concern for families while away from them was a prominent problem for this cohort. Both were at odds with the research aims as the hypothetical Martian village would lack this element of a temporary spatial separation from family. As a result, it was subsequently decided to only include permanent villages with families in the samples for the main study. This excluded any further FIFO installations, but also remote research facilities.

When it came to research techniques, questioning and interviewee selection the pilot study however confirmed the research design with only minor corrections. It also gave a good indication of the number of interviewees per locality needed in order to draw a sufficient overall image of each village.

While the stark differences between permanent and non-permanent settlement situations made inclusion of data into this study impractical, findings from the pilot study in regards to improving mental health outcomes for FIFO workforce were analysed together with two JCU psychologists, and presented at a 2015 conference (Pfaffl, McShane and Kanakis, 2015).

3.5.2. Region selection

The site selection process was split into two stages. First, case study regions were determined and later, with the assistance of local stakeholders, individual villages or case study sites were chosen from within these regions.

Regions were selected through a multi-variable matrix. This matrix was derived from the literature review on Mars as described above, in the literature review chapter two. The initial list of criteria was refined following the pilot study, which had shed light on differences between permanent and non-permanent settlements, as well as the importance of having family present on site. Candidate regions were identified from the literature. These regions where later entered into a matrix as displayed below in Figure 18 and subsequently rated against different criteria.

As a first step the prospective village was defined and described in accordance with the concept of using a hypothetical Mars village in order to understand villages in remote and harsh environments on Earth. The result was a clearly defined target village. From this village,

and taking into account typical villages on Earth an initial list of criteria for case studies was derived:

1. Located in a remote area
2. Located in an extreme (i.e., harsh) environment or terrain
3. Preferably purpose-built within the last 50 years
4. A modern "western" village, as opposed to traditional native-built
5. A "good example" village
6. A comparably low population size, the ideal being 400 – 800 people

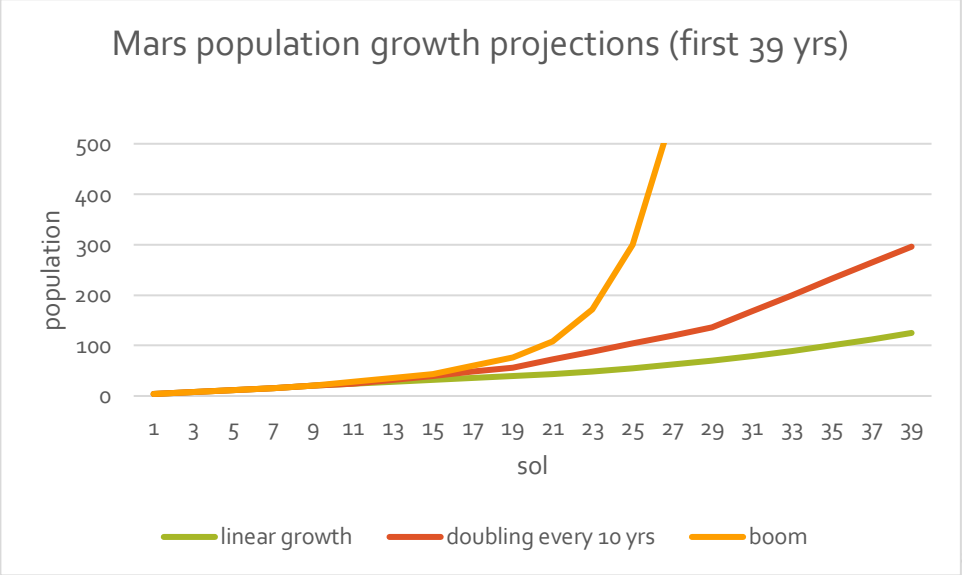
Of these points point five ("a good example village") was, as described above when discussing liveability hard to define because of its subjectivity. Ultimately local stakeholders' expertise was called upon in identifying those villages they considered to be "good" examples.

The notion of a "remote" village was another criterion that proved difficult to define. The preceding literature chapter shows how during the review of international and interdisciplinary research it became increasingly apparent that a broad definition of remoteness serving all disciplines and geographies may not only be hard to achieve, but also impractical. The level of remoteness ascribed to individual villages was found to be dependent on too many individual circumstances defined by culture, geography and the research needs of individual studies. Thus, in accordance with Merriam's (2014) notion of qualitative research as inductive research, as supported by Eisenhardt (1989), the decision was made to abandon the attempt of quantitatively defining the level of remoteness. Instead, villages would be identified as 'remote' by their individual circumstances and described as such in the lead up to each study. This descriptive definition was possible because the outcome of the case studies would be a rich descriptive (Merriam, 2014) report rather than the hard facts, data and number typical for quantitative research.

In realising the importance of in-situ resource usage (ISRU) for the Martian village, as outlined especially by Zubrin & Wagner (1996), preference was given to those villages that utilised local resources, such as water, energy sources or human resources.

In this sense, the initially designed idealistic stage II Mars village situation as described above in the literature review chapter, and the selection criteria shown above also served to create the "bounded system" creating a case study environment. Therein the case study is defined in accordance with Merriam (2014) as a research situation in which there is a clearly defined boundary around the applicable case, albeit in the case of this research in the form of a multiple-case study (Stake, 2006).

When designing the region selection matrix used three groups of variables were used: The first group, referred to as "desirable criteria" in Figure 18, are criteria directly derived from the conceptual Martian village. These criteria favoured a population size of 500 – 1000 inhabitants, and a young village. The population size therein was chosen in accordance with population estimates for the Martian village as shown in Figure 16 and described in more detail in the literature review chapter above.



[8]

Figure 16: Range of population projections after twenty years for the Martian village

Environmental criteria were divided into three separate criteria, which not only led to a higher weighting on environmental criteria, but also allowed for different types of "remote villages in harsh environments". The three equal criteria used were remoteness, as defined by distance to next major town, extreme terrain – both as a potential catalyst for remoteness, and as a factor of harshness in one's natural surroundings – and climate. The criteria from the desirable criteria list had the highest relative weighting with up to ten points per village.

A second category was referred to as "bonus points". These criteria were lower in weighting, that is less points were awarded for meeting of a criterion. The reason for introducing these criteria, mostly as a lesson learned after the pilot study, was in allowing villages that scored only average on the desirable criteria, but otherwise seemed ideal candidates for research a competitive edge, as well as to distinguish between otherwise similar regions or villages. These criteria included whether or not families were present, whether or not the village was a permanent village, self-reliance, economy and population trends, and a trend towards utilising new approaches as described in the literature about these regions.

[8] A sol is one Martian year, i.e., 687 days

Herein, when choosing regions, the "village" described was what was the predominant or typical village for the region or, where different types were present, the type of village most suited to research. In some cases, regions were assessed separately for different types of villages. Figure 17 gives an overview over the criteria used and their relative weighting by means of points available.

bonus points	
0	does not fulfill at all
2	does somewhat fulfill
4	does fully fulfill

population size	
10	500 - 1000 inhabitants per village
7	<500 or 1000 - 2000
5	2000 - 5000
2	5000 - 10000
0	>10000

settlement age	
10	<50 yrs
5	50-100 yrs
0	>100 yrs

remoteness	
10	very remote; c. 500kms + to next major town
7	remote; c. 250 - 500 kms
5	moderately remote; c. 100 - 250 kms
3	rural; c 50 - 100 kms
0	metropolitan

extreme terrain & climate	
10	very extreme (i.e. Antarctica)
6	extreme (circumpolar, desert)
4	challenging (e.g. alpine, tropic)
0	moderate

Figure 17: Region selection variables

A third category was added for practical considerations. This category attributed "malus points", i.e., negative points for undesirable criteria – single-industry towns and towns where residents typically lived only part-time. The latter were a direct result of lessons learned analysing data from the pilot study, as well as concerns of staple economies as non-sustainable (Schmallegger and Carson, 2010). Finally, malus points were also deducted for practical considerations such as cost, or safety. However, neither of the two malus categories had a major influence on relative ranking.

Figure 18 shows the resulting region selection matrix which ranked regions of interest by awarding points for the fulfillment of certain criteria, i.e., ten points were awarded to a region whose villages had a population of 500-1000 people, with seven points being awarded if the villages had a population of under 500 or above 1000 but less than 2000 people. Villages were ranked by adding up total points of both the "desirable criteria" and the "bonus points" category while subtracting "malus points".

			desireable criteria					bonus points						malus points			org. malus			
Settlement or Region Name	**Location**	**Type**	pop size ~500 - 1000	younger than 50 yrs	remote	extreme terrain	extreme climate	families present	permanent settlement (expected life <100 yrs)	high self-reliance or sustainability	stable or improving economy & demography	moderinsation effort	**points before malus**	single industry town	only part-time accomodation	**total points**	travel costs	bureaucratic hurdles	safety concerns	**points incl. org. constraints**
Negev Kibbuzim	Israel	Region	10	10	5	4	6	4	4	2	4	4	53	0	0	**53**	0	-2	-4	**47**
Princess Elisabeth	Antarctica	Research Station	7	10	10	10	10	0	0	4	0	4	55	0	-4	**51**	-4	-4	0	**43**
Norrland	Sweden	Region	7	0	10	6	6	4	4	2	2	2	43	0	0	**43**	-2	0	0	**41**
Alaska villages & camps	USA	Region	7	10	10	4	6	2	2	2	0	0	43	-2	-2	**39**	-2	0	0	**37**
Masdar City	UAE	Settlement	0	10	0	4	6	4	4	2	4	4	38	0	0	**38**	0	0	0	**38**
Ice Road - mining	Canada	Region	5	10	10	8	8	0	0	0	0	2	43	-4	-2	**37**	-2	0	0	**35**
Biosphere II	USA	Research Station	7	10	7	6	6	0	0	4	0	2	42	-2	-4	**36**	0	0	0	**36**
Mars Desert Research Station	USA	Research Station	7	10	7	6	6	0	0	2	0	2	40	-2	-4	**34**	0	0	0	**34**
Alpine Europe	Central Europe	Region	5	0	3	8	4	4	4	2	2	2	34	0	0	**34**	0	0	0	**34**
Outback - cattle	Australia	Region	5	0	10	6	6	4	2	0	0	0	33	-2	0	**31**	0	0	0	**31**
Outback - mining	Australia	Region	7	10	7	4	6	0	0	0	0	2	36	-4	-2	**30**	0	0	0	**30**
Outback - tourism	Australia	Region	10	5	7	4	6	0	2	0	0	2	36	-4	-2	**30**	0	0	0	**30**

Figure 18: Region selection matrix

As can be seen in Figure 18, the two study regions of the Israeli Arava desert and Sweden's northern region of Norrland were clearly leading in the multi-variable matrix. Their only serious competitor given the chosen criteria was the Princess Elisabeth research station in Antarctica. While ruling out Princess Elisabeth was practical even from a comparability point of view and especially because of its nature as non-permanent residence organisational, organisational constraints made this an unlikely study candidate.

Ultimately the two regions chosen were, as was the aim with the multi-variable matrix used for site selection, not those excelling in any one criterion or category, but those achieving higher than average values in as many criteria as possible. With the abovementioned constraints of funding and time it was decided to visit two to three villages from either region. While this small sample size might not suffice for generalisation even at a regional level it allows a look at general trends and indicators, and also allows for an understanding as to what is typical for each region and what holds true across two dissimilar regions with a dissimilar cultural background. i.e., what is likely to be applicable for a larger number of villages above and beyond what could be covered in this study.

3.5.3. Individual village selection

Once regions of interest had been identified using the multi-variable matrix described above individual villages within these regions needed to be chosen. It was most practical to employ local expertise to this end as there is no easily obtainable data that would have allowed identification of target villages. A more systematic approach was simply not possible due to time constraints and the less advanced state of the research. Further it needs to be kept in mind that, as described under delimitation of scope in chapter one, generalisation was not an aim in this study, but rather to bring forward new context-dependent knowledge (Flyvbjerg, 2006).

In Israel, the *Or Movement*, a group providing support both to villages in Israel's remote areas, and to prospective residents was approached to be a local liaison. In Sweden one village was identified during prior travel to the area, from an exhibition about Sweden's inland villages (Lundgren, 2015b), the second one via a contact at *Akademi Norr*, in Arvidsjaur kommun.

All stakeholders were given a written description and information sheet about the research project, as well as the abovementioned multi-criteria matrix that had already been employed for study region identification. Local partner organisations were then asked to identify villages that best fit the criteria as outlined in the matrix and usually came back with an extensive list. These villages were then again ranked against the matrix according to material available which, at times, was sparse especially where language constraints limited access to information. For Israel, the partner organisation helped with describing villages and providing information during the selection phase. For Sweden, there was a possibility for a drive-

through of potential villages during a private visit in April 2015 and also an improved possibility to access information through basic language skills of the Swedish language. Ultimately, though, practical considerations, i.e., the willingness of a community to take part, determined the final selection of case studies from a short list.

Three villages were visited in Israel during January and February 2015 with an on-site duration of ten days per village – mostly due to funding constraints. This was found to be rather short, but at the same time the amount of data obtained from any village was better than expected. Thus, the decision was made in conjunction with the advisory team to visit only two villages, albeit at fourteen days each in Sweden during May and June 2015 in accordance with grounded theory ideas allowing a re-evaluation of research plans mid-study (Birks and Mills, 2011).

Villages visited were: Be'er Milka (Ramat HaNegev regional council), Ein Tamar (Tamar regional council), Kibbutz Yahel (Eilot regional council) in Israel, and Glommersträsk (Arvidsjaur regional council) and Resele (Sollefteå regional council). Figure 19 and Figure 20 show the locations of case study villages in Israel and Sweden respectively.

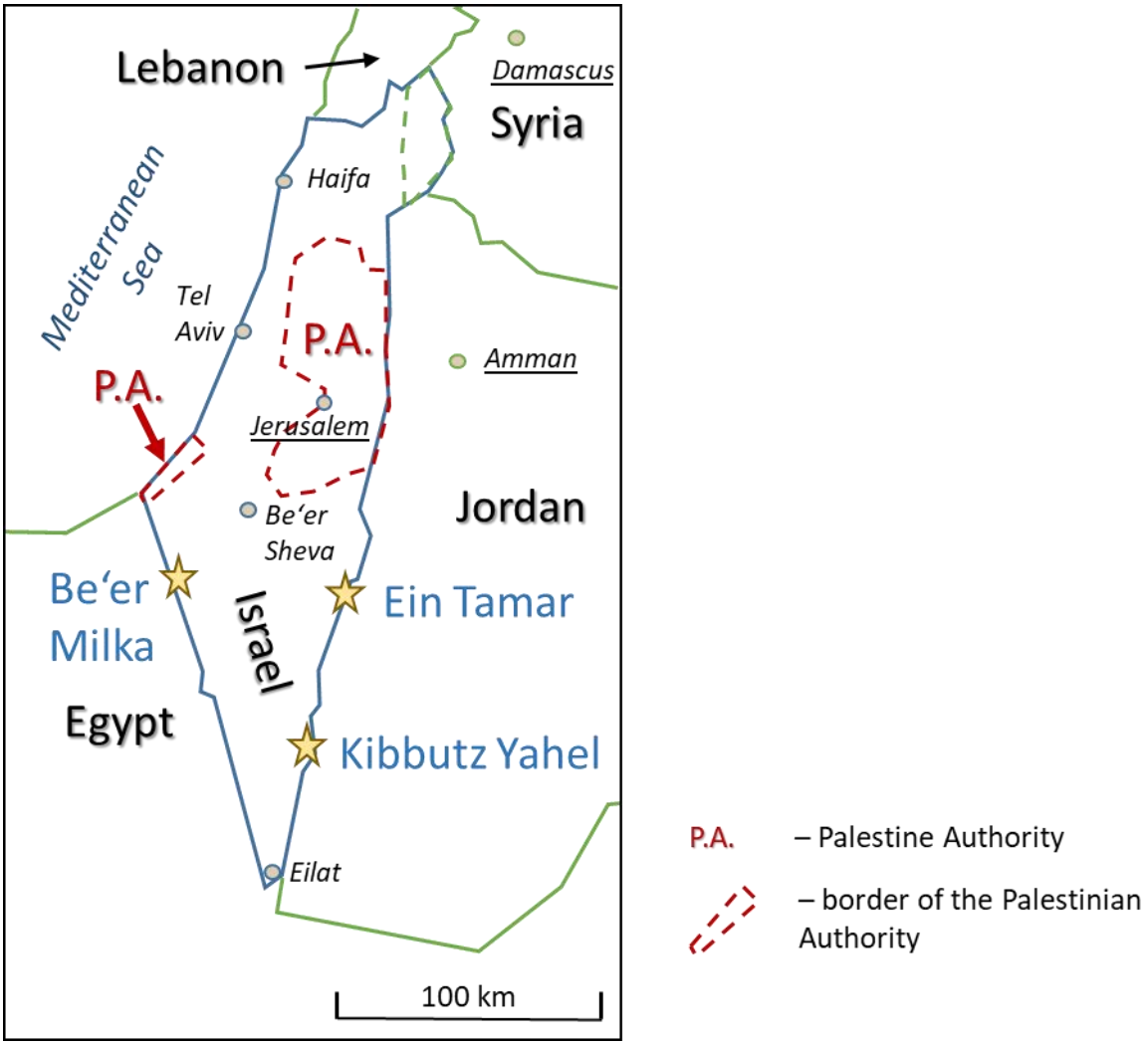


Figure 19: Israeli Case Study Sites

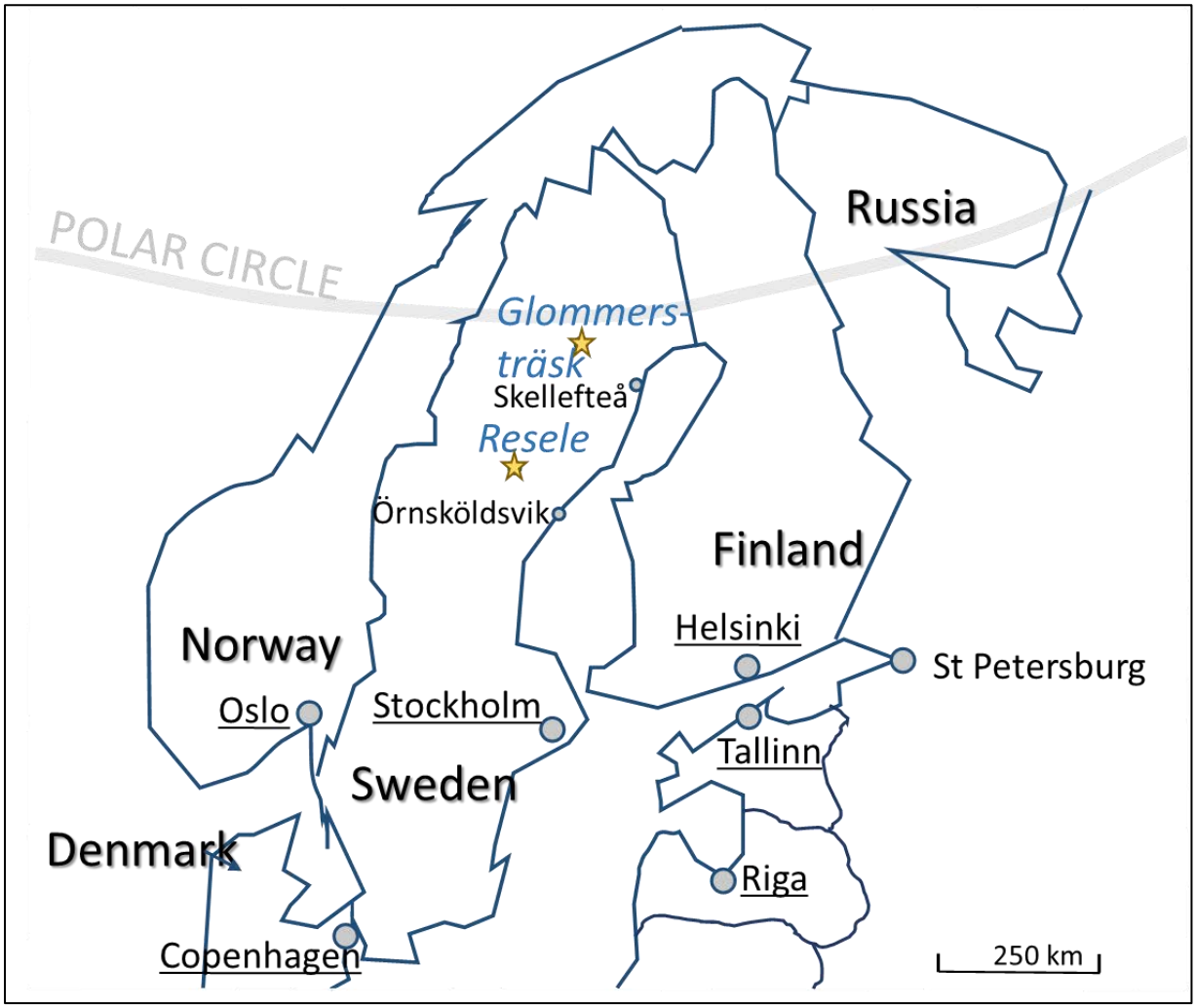


Figure 20: Swedish case study sites

3.6. Sample (interviewee) selection and recruitment

Figure 21 shows the process from choice of study regions to interviewee selection: With assistance of the partnering organisation a community liaison and, ideally, also a sponsor from the village population were identified. Identifying liaisons and sponsors is a technique derived from project management when preparing a project. A sponsor is a high-ranking individual whose job is mainly to approve the project and provide participants with a higher-ranking contact person to go to in case of questions. For the villages, this typically was someone in the function of a village council leader or equivalent.

The community liaison in contrast is someone involved with the community, often working together closely with the sponsor, who can assist the primary investigator and interviewees with any questions they might have. This liaison was asked for an initial list of interviewees. In particular, they were asked to nominate people with a specific function within the village, as well as members of important social groups for the village such as farmers in a village

where agriculture is an important aspect of identity and the village economy. From there on recruitment happened via community contact (Merriam, 2014), as well as via engagement with the community and snowball sampling (Bernard, 2002). Where available communities were also asked to post a message about the research including contact details in their village newsletters in advance. While posting of information in village newsletters yielded hardly any interviewees it did help in initiating contact and legitimising the research towards interviewees.

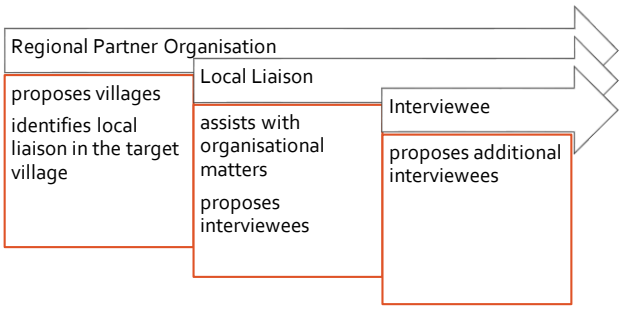


Figure 21: From region selection to interviewee recruitment

Sampling strove to have a large bandwidth of participants. Where certain groups were missing from the sample during an advanced stage of the field visit interviewee recruitment was targeted specifically at this group through actively asking the interviewees if they knew someone from the cohort in question. Typical sample size per village was between 15 and 17 participants. The number was initially informed both by time constraints and the double-documentation process. The pilot study had confirmed around 15 interviewees to be a sufficient number in order to access both subject area experts and samples of the general population. In total 76 individuals were interviewed during the five major case studies.

As mentioned above, all interviews were performed in English. Due to the high standard of English educations in both Israel and Sweden this had only a negligible impact on interviewee recruitment that was found to be acceptable. Neither did any concerns about the ability to communicate with the human subjects arise as all interviewee's English skills prove to be very good.

3.6.1. Interviewee engagement

Interviewing took place either in an office space provided by the site liaison or at a place of the interviewee's choosing, often their workplace or residence. These interview locations impacted positively on the possibility to contribute to this research through observation and in addition helped in providing background information for each interviewee and their individual circumstances. The typical interview had a duration of forty-five to sixty minutes and was sometimes followed either by a walk-through of an area of interest or an informal conversation which was not included in the interview protocol, but which was included in the memory protocol written after the interview.

All interviewees were furnished with an information sheet as prescribed through James Cook University's ethics guidelines. This information sheet provided them with information on the study, as well as contact information of the primary investigator, as well as supervisors at James Cook University. Many of the interviewees voiced their personal gain from the interviewing process in that it forced them to think about their lives in their respective villages with most concluding that they appreciated being aware of the high quality of life they had.

3.7. Coding and Analysis

After return from the field, data were coded and then disassembled accordingly. Coding took place in accordance with qualitative coding techniques (Saldana, 2013) using the NVivo 10 and 11 computer software (Silver and Lewins, 2014) and multiple passes of coding. Initial coding took place in an unstructured brainstorming fashion. Later, these individual codes were sorted into categories and coded on, i.e., further coding was added after disassembling and reassembling the data. Where practical in vivo coding, i.e., coding using respondent's own expression, was used. Analysis of the disassembled and, thus, also anonymised data took place in two major steps according to the research objectives:

Firstly, data were assessed in order to identify challenges faced by case study villages and their populations, as well as the adaptation techniques employed. Therefore, data were sorted into challenge and adaptation groups so different adaptation techniques for the same challenge could be seen – and also where such an adaptation technique was lacking or missing. Figure 22 illustrates the process.

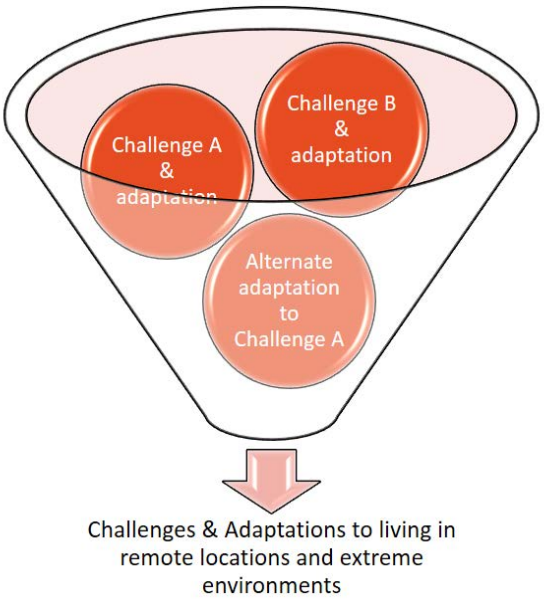


Figure 22: Analysis of multi-case case study data

Analysis of the data through de-construction and re-assembly of data through coding techniques led to the identification of a number of challenges and associated adaptation techniques. These challenges and adaptations were analysed both irrespective of their regional affiliation, and against prevalence or outliers in any single region or village. This allowed for a better understanding of themes that were cross-regional and thus more likely to be applicable for villages above and beyond what could be covered in this study.

The emerging themes could now be compared against their applicability for the hypothetical Martian village in order to identify to what extent the results are likely to overlap between the terrestrial remote villages researched in this study and a potential Martian extreme case. Figure 23 illustrates the intersection between terrestrial analogue situations and the future Mars village. Therein lessons learnt from terrestrial remote villages were either mostly applicable, applicable with adaptations, or not applicable.

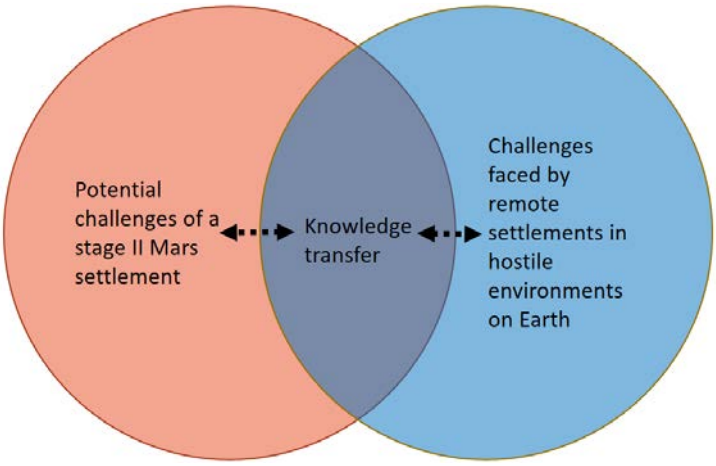


Figure 23: Analysis of findings towards Mars

Taking into account the Martian extreme case scenario, analysis could now move on to include existing research. In analysing results from this study against existing theory attempts at explanation of findings could be made that, in turn allowed the generation of new, nominative theory on remote villages in harsh environments.

3.8. Summary

This chapter describes the research design used to answer the research questions. The research design was constructed based on a pragmatic, post-positivist research philosophy heavily influenced by Flyvbjerg's (Flyvbjerg, 2009) understanding of social sciences as an emancipated science with its distinct research methodology. This study is inductive, qualitative and semi-structured, using one-on-one interviews to develop case studies within a multiple-case case study research.

Site selection was based on multiple factors including relative remoteness as well as markers of community welfare. Be'er Milka, Neot HaKikar and kibbutz Yahel in Israel, as well as Glommersträsk and Resele in Sweden were chosen using the abovementioned multi-variable

matrix. A total of seventy-six interviewees were interviewed in these villages during the first half of 2015.

Data gathered were interview protocols, memory protocols and research diary entries as well as supporting information in the form of photographs, maps, flyers and, where available, prior literature on the village in question and its close surroundings. Data analyses were performed through coding techniques developed especially for qualitative research.

Results from the case study will be presented in the following chapter four with subsequent chapters five and six discussing the findings and subsequently their implications for human geography that is informing planning theory and policy.

4. The Case Studies

This chapter describes in detail the case studies that provided the data for this research. Case studies were researched between January and June 2015 in five villages in two regions. Three villages were visited in the southern Israeli Arava desert and two in Sweden's circumpolar norther landscape of Norrland. A total of seventy-six interviewees were interviewed using qualitative techniques with open-ended questions on their perception of remoteness and the "best and the worst" aspects of life in their village. In addition, where possible, local stakeholders at municipal levels were interviewed in order to gain a better understanding of the village's situation within their village context in according with a network theory understanding of villages as part of a larger system (Ter Wal and Boschma, 2009; Koch and Carson, 2012).

First is an explanation of the site selection and interviewee selection process. After detailing each village separately, there is a summary of findings specific to each region, as well as identification of themes common among all or most case study villages. In the following chapters the findings will then be analysed against existing nominative theory in order to generate new substantive theory.

Figure 24 illustrates the site selection process. As a first step the type of village suitable for the purpose of this study was defined and described. This target village could be broken down into a multi-criteria matrix against which a large number of regions, villages or general settlement types were subsequently ranked. Regions and village types for this study were selected from those that showed the highest overall score, rather than villages with top marks in only one or two of the categories. The same matrix was later used for selecting target villages within the chosen area. Local stakeholders were equipped with a brief of the research requirements, as well as a copy of the matrix as used for regional selection and asked to nominate those villages in their own region they found to score highest across the board.

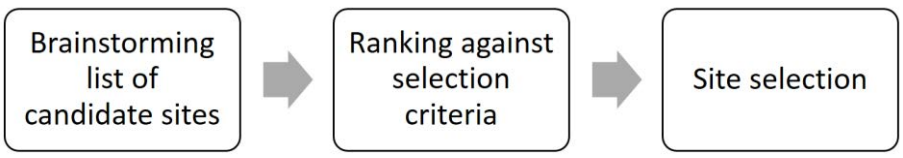


Figure 24: Overview of the site selection process

Within the villages, a community liaison helped with the initial identification of potential interviewees of people with roles within village leadership and/or knowledge in areas of interest such as education or emergency response. Interviewee recruitment from there on happened by contact, and if a demographic group was still missing towards the end of the study those people also might be included. In selecting interviewees for their knowledge

areas rather than a specific demographic this was a non-representative study. Interviews were supported by visits to areas of interest and, where possible, also visits to the closest town, for instance when accompanying residents on shopping trips. Observations recorded in a research diary completed the material.

Typically interviews took about forty-five to fifty minutes and were conducted either in an office space provided by the village, or in a locale nominated by the interviewee – often their workspaces or private residences. Most interviews were one-on-one, but in some circumstances a partner was present and had an input into the interview.

The data discussed below is from interview protocols supported by research diary entries in regard to general observations during the field visit. Data were supplemented where possible by locally collected photographs and – especially in the case of Sweden – publicly available material such as newsletters, flyers or posts in social media and newspapers.

4.1. The case studies

Five villages in two regions were visited during the main part of this study. In Israel, these were the relatively young villages of Be'er Milka in Ramat HaNegev regional council, Ein Tamar in Tamar regional council and Kibbutz Yahel in Eilot regional council. In Sweden, the case studies were the village of Glommersträsk in Arvidsjaur regional council and the dispersed settlement of Resele in Näsåker regional council. While these villages share being in a remote location and an inhospitable environment their settlement history and locations signify that they have developed in different ways and might now be facing different challenges. This high level of discontinuity between villages even in the same area is typical for remote villages (Carson and Carson, 2014). In general, settlement history and settlement patterns between Israel and Sweden are acutely different.

Figure 25 and Figure 26: Overview of Swedish Case study sites show overview maps over the case study sites in the context of their countries for Israel and Sweden respectively.

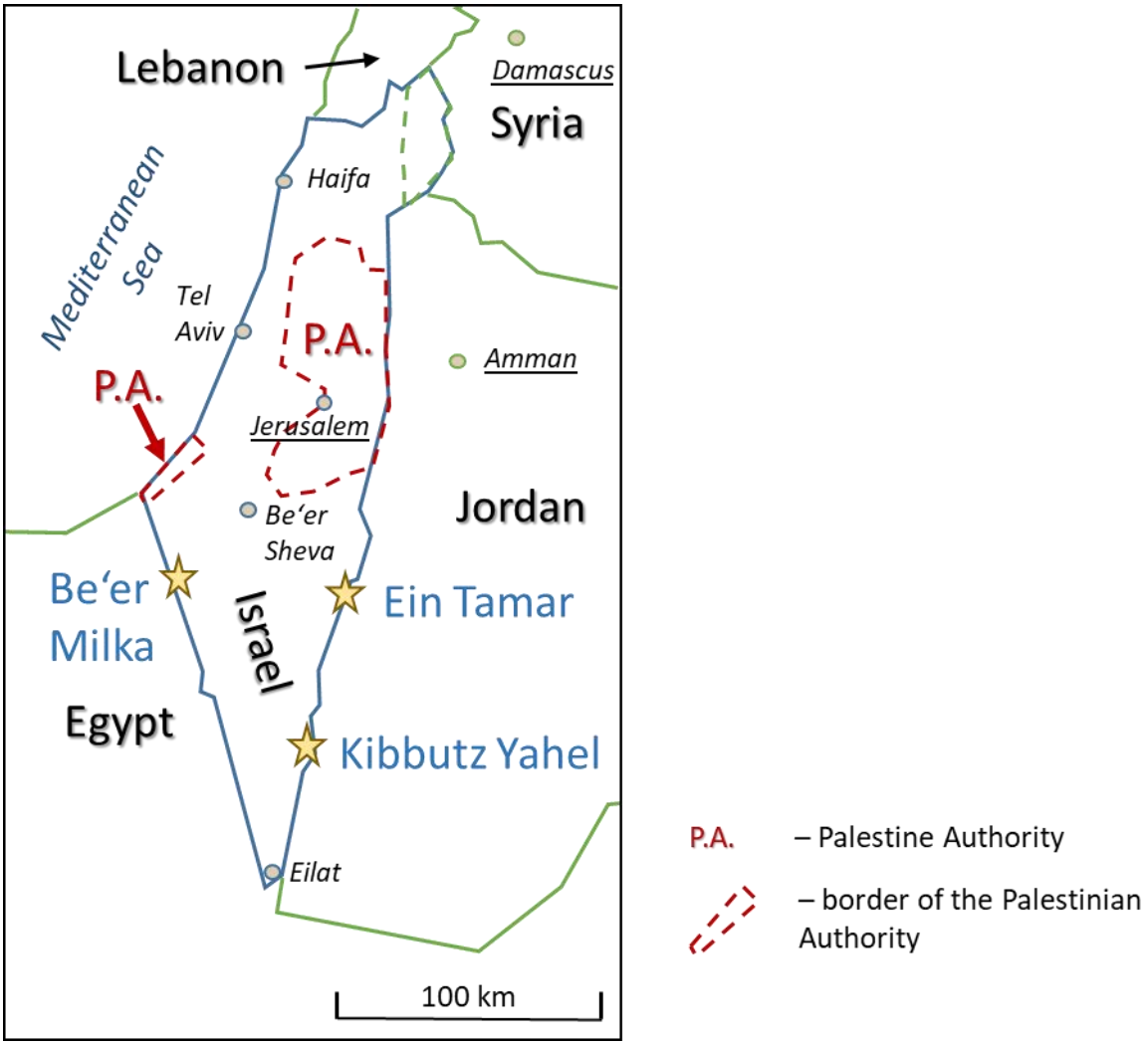


Figure 25: Overview of Israeli Case study sites

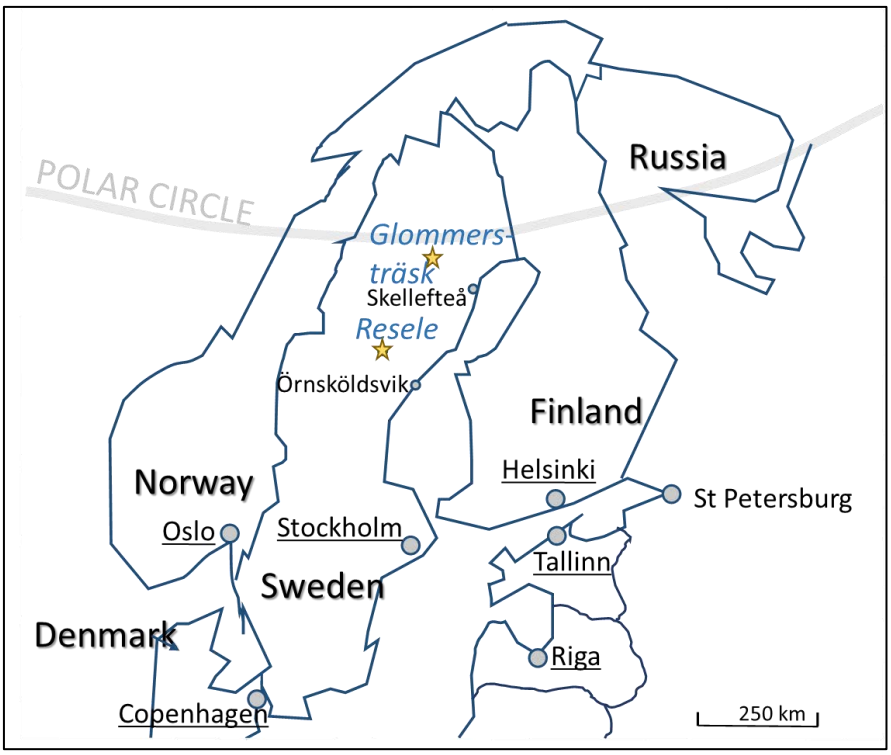


Figure 26: Overview of Swedish Case study sites

In Israel waves of settlement into the country's less hospitable areas have occurred in connection to Zionism, a political agenda of securing Israel for its Jewish population (Ben-Gurion, 1956; Miles, 2007). It needs, however, to be noted that while Zionist ideas might have provided the funding and support needed to found and maintain desert villages it is not necessarily the same motive that caused any one village's population to relocate to the desert. In Sweden's Norrland, the motives and support systems for remote villages are not as clearly cut (Müller, 2015). In the sub-arctic north of the region major settlement waves into Norrland's inland commenced around the end of the 19th century (Bylund, 1971b, 2000) while the middle and southern parts of Norrland have had settlement continuity from at least the middle ages. Settlement patterns too can be different. In Israel tightly settled communities, often defined by a fence and gate, with farms outside the built up areas are the norm while in Sweden villages can be more or less densely settled, often even dispersing over the landscape. These differences in settlement layout also mean that for Sweden the boundaries in areas of direct influence and service can be hard to define as is the case for both Swedish villages in this study.

In the following sections villages will first be introduced in regard to their size, type and location, but also in regard to their settlement history, immediate geographic neighbourhood and ties with their next towns. When describing the case study sites in regard to the challenges they face and the adaptation techniques that are employed in order to cope, three main areas of interest will be looked at: environmental challenges, infrastructure challenges and community challenges.

Environmental challenges were common to all case study areas. Bylund (2000) pointed out the link between environment and population density; it is only because their habitability is constrained in some way that sparsely populated areas have remained sparsely populated and, thus, remote. Infrastructure provision is, for obvious reasons, a focus for both research and policy when working with any type of village. For the purpose of this research, environmental challenges include the impact of extreme environments and climate on habitation, i.e., the way buildings and infrastructure are designed to withstand extreme environments. In some instances the environment can even include human induced environmental factors, such as political instability or war; environmental factors are those factors that are completely outside of the control of the individual and that, at the same time, need to be dealt with in order to make any type of settlement possible in the area.

While all villages in this study were provided with basic services such as electricity, water, sewerage, garbage collection and telecommunications by their respective governments, other services are not necessarily as readily available. Education and health in particular were a point of concern for residents in all villages. Understanding a village's needs and current state of affairs in regard to infrastructure and services is important for understanding the village and how to support it. For the purpose of this study, infrastructure includes both built and social infrastructure, as well as the area of employment. i.e., infrastructure is understood as those structures and systems that, support the individual in their needs. Infrastructure challenges are entirely human-made, however often controlled by decision makers remote from the areas which means infrastructure is an area over which locals have a limited amount of control.

Those challenges summed up as "community challenges", however are to a larger extent under the control of the village and its residents. Community, in this context, means the interaction of residents with each other and the instances in which individuals contribute to the greater good of the community. Such activities include but are not limited to activities such as volunteering or political organisations. This area of community challenges also includes conscious decisions made by individuals as to what they are willing to accept when living in a remote area, i.e., it touches on changed perceptions as to liveability (Gilbert, Colley and Roberts, 2016). This section also touches on – albeit briefly – the problem of political remoteness. In this context it will be investigated whether it might be the communities and their residents themselves that are different (Murray *et al.*, 2005); i.e., if villages might be creating their own cultural remoteness.

While each village is presented as a single case the concluding summary chapter will sum up the most striking differences and similarities between different types of village or different regions. However, it needs to be remembered that all cases in this study are extreme cases (Flyvbjerg, 2006), and that as such they are not representative even of their immediate surroundings. Rather, these are villages chosen because they represent examples of extraordinarily self-sustainable villages in one or more aspect of their village organisations. As a qualitative study with only a limited amount of cases, the worth of this study is not in statistically backed generalisation, but in context dependent learning (Flyvbjerg, 2006), such that context is as important as are the results themselves.

4.1.1. Be'er Milka (Israel)

Introduction

Given the cessation in new settlement foundation in traditional frontier countries such as Australia (Carson and Carson, 2014) and Canada, Be'er Milka, founded as recently as 2008 on Israel's border with Egypt might well be one of the youngest permanent villages in the western world. This village of only 35 families at the time of visit in January 2015 is situated in Israel's most sparsely populated regional council, Ramat HaNegev regional council. Although surrounded by desert Be'er Milka is a predominantly agricultural village due to availability of water from an underground aquifer. Its population is dominated by well-educated young families priding themselves on their affinity for the desert and their drive to create a new, better community in this remote corner of Israel.

As for all villages included in this study Be'er Milka's remoteness has cultural as well as spatial components. Spatially, the village is remote from towns and cities when compared to other localities in Israel, but it is well-connected to the Israeli road network and even to public transport. Culturally, it has a distinct population that has taken a very conscious decision to move to a remote location in order to create their own, different community.

Be'er Milka is one of a small group of new moshavim (agricultural villages with communal elements) founded under the initiative of the privately funded Or Movement with support of the predominantly US American Jewish Agency. While the Israeli government prioritises consolidation of existing remote villages the founders of Be'er Milka believe in creating new villages in order to exercise sovereignty over uninhabited areas and move a larger part of the population to Israel's southern desert regions. In doing so the Or Movement follows in the

footsteps of historic personalities such as Israel's first prime minister David Ben-Gurion (Ben-Gurion 1956).

Geographically Be'er Milka is one of the most remote villages in Israel. While it is part of a small village cluster and only seven kilometres from the slightly larger, more well-equipped kibbutz Kadesh Barnea the area lacks the most basic services like a hospital, high school or major grocery store – a situation that is unlikely to improve in the foreseeable future. In order to access services, residents need to travel to the town of Be'er Sheva, a provincial capital of a quarter of a million inhabitants, 74 kilometres from Be'er Milka. Israel's two major towns of Tel Aviv and Jerusalem are 184 and 178 kilometres respectively[9] from Be'er Milka. Some services, most importantly secondary education can be accessed in Dimona, 57 kilometres away, or for certain specialised services in Sderot 120 kilometres away. Under normal circumstances the village is accessible via sealed road and even has regular bus connections via Be'er Sheva to Tel Aviv from a bus stop just outside the village.

The climate is arid but milder than in some of the more southern villages. The area is subject to both sandstorms and seasonal flooding both of which can inhibit normal activity and cut off the village from the outside. An added risk of inaccessibility is posed by Be'er Milka's proximity to the Egyptian border. While relations between Israel and Egypt were calm at the time of this study smuggler and terrorist chases in the border region can send the area on lockdown or even lead to destruction of property.

As a moshav, Be'er Milka is designed to be a predominantly agricultural village. However, at the time of this study most families had an additional source of income from employment outside their own agricultural enterprises.

The village itself offers only a very limited range of services. A village centre provides meeting spaces and day care for young children. There is also a range of sports and leisure infrastructure, such as sporting facilities, a community space and a shared garden. The larger neighbouring Kibbutz Kardesh Barnea, about seven kilometres away provides some additional basic services, such as a nurse, kindergarten, primary school and a small grocery store. It is up to residents and the community as a whole to negotiate the lack of services.

[9] The relativity of these kilometer measurements, a distance that is aggravated by rugged terrain and seasonal inaccessibility will be described below when discussing environmental challenges.

Environmental challenges

The environmental, challenges of Be'er Milka are caused by the desert itself and the associated weather patterns and extremes, as well as, to a lesser extent, the village's situation in close proximity to the Egyptian border.

Be'er Milka, located in the Nizzana valley of western Negev desert, along the border of the Sinai Peninsula is subject to an arid desert climate with low precipitation and large temperature variations between day- and night time. Summer days can see daytime temperatures rise well above 40°C while winter nights can even bring frost to the area. Sandstorms are typical for the area as is seasonal flooding during the rare rainfall events.

Sweeping sand dunes and stony sun-burnt valleys dominate the hilly landscape around Be'er Milka. This is a landscape seemingly without life where no green and no oasis or creeks are visible. Be'er Milka itself is positioned atop a hill overlooking the sand dunes on the one side and the stony Nizzana valley on the other side. The residential areas are positioned on the hillside away from the nearby road connecting the villages of the area.

As lifeless and unwelcoming the landscape might be to the untrained eye, Be'er Milka residents see themselves not as in a struggle against but as a part of its desert surroundings. They describe a strong sense of place, that is a feeling of belonging (Avriel-Avni, Zion and Spektor-Levy, 2010), in the surrounding natural environment. Be'er Milka residents see the landscape as an asset. Actively attracting a group of nature-loving young families the village layout is planned in a way that allows every family a view of the surrounding desert landscape. This right to a view is codified within the village plan and supported by further regulation encouraging the use of natural colours, materials and plants within the built-up area.

People that are moving to the desert now are more natural, "tree hugger type" people. – a resident of Be'er Milka

Interviewees by and large described their decision to move to a remote desert village as caused by, rather than despite the surrounding desert.

Here in the desert I can find my own peaceful, quiet spot. I can have privacy. – a resident of Be'er Milka

They described the desert as providing quiet and peace as well as a sense of place and connection to the environment. Residents also described a certain sense or identification in being able to find enjoyment in such a harsh environment. Life in the desert, they reported, is not for everyone – but perfect for some.

Figure 27: Residential homes, their landscaping and view in Be'er Milka (M.Pfaffl, 2015)

The desert climate of Be'er Milka is defined by both a low precipitation and large differences between day and night-time temperatures that need to be managed. Instead of opting for the extensive use of air conditioning and heating in order to cater to a mild temperature in their homes Be'er Milka's residents pride themselves in striving to find natural and environmentally friendly solutions for living in their extreme environment. For example houses are built with the directions of sun and prevailing winds in mind, often featuring winter as well as summer terraces, and making as much use as possible of passive cooling and warming. Through building techniques increasing thermal mass – for instance through the use of cob – home owners can take advantage of the variations between day- and night time temperatures in the desert to maintain even temperatures indoors.

We have ceiling fans but no air-conditioning. In winter we hardly ever have to heat. – a home owner, Be'er Milka

Interviewees reported their own surprise with the success they had through such building techniques centered on utilising thermal mass and prevailing sun and wind directions. In some cases residents reported on not usually needing any active cooling or heating at all as the house keeps stable temperatures in itself through thermal mass acting as a heating and cooling battery.

Residents taught themselves about alternative building techniques by studying existing buildings in ecovillages around the globe, as well as ancient building techniques employing local resources. While there are externally built concrete houses in Be'er Milka some of the

houses in the villages were built by the residents themselves, often with the help of volunteers for instance through the WWOOF (World Wide Organisation of Organic Farmers) initiative.

One resident, an architect, has turned the knowledge gained during building her own house into a profession by designing houses for both new Be'er Milka residents as well as residents of other desert villages and towns.

Dust storms are common in the Be'er Milka area but the area's fine sand can pose problems at all times of year. Residents struggle with keeping the sand out of their homes on a daily basis. Sand is kept out of homes via construction of entryways shielded from the prevailing wind and through frequent vacuum cleaning. Residents have installed central vacuum systems with more powerful engines in their homes in order to simplify regular vacuum cleaning. During dust storms residents make use of additional measures for keeping out the sand, for example through use of masking tape to seal doors and windows.

Keeping roads drivable can become a struggle as they become covered in sand, especially during sand storms. Walkways also get covered posing a special problem for those relying on wheels, - such as parents who complained repeatedly about having to drag heavy prams through the sand when going for a walk with their toddlers.

Figure 28: Residential street covered by sand after a minor sand storm (M. Pfaffl, 2015)

During dust storms the village is cut off from the outside for days at a time. Driving becomes hazardous due to highly limited visibility when too much dust is in the air and roads can become covered in sand to the point of being undriveable. The village can also become cut off during seasonal flooding in the Nizzana valley, flooding roads.

Residents are aware that these are recurring events and that they have to plan accordingly. Grocery supplies are important and many residents report on having large or double fridges and freezers in order to stock up for eventual disruptions in access to the village. For example, one resident suggested that:

> *Yes, there is seasonal flooding. Once a year the rivers flood. Be'er Milka is surrounded by [...] rivers. If they flow we are stuck. Last time that happened the army brought bread but it is usually only a couple of hours anyway. – a resident of Be'er Milka*

> *Sandstorms cover everything. Sometimes you see a wall of sand coming from Egypt. – a resident of Be'er Milka*

Besides the practical aspects of planning for unavoidable situations attitude can also play a role in coping. For Be'er Milka's population that places a high value on the nature experience, weather extremes can become an event of beauty. For example, one resident suggested that:

> *When the Nahal [the usually dry river] comes up [and floods the valley] [we] celebrate because it is so beautiful. - a resident, Be'er Milka*

Sand storms that can bar residents from going outside altogether and seasonal floods that can cut them off from the outside world were described as a welcome opportunity to stay inside and take a break from everyday life.

The desert also impacts on business prospects, especially for a farming community like Be'er Milka. Budding farmers needed to be inventive in finding ways of making a living farming the desert. Be'er Milka, being such a young community was still in a phase of experimentation around the crops and techniques that work best in the environment. While there were traditional fruit and vegetable farmers, others tried their hand at more unusual crops, such as medical and culinary herbs or cactus fruit. Israel has a long tradition of farming in arid climates so farming the desert is seen not as a question of possibility but rather as a question of finding the crops and techniques that fit their particular area. Through the availability of a large underground aquifer farming the desert is mainly a question of getting the programming of drip irrigation systems right.

Besides technological solutions and choice of crops some farmers further report on adjusting their own routine to better match the desert climate. Foregoing work in the hot mid-day

hours they rest during mid-day and work in the cooler early morning and late afternoon hours.

We have adapted a more Mexican lifestyle of working in the mornings and evenings and staying home at mid-day. – a farming couple, Be'er Milka

In addition to its desert location Be'er Milka is also located in close proximity to the Israeli-Egyptian border. Border breaches by smugglers and (suspected) terrorists can lead to chases across the border regions that can send surrounding villages on lockdown for security reasons.

But even if relations between Israel and Egypt were calm at the time of study there was an acute awareness of residents that this might change in the future. Border tensions or even war were seen as possibilities that might see Be'er Milka in the middle of a crisis region.

Figure 29: Village security fence and perimeter with light as seen from within the village (M. Pfaffl, 2015)

With regard to security, residents reported that accepting them as part of living in Be'er Milka. Like other Israeli border villages Be'er Milka has a security perimeter fence and a so-called "alert team"; a military-trained volunteer group of armed men that can be called in to defend the village and its surroundings if needed. Some of the women – all of whom were trained with firearms due to Israel's obligatory military service for both men and women – also report on keeping trained on firearms "just in case".

And then, there is the proximity to the Egyptian border. I do shooting exercises sometimes so I know how to use a gun [since it's in the house anyway]. – wife of an alert team member, Be'er Milka

Another response to the threat of war or terrorism is the legal requirement for bomb shelters. All of Be'er Milka's family homes have their own *mamad*, an air-tight safe room made of re-enforced steel, while those residents housed in the caravan park area of the village have access to communal bomb shelters.

The village and its infrastructure

In Israel, it is the responsibility of the state to provide basic services to each village. Be'er Milka and its surrounding farms are connected to the national grid for electricity, water and waste disposal, as well as for telecommunications. Residents judge the internet connection, vital for businesses and education, as being of sufficient quality for residents' needs after initial problems with the provider.

Other basic services, such as education and child care, groceries, medical care and leisure activities are harder to come by.

As for education and child care there is a kindergarten for young children in the village but some of Be'er Milka's working mothers described its opening hours as prohibitive to their careers. A larger kindergarten – albeit still with insufficient opening hours – as well as a primary school are located in neighbouring Kibbutz Kardesh Barnea. Most families are content with local primary schooling options, although some wish for the availability of specialised facilities, for instance religious or Montessori schools. For example, one parent said,

There is excellent education until grade nine.

During the initial years of settlement some families tried their hand at home schooling as an alternative, but ultimately all of these families returned their children to public schooling. Among the reasons given was the lack of networking opportunities for home schooling families and children's own wishes for camaraderie with children of the same age. For example, a former home-schooling mother in Be'er Milka suggested that,

[The year I home schooled] was a hard but happy year. The children got a lot of self-experience and self-expression through creating things.

In grade five the daughter wanted to join her friends at school, so she went. The boys followed after grade two.

Secondary and tertiary education are a challenge for Be'er Milka families. As a highly technological country that puts much value on education and given the highly educated background of most of the Be'er Milka adults, children can be expected to complete not only secondary schooling but go on to university. Boarding schools, while available, were described as unpopular due to Israel's family-centred culture.

Attending secondary school requires children to spend almost two hours on school busses every day. This ride can be especially hazardous if going to Sderot, a small town situated in an area prone to rocket attacks from the Gaza strip. All families interviewed on the issue agreed commute times to secondary schools were too long and some voiced security and safety concerns during long bus rides.

It's also a problem that there is no nearby high school. The daughter now attends a boarding school. It's an amazing school though. But in a city, I would never think of boarding school. – a parent, Be'er Milka

There is no choice for high school, it's either boarding school or a long drive, more than 100 kilometres each way. The school is near Gaza so the Kassam [rockets] are a threat. When there are Kassamim there is no school. – a parent, Be'er Milka

A further problem reported on was a lack of availability of specialised schooling and training, for instance for gifted children or for those pursuing specialised career paths. The child of one family interviewed pursued additional education in IT aiming for a spot in Israel's cyber defence unit when drafted into the army after secondary school – a pathway into a promising career in IT. For the child the only possibility to attain this training that they saw as essential for their career and future was to commute to Dimona, about an hour's car ride away, in addition to the already long daily commute to Sderot where the child's secondary school was located.

Parents reported that while online services did exist they could only fulfil a small part of the demand.

Education, especially specialised education is a problem. – a parent, Be'er Milka

When it comes to lack of infrastructure and services secondary education was the single largest concern voiced by Be'er Milka residents, yet also an issue without a forthcoming solution. According to the regional council the population of the Nizzana valley would have to more than double in order to warrant a secondary school in the area. However, none of the

families interviewed reported on having considered moving away in order to move closer to education, so the community appears to be set to endure.

Health care is often a focus for literature on remote villages. In Be'er Milka routine medical care is available from a small clinic in Kardesh Barnea. More major medical treatment and even drugs need to be obtained further away, usually in Be'er Sheva, but sometimes even as far away as Tel Aviv or Jerusalem. While Be'er Milka residents did not complain about the distance to routine care, as was to be expected from the literature they described the local clinic in Kardesh Barnea as being severely understaffed. Residents felt ignored by the government that did not accurately consider their needs. In particular residents reported that the large number of migrant guest workers in the agricultural industry was not taken into account when calculating the medical needs of the population in the Nizzana Valley.

> *There is a clinic just five minutes' drive away but the doctor is not always there. We tend to be more natural in our health anyway. But it might be a problem for a hypochondriac. – a resident, Be'er Milka*

> *There is a doctor in the clinic twice a week for half a day each. The two nurses also do all the paperwork. It's a big problem. They need more manpower and funding. Many people here are into alternative responses to medical problems. I think that's a response to the problem. – a resident, Be'er Milka*

Several residents further reported on having a "more natural" approach to health care. They report relying on herbal remedies or sitting out illnesses rather than seeing a doctor. Some residents suspected this approach to be, at least in part, a method of coping with the distance from doctors.

> *It makes you change your attitude towards conventional medical care. We only see the doctors when we absolutely have to. It always happens when the doctor isn't there anyway. But for people that stress more about it is hard. But for us it's another excuse not to rely on the doctor that much. – a resident, Be'er Milka*

Emergency medical care however was clearly seen as lacking in the large open areas surrounding Be'er Milka. Hospitals are at least 74 kilometres away and there are no civilian helicopters for medical emergency evacuations available for the area. Concerned with the situation residents decided to take matters into their own hands. The community collected money in order to finance the education of an army-trained paramedic into a fully qualified civilian paramedic with a three-year degree who would henceforth service the surrounding areas as a volunteer. An ambulance has been donated by Magen David Adom, the Red Star of David Association. The emergency response chain was completed by a group of medics

with advanced first-aid training and backpacks with basic first aid supplies. This group is activated via Magen David Adom's switchboard so the medic closest to the scene can attend it and ask for reinforcements if required. The system is a first for remote areas in Israel.

> *There are also volunteer medics in the communities that help during emergencies. They have beepers and can bring an Ambulance. – a resident, Be'er Milka*

> *I tried to change the system to give better service. […] It is a system that is around in the centre but that hadn't been used in the periphery before. It takes 20-25 Minutes for an ambulance to arrive in Be'er Milka. Having medics in the communities means they can be there and administer acute care in only 4-5 minutes. – the initiator of the paramedic initiative, Be'er Milka*

Grocery shopping is a further challenge reported on. There is a *markolit*, a small general store, in neighbouring Kardesh Barnea, but residents report on using it mainly for "bread and milk type of purchases", partially due to high prices and partially due to a very limited selection. There is, however a possibility to obtain fresh produce from local farmers via a distribution network run by one resident that is an often-used alternative. Residents further reported on the importance of neighbourhood networks in obtaining groceries. Technology plays a role with the community coordinating themselves via a WhatsApp group.

> *We source our vegetables locally, we try to buy as much local as possible. There is an organic farm in Assuz.*

> *[Person] collects things from local farms and distributes them around. [Persons] supply creams and soaps. We try as much as we can locally. – a resident, Be'er Milka*

> *I go to Be'er Sheva a lot so I always WhatsApp people and bring stuff they need [from Be'er Sheva]. – a self-employed resident, Be'er Milka*

Growing fruit and vegetables in local gardens, however plays only a limited role.

The bulk of Be'er Milka's groceries comes from Be'er Sheva either by means of individual families' weekly shopping runs, or ordered in on a weekly truck from one of the major supermarket chains. Petrol costs for long journeys were also a problem, although most residents believed them to be offset by a generally lower cost of living in Be'er Milka.

The seldom but large grocery runs mean residents have to develop distinct planning skills and have large stockpiles of food. Large or double refrigerators and freezers are a standard for Be'er Milka households in order to be able to store large amounts of food.

The grocery stores is so far away. And it's expensive too. But you adapt. You buy for the whole week when you are there and you cooperate with neighbours. – a resident, Be'er Milka

In the beginning, we had to go to Be'er Sheva a lot. You get used to it. You buy more and have big refrigerators and freezers. – a resident, Be'er Milka

In general, Be'er Milka residents see themselves as very well adapted to the challenge of grocery shopping. Be'er Milka residents even see a positive side to the distance in facilitating opportunities. What is more, even though there are high costs of petrol spent on long travel to the surrounding towns many report that through a lack of opportunity they find they actually spend less money than when they used to live in the cities.

But then when we lived in town I gave in to temptation more. It's a matter of self-discipline. – a resident, Be'er Milka

Like most other villages of this study Be'er Milka residents felt politically and culturally remote from the mainstream population in Israel's big cities and the fertile north. This feeling, though, was not always described as negative- in terms of their needs not being heard - but rather as being "in a bubble" that allowed them to live a life according to their own terms.

We wanted to live in a place that is remote from standardised, commercialised mainstream lifestyle. We wanted to create a bubble where we can raise the kids safer, simpler and with more nature. – a resident, Be'er Milka

The village as a community

Be'er Milka's residents voiced a sense of pride in being one of a very small number of remote villages in Israel that grow steadily., Be'er Milka's growth is inhibited not by a lack of interest, but by the availability of interim accommodation – caravan park style accommodation used by new residents during their initial years until they have built their permanent homes. The interest in moving to Be'er Milka is mostly due to an individual perception of city living conditions as dystopian and a wish to be part of creating a new, better community in a remote location. In a remote location, residents reported, they felt enabled to have more control over their living environment. Often quoted factors in deciding to move are the access to nature and a more natural, supposedly healthier lifestyle with a strong community orientation. Some residents described an affinity for living in the desert in particular. For some the access to farm land played a role but most importantly residents reported they want a safe community environment for their children. For example,

We wanted to be a part of something bigger than ourselves. Something completely new. – a resident, Be'er Milka

This is a new place, we get to build something new. – a resident, Be'er Milka

Also I here we have more influence over our surroundings and over how the place is run. That comes with it being so small and remote. – a resident, Be'er Milka

As a moshav Be'er Milka is different from most small villages outside of Israel. A moshav works partially like a not-for-profit business. Every new family needs to buy themselves into the moshav. In return the new members receive allocations of residential and farm land as well as shares in the moshav businesses with hopes these will eventually provide retirement funding. Another way in which the moshav is different as a settlement type from villages outside Israel is the process of relocation to the village, the so called "absorption process". This process, a legacy of Israel's earlier settlement history and the kibbutz movement, allows a village very tight control over choosing which families are moving in. It is a process more resembling marriage, than of relocation.

The absorption process in Be'er Milka is typical for moshavim in Israel, albeit by merit of their desirability Be'er Milka can be more selective than other, struggling, villages are. A family interested in joining the moshav (i.e., moving permanently to Be'er Milka) is first invited on informal weekend visits with the aim of meeting as many resident families as possible. After a certain period of such visits, the community, together with its supporting agencies, decides whether or not the new family is a potential match for the community based on these get-togethers. The family then undergoes an extensive external screening process including financial screening, criminal background checks, but also a personality test. If the results satisfy the absorption committee – that is a group made up of village residents as well as individuals representing the village's supporting agencies - the family is invited to move in for a one-year trial period. After this year, a vote of all "full member" residents determines whether the new family obtains life membership in the moshav. Only at this stage does the new family receive its allocation of residential and agricultural land – although exemptions have been made in order to allow families to earn an income. While this process might appear strange to the foreign eye, to Be'er Milka residents it guarantees safety and a high amount of control over their village's further development outside of the forces of supply and demand.

During their initial year, as well as while constructing permanent housing families are housed in a caravan park like area. Availability of temporary accommodation in this area determines the speed of growth. At the time of this study delays in construction of residents' permanent houses had led to a bottleneck in families moving in.

As a moshav Be'er Milka is designed to be an agricultural village enabling resident families to support themselves through the allocations of agricultural land. However, at the time of this study none of the families interviewed were able to support themselves exclusively through agriculture. In all likelihood, this is in part due to the young age of the village and the learning curve in agriculture. Thus, income sources in addition to agriculture were needed for Be'er Milka families at least at the time of this study.

Most residents brought their jobs with them when moving to Be'er Milka. This situation is in part a result of the restrictive selection process allowing in only financially stable families – usually professionals. Next to traditional working arrangements of people commuting to the nearest towns Be'er Milka has a high occurrence of self-employment as well as mixed or part-time work arrangements.

Be'er Milka residents either commute to Be'er Sheva – about three quarters of an hour each way – or work from home. Some have combined both possibilities, working from home some days of the week and driving into the office on others. There are a small number of full-time jobs in existing agricultural businesses for instance in Be'er Milka's own dairy farm or in service provision. Hospitality, usually small bed and breakfasts type businesses, play a small but growing role. Others work part-time from home or commute next to establishing their agri-businesses. Besides farming families also consider their options in the tourism industry with hopes that a new hospitality precinct within the villages might bring in tourists interested in local arts and crafts or produce. One interviewee already runs a small bed and breakfast, as well as a pizzeria supplying mostly soldiers from the small army outposts alongside the Israeli-Egyptian border.

One problem of Be'er Milka's atypical working environment concerned young mothers. Taking into account long commute times a lack of quality child care with sufficient opening hours, child care could become a bottleneck for female employment.

> *I am an architect. I own my own office. It's a woman's practice. I love having that kind of office environment. We are all women and we all understand. Once a week I teach at the college of technology in Be'er Sheva. I used to be the head of the architecture department but stopped doing that because the distance was too much. I shifted my focus to Be'er Milka. – a resident, Be'er Milka*

> *[My husband] and I both try to work but it can be hard, especially in summer. I think in the end this can be the bigger challenge than the distance. – a working mother, Be'er Milka*

Most families interviewed voiced the desire to increasingly shift their professional life to Be'er Milka in order to decrease commute time and not having to "spend their life travelling".

Village administration is reacting to this development by attempting to provide bigger residential blocks that can also be used for small industry or hospitality businesses, as well as a new community building where offices can be rented. There are also plans to build an arts and crafts area and a café within the village in the hope of attracting tourists.

The community itself is of paramount importance to Be'er Milka residents. The community lifestyle is not just one of the reasons that attracted people to Be'er Milka in the first place, it is also perceived as a social safety net mitigating the effects of living in a remote location and away from friends and family. Residents describe their tight-knit community as "like extended family". They value how children can grow up "as if everywhere was their home" - meaning they can roam free within the village. A common description of the village community as akin to extended family also refers to the fact that for these families, living remotely from their biological families, an important support network is missing, a gap that needs to be filled by the village community.

Nobody out here has a family [in the area] so we are each other's family. – a resident, Be'er Milka

The great community definitely is the biggest pro. Even when I am mad at people it is only because I love them. – a resident, Be'er Milka

I also really like the mutual assistance for each other we have here. You need these relationships because you are far away from your family, far enough away from everyone. It's like a family here. Especially in the beginning. Including the emotions and drama [that comes with a family]. – a resident, Be'er Milka

The tight control over new residents is just one measure the community is employing in order to create the best possible community. Like every moshav, Be'er Milka is governed through volunteer residents' committees with their individual areas of expertise. The community believes in taking control of its own fate, that is in exercising its agency as much as possible. One often repeated phrase was that of how when living in a remote area "you have to make it yourself", that is you cannot wait for external authorities to provide and steer, but have to take charge yourself. Volunteer committees are in charge of everything from improving childcare opportunities, planning the village, absorption of new members, landscaping within the villages to organising holidays and social events for residents.

Another means of building and maintaining community is that of creating opportunities to create shared memories. In Jewish culture this usually happens through shared celebration of religious holidays – even in secular families like the majority of Be'er Milka families. Since

organising holidays can be a resource intensive task for small communities Be'er Milka has pooled resources with other villages in the area, so each community hosts another holiday distributing the burden. Attendance at these celebrations can however be small as many families leave for the cities to spend time with their extended families.

A pressure point for the young community is the low but tangible tension between the secular majority and a smaller group of religious families within the moshav. The religious families are seen as alien to the secular majority populations, some of whom seem to have had bad experiences with religious families in the past. Some interviewees mentioned even a certain fear that the village might be taken over by religious families and become itself subject to religious rules. Even if a majority of secular families might welcome being able to de-select too religious families during the selection process, this is prohibited by Israeli law so the village needs to continue to allow in religious families.

Another pressure point is finances. A small number of initial founding families appear to have run out of money when building their houses and starting their agri-businesses. These families are now stranded in their caravan park temporary accommodation causing a bottle-neck for new families willing to move in. After much discussion the village has started to organise help – for instance through pre-fab mobiles – so these families can finally move to their permanent homes. However, there is a question as to what extent the village and its better-off residents are morally or legally obliged to help out financially weaker families especially in the light of the life-time nature of moshav membership.

As empowering as Be'er Milka's tight community can be in mitigating the challenges of life in a remote location it also comes with the potential challenge of a high mutual dependence. Families who leave can leave scars in the community as it feels, indeed, as if family were departing. Residents are aware of the danger and see it as yet another reason to put even more effort into a rigorous selection process, so they can choose those families most likely to thrive in the village.

> *Even the two families that left (though I think they never arrived in the first place) was a very traumatic event for the community. – a member of the absorption committee, Be'er Milka*

Summary

Be'er Milka is a rare example of a twenty-first Century village foundation using both the latest in technology and the expertise of residents educated in a twenty-first century mindset. While the young age of the community makes it hard to judge its prospects for long-time

success it might well be the most similar example to what might be expected when settling off-planet. Many aspects of the village, for instance its rigorous selection process and the demographics of its population, mimic what might be expected of future villages both on Earth and in more exotic locations.

Be'er Milka's remoteness has cultural as well as spatial components. While it is possible to drive to the next city on a daily basis, Be'er Milka's situation in the desert and without easy access to major services makes it a remote place at least by Israeli standards. The specific climate, terrain and geopolitical challenges associated with its location add to the village's relative remoteness from Israel's mainstream population. On the cultural side Be'er Milka's population consists of a cohort with distinct characteristics. These are people who find beauty and a perception of place in the barren desert and who see themselves in the role of pioneers not just in living off and with the desert, but also in creating a new, better kind of community. Be'er Milka's residents see themselves as distinctively different from Israel's urban mainstream population in their needs and wants.

Like every remote village Be'er Milka has to face a number of challenges. Some are in the hands of the community itself, some under the influence of big-city decision makers, and some rooted in the nature and location of the village itself. The residents of Be'er Milka described issues associated with access to secondary education as most pressing but, felt they could cope with the lack of medical services available. Ultimately, it appears the village has found ways to either accept, adapt to or mitigate its challenges using technology and cooperation within the community. What sets Be'er Milka apart from most other villages is the willingness of the people themselves to change and to make an effort in order to create sustainable structures and a sustainable community. In contrast to earlier approaches on desert village that centred upon an idea of pushing away the desert Be'er Milka sees opportunity in it and works hard to make use of its environment rather than change it.

The residents of Be'er Milka strive to create a more tight-knit family-like society with a high level of access to nature and a safe environment for children within the village so they can "roam free". Most subscribe to ideas of sustainability and living with, rather than merely in the desert. So far, their high desirability and Israel's unique selection process for village residents has given them a unique chance to be highly selective in choosing new residents on both the social and economic scale. It remains to be seen whether this competitive edge can assist the village in building a sustainable community in the long run.

4.1.2. Ein Tamar (Israel)

Introduction

In many respects, Ein Tamar appears to be a one generation older version of Be'er Milka. Situated in the Dead Sea valley, in one of Israel's harshest environments Ein Tamar was founded in 1982 as a moshav-type village in order to exercise sovereignty over the border region with Jordan. Like Be'er Milka Ein Tamar is a predominantly agricultural village that is slowly adjusting to the inclusion of hospitality-based businesses in order to be able to grow past the limits imposed by land availability. Using high-tech methods and techniques, farmers prospered on their allocated blocks in the 1980s and early 1990s but were hit hard by the economic crisis in the 1990s and later a high level of market competition in the 2000s. Today, Ein Tamar's biggest challenge is to adapt to the changed economy while succeeding in bringing back the younger generation.

Ein Tamar is situated in the southern Dead Sea valley, an unusual area at an altitude of 335 metres below sea level and with a unique air composition high in bromine and other trace elements (Moses *et al.*, 2006). The low altitude contributes to an especially challenging climate with the typical low precipitation and high daytime temperatures of the desert but with high humidity levels due to the proximity to the Dead Sea. For agriculture, the low altitude and proximity to the Dead Sea brings additional challenges in high levels of water salinity in a high water table. The typical seasonal flooding, as a risk to road-connections that needs to be managed, is dwarfed by the challenge of sink holes caused by the retreating Dead Sea (Closson and Abou Karaki, 2009). In addition, the Dead Sea valley, as a part of the Dead Sea Transform fault zone is in permanent danger of strong earthquakes (El-Isa, McKnight and Eaton, 2015).

During the time of its settlement Ein Tamar fulfilled a function of border protection towards then-hostile Jordan. While the village maintains its military-trained volunteer *alert team,* the relationship between Israel and Jordan was calm to friendly during the time of this study. There are however, remaining land mines north of Ein Tamar that can reach the creeks of the farm area during flooding.

Ein Tamar is situated in the most extreme of environments among the case studies. Nonetheless, the village has achieved a level of self-sufficiency and a high quality of life over the three decades of its existence.

Spatially, Ein Tamar is a typical – according to Israeli norms - remote village in Israel. The next town of Dimona (pop. 33'000) is 47 kilometres away, the regional capital of Be'er Sheva 82 kilometres and Tel Aviv and Jerusalem are 190 and 147 kilometres respectively from the

village. Like Be'er Milka Ein Tamar was founded next to an older, slightly better equipped kibbutz – Neot Hakikar about three kilometres away – with which it shares infrastructure.

Founded in 1982 Ein Tamar was part of the moshav settlement wave along the Jordanian border (Ben-Artzi, 2001). Foundation of these villages was supported by the State of Israel and especially by the Israeli army as part of a now discontinued tradition of close collaboration between settlers and the army (Drory, 2014). Private support played only a limited role during the early years of Ein Tamar.

The village attracted a cohort similar to that building Be'er Milka in the 2010s: young individuals and families willing to be pioneers. They, too, moved to the desert because of affinity to the landscape and because of the wish to create a new, better society for themselves and their families. While community was important to the group they also wanted to set themselves apart from a strong kibbutz movement and retain individual control over their lives and businesses. Thirty years later Ein Tamar's farmers have mastered growing produce in the desert but are struggling on the world market. At the same time the first of this cohort's children – born and raised in the desert – are returning with families of their own. However, the community also needs to attract new families in order to keep demographics even. Allowing these new residents not just into the community, but also into decision making is a challenge for the original cohort.

Environmental challenges

Situated at around 450 meters below sea level Ein Tamar is subject to extraordinary environmental conditions in addition to its remote location in the Israeli desert. The proximity to the salty Dead Sea is not just a potential boon for tourism, but also entails salty grounds and saline ground water that needs to be managed. The Dead Sea's retreat can lead to sink holes capable of swallowing whole buildings or streets without a warning. In addition, there is the looming threat of severe earthquakes in the Dead Sea Transform fault zone.

On a geopolitical scale, Ein Tamar has left behind the threats of war that were omnipresent during its founding years. Only remaining land mines pose occasional problems. These old land mines can get into creeks near Ein Tamar during flooding and pose a threat to residents. In addition any newly opened residential or farm land needs to be cleared of land mines first leading to higher costs and delays in opening up new land.

Flash floods are typical for desert areas. For Ein Tamar flash floods mostly pose a problem of accessibility since, when roads flood, the village can become inaccessible – an event that will last anywhere from a couple of hours to a couple of days. The Tamar regional council has

developed a sophisticated monitoring and forecasting service usually warning about flooding in advance. Thus, flooding events have become a normality that families have learned to deal with. Children are brought back from school when floods are forecast and in those cases where they get surprised, are housed with friends or at the school until they can return to Ein Tamar. Parents pack overnight bags for this possibility.

[During flash floods] sometimes you can't get out for a day. [But that's not a problem because] we have big refrigerators and [grocery] stocks. – a resident, Ein Tamar

The kids return from school [when floods are forecasted] so they don't get stuck on the road. We have WhatsApp [so we are updated]. WhatsApp is very good. That way we get all the info. We get info on things like road closures […] via WhatsApp. – a resident, Ein Tamar

Similar to the interviewees in Be'er Milka many residents see flash floods as a beautiful spectacle of nature. With large, well-stocked refrigerators residents feel safe and relaxed during these events. When I left only a day before a forecast flooding the prevailing reaction was one of trying to persuade me to stay for the natural spectacle.

The Dead Sea valley is a unique landscape. Steep drops from the hilly surrounds to the valley itself make for a stunning, but also challenging landscape. Little is known about the long-term effects of high air pressure and unusual trace elements in the air (Moses *et al.*, 2006) but its therapeutic effects during short-time exposure led to a thriving spa industry in the Dead Sea valley. The valley itself has an especially challenging climate lacking the cold nights typical for the desert and with high humidity due to the proximity to the Dead Sea. Farmers can only cope by arranging their activity around the hottest time of the year when farming is simply impossible. Many leave the village during the hot summer months for vacations abroad or to the more moderate north of Israel. Following Ein Tamar residents on Facebook reveals a population with a taste for long-distance travel to Europe, Asia or Africa.

We have very hot summers. We are the lowest place in the world so it is closed [the heat can accumulate]. It's not like normal desert [climate]. It's also hot at night. – a resident, Ein Tamar

Many [farmers] travel abroad during summer. They can't grow anything during that time of year [during summer] anyway. – a resident, Ein Tamar

Figure 30: The dramatic cliffs and sparse vegetation of the Dead Sea valley (M. Pfaffl, 2015)

Farming is another challenge posed by the extreme desert environment. Rather than experiencing the sterile desert sand as a challenge to cultivation, local farmers praise the them due to the amount of control it grants over their crop's nutrient and water supply. Whereas more traditional farming relies on nutrition provided in the soil, and, on natural rainfall, desert farmers can feed their plants nutrition and moisture as to their choice – not unlike the controlled environment a greenhouse would provide. At one occasion outside the interviews a former farmer turned agricultural consultant remarked on feeling sorry for European farmers having to grow a crop with whatever nature throws at them.

However, ground water salinity is a problem. Farmers in the area had to develop special pulsing watering techniques in order to wash salt out of the ground and keep their crops alive. In this situation, even rain can be a problem as it washes the sand back into the fields requiring aggressive watering as a control mechanism.

Israeli farmers have learned to master growing crops in the desert through use of sophisticated growing techniques. In the past, their climate allowed them a competitive edge on the European market because desert farmers could deliver produce at a time when it was not available within Europe. In recent years though they are facing increased competition on this off-season market from large greenhouses in Southern Europe and South America. This changed world market, together with the Israeli financial crisis in the 1990s has put many farms in financial difficulties.

Unlike Be'er Milka, Ein Tamar houses are predominantly conventionally built houses cooled by air conditioning. The largest challenge in construction is the sandy underground and the threat of earthquakes. While all houses in Ein Tamar need to be built on foundations of fifty centimetres of reinforced concrete larger community buildings can require metres-long anchoring in order to guarantee a safe foundation.

No severe earthquakes have happened in the area since its settlement during the second half of the twentieth century, but experts agree one could be imminent at any time. Houses need to be built as earthquake safe as possible. In addition, there is an earthquake response infrastructure in place. Similar to the military alert team a group of Ein Tamar volunteers trains for response in case of an earthquake, as well as having access to basic early response equipment.

Ground instability, though, is an imminent reality and a constant struggle for the area. Due to the retreat of the Dead Sea surface instability leads to sink holes that can open up without a warning and swallow whole buildings or pieces of road. Even sophisticated monitoring techniques can do only little to mitigate the danger. Sink holes, because they cannot be controlled, are a topic the community does prefer not to talk about. This was evident during the case study when residents would only talk about them when prompted.

Figure 31: A sinkhole swallowing a caravan ((Tonkin, 2015) / Reuters)

Another problem associated with Ein Tamar's location in the Dead Sea valley is that of telecommunication. Because of the steepness of the valley radio signals cannot easily travel in and out of the valley. While this problem plagued residents in early years the region had, as of the time of this study, obtained dedicated cell phone towers allowing normal rates of high-speed communication as expected in a high-tech nation like Israel.

The village and its infrastructure

While the founding years saw Ein Tamar dependent on water delivery by army trucks, generators, and the hospitality of neighbouring Neot Hakikar for basic necessities, today's Ein Tamar, like most villages in Israel, is connected to the national grid for electricity and water. Waste collection is provided by Tamar regional council; telecommunications are provided by large national providers at sufficient quality according to residents.

Child care and education, major concerns in Be'er Milka, are also at a comparably low level of availability. However, families have had many years to adapt and with most first-generation children long out of school the urgency of the issue appears to have declined. Similar to Be'er Milka Ein Tamar is able to pool its resources with neighbouring Neot Hakikar. While a kindergarten for young children is provided in Ein Tamar older children are sent to Neot Hakikar. With Neot Hakikar's primary school closed due to a drop in numbers elementary school students now travel to a small area school in Neve Zoar, 35 kilometres away via school bus.

As in Be'er Milka elementary school availability and travel times were not important topics for residents. Secondary school, however, the closest one 70 kilometres away was repeatedly described as a problem. A constant push to bring the school closer to Ein Tamar shows parents' concerns with the long commute. One parent reports:

> *[T]he biggest challenge was that everything had to work according to school busses. And busses could take up to an hour each way to reach the schools which meant students spent up to two hours a day travelling from and to school. So there wasn't too much time left in their days anymore by the time they come home (students would have to leave before 7 and be back around 19:30 in the evening). – from the research diary, Ein Tamar*

Parents of grown-up children, as well as some of the grown-up children themselves, report there were also pros to the long commutes in that children got to spend a lot of time with their school friends. Interviewees reported on a number of lasting friendships started during school commutes.

It takes the bus one hour each direction [to high school]. That is two hours a day. The children are at school most of their day. That affects their social life. – a resident, Ein Tamar

Parent-teacher interviews can be another problem with long travel times to school. Further, schools in Tamar regional council cannot rely on volunteering work as much as many other schools because parents live so far away.

Access to health care, too, is comparable to Be'er Milka. Counter-intuitively, the increased average age of residents has not meant a higher focus on health care concerns. Likewise, care for the elderly is not yet a major topic in Ein Tamar even though some of the original settling cohort were vaguely aware decisions needed to be made during the coming decades. Where basic health care was mentioned during interviews it was most often in order to praise the local nurse and her services. As far as basic health care capabilities are concerned residents feel they are well-serviced by a local clinic with a resident nurse and visiting doctors. Doctors' visiting hours can however become a problem for those working outside the village.

The doctor here is very good. The nurses are also very good. So [medical care] is not that bad here. – a resident, Ein Tamar

The doctor is only here for three times two hours a week – you can miss those times when you work. – a resident, Ein Tamar

For immediate emergencies Ein Tamar has a local ambulance that, together with the infrastructure at the clinic in Neot Hakikar can administer first aid. For emergency evacuations, the community profits both from the proximity to the Dead Sea hotels and the Dead Sea factory with its infrastructure, as well as from good relations with the army.

What residents – regardless of age group - did complain about, though, were long travel times for advanced health care that usually requires commutes to Be'er Sheva or Eilat with the closest town of Dimona lacking a major hospital.

Last week I had a quad accident so I asked the nurse to check it [the injury] out. She told me to rest and to see the doctor [when he was in the next time].

The doctor told me he wanted to make a cautionary x-ray. You need to go all the way to Be'er Sheva or even to Eilat to have an x-ray done. – a resident, Neot Hakikar

Both Ein Tamar and Neot Hakikar have their small convenience store type *markolits*. About comparable to the selection and pricing of the Kardesh Barnea convenience store these

stores are readily used for basic purchases like milk and bread. In particular, the store in Neot Hakikar has also become a sort of village meeting point where adults and youth alike will stop for an ice cream and chat with others. Major purchases, however, are most often conducted in Dimona or ordered online for weekly truck deliveries from one of Israel's major supermarkets. Some fresh produce is accessed from the community's own fields. During the farming season farmers spread some of their produce around their neighbourhood for free supply, even for those without farm land or visitors. Some farmers have further space set aside in their greenhouses to grow their own food, but both are seen as a welcome addition rather than a dependable source of produce.

In comparison to the younger Be'er Milka, Ein Tamar has a higher availability of services. Some families have taken up businesses serving the agricultural industry – for instance in biological pest control through beneficial insects – as a side income providing a good range of business services. There are also some personal services, such as hair dressing or small cafés available, usually driven as part-time businesses.

The moshav itself and the regional council provide a range of leisure infrastructure and services to the community. There are extensive sporting facilities, playgrounds and parks within the area, as well as a large community building even housing its own fitness centre. The community building serves as office space and as venue for an assortment of events from arts and crafts courses via workshops to film screenings.

One major difference between Ein Tamar and Be'er Milka is in its relations with outside stakeholders. As a result of its earlier settlement history and the more favourable political climate towards villages for most of its existence (Drory, 2014) Ein Tamar residents have very good relations and often also have influence with the army and even with political decision makers. Relations with the neighbouring Dead Sea factory and, to a lesser extent also the Dead Sea hotels further to the north are also good. These good relations result in a neighbourly spirit where the residents of Ein Tamar and the surrounding army posts and industry installations are constantly helping each other with smaller tasks. Similarly, Ein Tamar residents often staff regional political positions themselves gaining influence and an understanding of how resources are allocated. As a result, satisfaction with political decisions – at least on the local level – is higher than in Be'er Milka where residents mostly lack this kind of influence and insight.

Ein Tamar has a thriving volunteering culture out of an understanding that in a remote area you have to take care of your own services. Volunteering includes areas such as search and

rescue in the surrounding areas, earthquake preparedness, ambulance duties, as well as unusual tasks such as highway policing.

> *There is a very high level [of volunteering activity] here. People want to do things, they like to volunteer, they like to help. They help take care of other small children. – a resident, Ein Tamar*

The village as a community

The decades of its existence have only strengthened Ein Tamar's "can do attitude". The community has a very strong conviction that in a remote village they need to "take things into their own hands". The village prides itself on successful initiatives and in being in charge of their village even where the government falls short. It sees itself as a place where residents can have a high level of influence over their life and their community. Many interviewees reported on this being a major driver for them moving to Ein Tamar in the first place or – in the case of returning children – of moving back.

> *I also like the feeling that you can influence [things]. If you don't do it [take charge of things] nobody else will.*
>
> *You are responsible for doing things. You feel satisfied when it works. You can't [just] complain; you have to act [because nobody else will]. – a resident, Ein Tamar*

As an agricultural village, Ein Tamar has traditionally created its own employment. Similar to Be'er Milka the moshav as an organisation runs a small number of businesses, usually in agriculture or related industries such as sorting and packing. Moshav businesses not just provide services to local farmers, but also substitute the village's income from taxes and state funding that can be spent on the typically extensive infrastructure in moshavim, as well as on social security for members.

The loss of market to competitors in Southern Europe and South America, as well as the more recent financial crisis of 2008/09 has meant an end to full-time farming for some of Ein Tamar's families. Many families now have at least one income from outside the family agricultural business and some have given up on farming altogether renting their fields to neighbours. Additional jobs come from government and service provision – often on a part-time basis – as well from the nearby Dead Sea factory. As a side effect, part time workers allow for the provision of specialist services the municipality might not be able to afford on a full-time basis.

Some new residents also work for a university outpost researching the unique Dead Sea environment. Members of Ein Tamar's traditional farming families have also found ways to capitalise on Ein Tamar's extensive body of knowledge in high-tech farming consulting out to other farms, sometimes even abroad. Agricultural services, for instance natural pest control consultancy, for the larger Dead Sea area have also provided jobs or opportunities for self-employment.

I work about three days a week [for the municipality]. For the rest of the time I work in the Basil fields and manage the paper work. – a resident, Ein Tamar

Tourism is slowly becoming a part of Ein Tamar's economic landscape with dedicated land within the built-up area set aside for hospitality businesses – usually small bed-and-breakfast units. How and to what extent tourism can become an additional income stream or even the sole income for new families is an ongoing discussion within village administration amid fears of losing the village's shared identity and thus its cohesion. Some believe that it is their shared task of understanding and farming the harsh land that has caused the community to bond and that this bond might disappear in a more diverse economy.

Ein Tamar shares Be'er Milka's concept of community as a kind of extended family even though with an increasing number of grandchildren in the centre, i.e., northern towns such as Tel Aviv, Jerusalem or even Haifa, families might not see each other as much anymore as in the early days.

Because we are far from our families we are each other's second families. – a resident, Ein Tamar

As is to be expected the years have brought differences in opinion and conflict to the village. However, the community believe that they can only survive together. For one, the village and its community rely on volunteering, but there is also a limited availability of friends. Parents especially sometimes feel this lack of people in a particular age group, as friends cannot simply part ways after a fight. As a result, most adults report on having settled for a more open attitude that accepts others' differences. While it is obvious there is a normal amount of tension within the community it did not appear to be destructive.

If you come to a remote community, you have to accept the people the way they are. You must have the will to be a part of the community. – a resident, Ein Tamar

Where the extended-family approach can become a problem, however, is when it comes to not just attracting but retaining new families in the village. While some of the community's

own children have started to return, there is an ongoing discussion over whether or not the community should push harder to bring in an entirely new population. One problem in the discussion is whether or not to save some of the limited amount of remaining additional agricultural land for eventually returning children. As with Be'er Milka, residents and community leaders report on land availability, rather than a lack of potential new members, being the bottleneck in growing their village.

It is a big conflict in Neot Hakikar because there is only land for 100 families. People cannot decide whether to fill the plots or wait for [more] returning sons. So that's why everything is stopped now. – a resident, Ein Tamar

There aren't enough new families coming because there aren't enough houses and there isn't enough land. That leads to economic problems. – a resident and community leader, Ein Tamar

The community feels that they need to bring in more young people one way or the other. Some of the community leaders interviewed have not just the village's future existence in mind, but also see new residents as a vital source of new ideas and new initiatives that can continue to shape the village.

Young people have a hunger to build. That's why we need young blood; we need young life. – a resident, Ein Tamar

At the time of this study Ein Tamar had opened up some new residential land and, predominantly with the help of rent-to-buy schemes and by renting out empty houses to non-member residents, had successfully attracted new families. Some of these new arrivals have meanwhile become moshav members or are in the process. The process for gaining full moshav membership is similar to that of Be'er Milka with both community votes and an extensive screening process. This process, obtrusive into the personal life as it might be, has a long tradition in Israel and is thus well accepted by those willing to move into a moshav as it is seen to bring safety not only to the village, but also to the person willing to move.

The absorption process looks at things you might not know yourself. It's like looking into a mirror. – a new member on the absorption process, Ein Tamar

New and old members report on having moved to Ein Tamar for very similar reasons. The ability to be able to have an influence on how the community is run and how it develops was often quoted, as were access to nature and a general affinity for the landscape and the "calm" of the desert. Supplying children with a safe environment in which they can obtain a high level of independence was also a common theme – especially for those who had themselves grown up in a village.

We wanted to start something, create something from nothing. You can do that when you are young. – one of the original settlers, Ein Tamar

You have that feeling that you are in a relaxing place. You feel you can breathe. – a permanent resident, Ein Tamar

Nonetheless, generational conflict is an issue in Ein Tamar. The original group feels it can be hard to allow new residents not only into the village, but also into decision making. The original cohort has its own "stories" and culture, stemming from early settlement times. Interestingly, while the settling cohort were concerned about excluding the new generation from decision making, younger residents repeatedly voiced their satisfaction with being invited into the village's committees.

Utopian societies without problems won't last. They will only stay if there are difficulties. It must be difficult. It must be harsh. Harsh conditions bring people together. They are the stories to be remembered. – a resident recounting the founding years of Ein Tamar

The development towards a higher focus on tourism and the prospect of bringing exclusively tourism-based families into the village are a source of concern for some residents. As traditional farmers, Ein Tamar residents not merely pride themselves in their mastery of the desert conditions, but also see their identity rooted in being farmers. Some wonder whether the community's high level of cohesion can be maintained if agriculture is no longer a shared identity for everyone within the community. On a more practical level, with community building and decision making often happening in informal "parliaments" in the farming area such exclusively non-agricultural families might find themselves excluded from decision making.

The most important tool for building and maintaining Ein Tamar's community appeared to be its extensive committee structure. Typical for Israeli villages the village is governed by a board consisting of one chairman and a representative from each interest group or *committee*. Committees can differ by village; in Ein Tamar there is an environmental committee, a cultural committee, an events committee, an educational committee, and a gardening committee. All committees are visibly active within the village with the events committee organising parties for all major Jewish holidays and other occasions.

Beyond the committees, the village also coordinates via WhatsApp. Residents repeatedly reported on the high level of neighbourhood help and a general spirit of helpfulness.

People also write on WhatsApp if they are going to Be'er Sheva or Jerusalem so people can catch a ride. That's also very helpful for soldiers that need to catch rides. The WhatsApp group helps the community know about each other. – a resident, Ein Tamar

Summary

Having looked at the young community of Be'er Milka, Ein Tamar offers a glimpse into a possible future of today's new villages. Both villages were settled by a similar demographic group with similar expectations and motivations. Young families and individuals moved to the desert because they wanted to be part of something new; the creation of a better society. However, neither in Ein Tamar nor in Be'er Milka was the harsh environment perceived as any kind of a detriment. On the contrary, residents described an affinity to the desert environment and its "calmness" and beauty.

Ein Tamar's physical environment is somewhat harsher than that of Be'er Milka. In addition to the desert's typical low precipitation and high temperatures Ein Tamar's situation in the Dead Sea valley brings additional challenges to residents: While the long-term effects of low altitude and trace gases in the atmosphere around the Dead Sea are not yet fully understood, high humidity further increases the wet-bulb temperatures in the Dead Sea Valley. Farmers cope with the high humidity and heat by arranging their lives and farming activity around the hottest time of the year. The proximity to the Dead Sea causes even more unusual challenges: In addition to high soil salinity and a threat of earthquakes, the retreat of the Dead Sea also causes sink holes.

However, in spite of these harsh conditions the residents of Ein Tamar have learned to not just master farming in the desert, but they have also, for many years at least, succeeded in using their climate as an advantage. Their ability to deliver fresh produce to European export markets off-season has seen many farms thrive during the 1990s and early 2000s. Now, however, after both the financial crises and the loss of export markets to competitors in Southern Europe and South America an increasing number of farmers are struggling to make ends meet.

Next to the external threat to their livelihood through financial crises and market competition Ein Tamar also faces a demographic challenge. While the village's own first generation of children have started to return, the village will need more families to move in, in order to grow. Agricultural land, however, is nearly exhausted so different income streams must be found for new families. One option that is being discussed is that of opening up to tourism. Either way, though, the community sees its biggest challenge in managing this generational change not just through the availability of housing and jobs, but also in allowing young residents into decision making.

Ein Tamar, like Be'er Milka, is a village heavily focused on community. With their own extended families away in the "centre", i.e., further north in the Tel-Aviv / Jerusalem area or even the Galilee, Ein Tamar residents see their village community as "extended family". With

the small village and its close community also came trials and tension. Over more than a decade, however, the community has managed to overcome disagreement and still enjoys celebrating and living together.

Living in the desert and with limited services volunteering is important for Ein Tamar. Next to the village's pillars – the committees – villagers partake in a wide variety of volunteering activities also including some unusual areas, such as highway policing. Next to volunteering part-time service providers enrich Ein Tamar's service availability with expert services in the municipality, as well as convenience services such as hair dressing.

Though crises persist and need to be managed it appears that Ein Tamar is a good way towards sustainability and successfully managing upcoming generational transition. It is interesting in the light of this study that while environmental challenges can be adapted to, mitigated or accepted it is the community that ultimately decides over the long-term success or failure of a remote village.

4.1.3. Kibbutz Yahel (Israel)

Introduction

Kibbutz Yahel, situated in Israel's southern Arava desert is the only kibbutz included in this study. Founded in 1978 by predominantly foreign Jews Yahel is one of just two Reform Jewish[10] kibbutzim in Israel. Its settlement history makes Yahel the most remote village on a cultural scale within this study, although on a geographical scale it is about equally remote – relative to its surroundings in Israel – as are the other villages. After repeated waves of members leaving, Yahel's membership has shrunk dramatically and the initial settling cohort is now nearing retirement age. What is more, unlike Ein Tamar, Yahel's own children have, so far, not returned in larger numbers. The village struggles to keep going, even if it means making big compromises to their identity.

Yahel's location in the southern Arava desert puts the kibbutz in a sparse, rocky desert, right on the Jordanian border. The village is subject to low rainfall, high day-time and low night-time temperatures as is typical for the desert. While originally one of Israel's border villages and even neighbour to a small military post, today Yahel's location along the desert plays no

[10] Reform Judaism is a liberal stream of traditional Judaism striving to consolidate ancient religious text with a modern living reality. It is found predominantly outside Israel, in the United States of America and South Africa

major role for daily life. The kibbutz's tourism business hopes to eventually use a cycle track along the border with Jordan as a leisure activity for tourists.

Spatially, Yahel is very remote by Israeli standards. Part of a small group of kibbutzim that share an administration centre and some infrastructure Yahel is situated 65 kilometres north of Israel's southernmost town of Eilat – a town of just under 50,000 people kept alive by tax credits and government provisions – and 290 and 255 kilometres respectively from Tel Aviv and Jerusalem. Yahel is the only village in this study where air-borne traffic by way of flights from Eilat to Tel Aviv played a role for transport.

Economically, Yahel came into existence as a traditional kibbutz making its living from agriculture. Like other former agricultural villages, it has since diversified into a range of services. Today Yahel manages vegetable, fruit and dairy farms, as well as a bed and breakfast, a share in a roadside outlet centre and administrative services for its own and other kibbutzim's businesses. Commuting and telework are also starting to have an increased influence.

Culturally, Yahel is starkly different from its surroundings, as well as from all other villages in this study. The village was founded in 1978 by the Reform Jewish movement and settled predominantly by US American and South African Jews. Yahel and its single sister kibbutz were founded as villages where this alternative approach to Judaism could be lived. With religious kibbutzim already rare within Israeli small villages this makes Yahel the exception of the exceptions among the Israeli kibbutzim. This history has attracted academic interest: In the early 2000s both local Gideon Elad (2000) and US American ethnographer William Miles (2003, 2007) wrote about the kibbutz describing its founding years and the crisis leading to kibbutz reformation.

In stark difference to all other villages in this study Yahel's population lacks a sense of place. Rather it sees its harsh environment as a price that has to be paid in order to be able to settle according to their ideas. From the beginning of settlement Yahel has prided itself in its approach to "push away the desert", rather than in trying to live with and in it as others do. This can be seen not just in residents' pride in their successful agricultural projects "in spite of the desert", but also in the kibbutz architecture itself. In a classic "all-day garden" (Rosenberg, 2012) approach kibbutz Yahel lies in a beautifully landscaped garden "hiding the desert behind trees"- as one resident put it.

Yahel's new population, too, does not move there because of an affinity for the desert landscape. Rather new residents, much like the original settling cohort, see the location as a price that must to be paid in order to escape larger cities and towns' inflated housing market.

The kibbutz movement

The kibbutzim are a type of village unique to Israel and inseparably connected to its history. The first kibbutzim were founded in the initial decades of the twentieth Century in Israel's fertile lands around the Sea of Galilee and, later, the hilly and often swampy Galilee area. These "classic" kibbutzim were communal utopian villages – similar to More's (1516) ideas of utopia in its principle of equality of material wealth within the village – where everything was owned and shared communally. The original kibbutz functioned without personal property or the use of money within the village. Jobs were allocated by the kibbutz and goods and services were available free to members according to their needs. At its most extreme kibbutzim shared the rearing of children with even babies housed away from their parents but within the community in "children's houses".

It is likely, no "living utopia" has ever survived as long as the kibbutzim. Despite Sabra discontent (Spiro, 2004), the longing of the kibbutz-born *Sabra* generation for change which started to trigger reform from the 1960s, the kibbutzim survived as utopias into the 1980s. During the 1980s, however, the kibbutzim were hit by both a financial crisis in Israel and by decreased support from the government that had traditionally supported the kibbutzim (Snir, 2007; Zilbersheid, 2007). Many kibbutzim were driven to the edge of bankruptcy and forced into reform. Between the 1980s and early 2000s almost all kibbutzim reformed away from their radical communal beginnings into so called "reformed kibbutzim" (Palgi and Getz, 2014; Getz, 2015). These "reformed kibbutzim" retain traditional kibbutz ideas, but personal life has been privatised. Members now receive a salary either from the kibbutz or increasingly from external work, and in turn need to pay for services, rent and goods that were earlier available free of charge. The range of services a kibbutz might provide for its members is long and varies between kibbutzim. Many for instance retained the dining hall even though members now need to pay for meals and/or it is only used on weekends.

Kibbutz Yahel, founded only in 1978 already profited from some of the Sabra discontent reforms. Although a classic kibbutz on a financial scale, for instance, it never had a children's house. When the kibbutz crisis hit Yahel in the 1990s other kibbutzim had already undergone change and, as a result, Yahel was able to acquire professional help for its own reforming process. The same as most other kibbutzim Yahel reformed away from job allocations and instead privatised incomes. At the same time, it diversified economically in order to be able to make the best use of a highly skilled workforce. Yahel retained the dining room and a high level of service provision – for instance for medical services – typical for kibbutzim. It was also required by law to retain its social safety provisions for members even though these have

become harder to access. Though now out of financial trouble Yahel's community appears never to have recovered from heavy losses in membership during the reforming years.

Environmental challenges

Yahel's desert environment is similar to that of the other Israeli villages included in this study. The village is situated in a desert area right alongside Israel's border and subject to the typical desert climate of cold nights and hot days but lacking rainfall. Where Be'er Milka has its *Duna* nature reserve and the Nizzana Valley and Ein Tamar has the dramatic Dead Sea Valley landscapes Yahel finds itself with a good view of the Jordanian mountains of Moab.

> *In summer, it is very hot. We get 45°C-50°C in the shade. In the sun, it is 4-5°C hotter. In July and August, it is hot at day and night. It always stays above 35°C. You can't get rid of the heat. – a kibbutz member, Kibbutz Yahel*

Flash floods affect Yahel just as much as other villages in the desert. While for residents they have become a normal occurrence and well-stocked fridges mean they are hardly a problem flash flooding can be a problem for Yahel's tourism branch.

> *When there are floods people panic. They panic if there are floods anywhere along route 90 [even if they are far away]. But even if people do get stuck it's a beautiful thing. But people can't be convinced by that. – an employee of Yahel's hospitality branch, Kibbutz Yahel*

Like Ein Tamar Yahel is under threat of earthquakes but none have happened during its settlement history. Similar to Ein Tamar Yahel, too, has its earthquake response team. What does, however set Yahel apart from all other villages included in this study is its reaction to its harsh desert climate.

When it comes to the physical component of responding to its climate Yahel has, just like its sister villages, found ways to adapt. The villagers pride themselves in having made agriculture in the desert possible and recount how they made their location into an advantage for off-season delivery of produce to foreign markets. Yahel's residents see making apparently impossible tasks happening as a challenge and a source of personal pride. This was evident when interviewees talked about their dairy farm and the pomelo orchard that have become Yahel's trademark. Like Ein Tamar Yahel relies on conventional cooling techniques and heating – usually using air-conditioning for both.

> *We have to manage our life, so we profit from the heat. For instance, we can export peppers now [in winter] and melons in October. We can grow dates through summer. – a kibbutz member and part of the original settlement cohort, Kibbutz Yahel*

We have a citrus fruit grove that we planted because someone told us we would not be able to do it. – a kibbutz member and part of the original settlement cohort, Kibbutz Yahel

On a psychological scale, however, Yahel is different from all other villages included in this study. Other than residents of the remaining villages Yahel residents did not report any affinity for the desert whatsoever. Just one interviewee, a former tour guide, commented positively on some aspects of the desert landscape. Rather, Yahel residents see living in the desert as a price they need to pay in order to be able to live in a Reform Jewish kibbutz.

The government put us here. We had no choice [in what location they would put us in]. – a kibbutz member and part of the original settlement cohort, Kibbutz Yahel

This dislike for their environment manifests itself in two major ways. For one Yahel resident, in a classic kibbutz way of building an "all-day garden" (Rosenberg, 2012) people use extensive landscaping to create an oasis and, to put it in one interviewee's words – "hide the desert behind trees". This cohort regards the desert as something that needs to be "pushed away". As a result, and probably influenced by the Zionist idea of greening the desert, the group has developed its own kind of heroism in living in the desert and fighting against it. Other than striving for a way of life *with* the desert this group strives to push the desert away as far as possible. Figure 32 shows some of the colourful landscape typical for kibbutzim landscaping.

You can see the desert from the windows but in front of you there is greenery. We push the desert away. So, we don't feel like we are in the desert. The desert is only a backdrop. – a kibbutz member and part of the original settlement cohort, Kibbutz Yahel

We have a quota for gardening water so we have some quality of life. So, we can have the same kind of greenery then in Tel Aviv. – a kibbutz member and part of the original settlement cohort, Kibbutz Yahel

Figure 32: Yahel's gardening landscape is typical of the Kibbutz Idea of being an "all Day Garden" (M. Pfaffl 2016)

The village and its Infrastructure

Due to traditional service provision in kibbutzim Yahel's residents are used to a very high standard of service provision compared to moshav residents. The group's ideas about service provisions tie in with their understanding of the desert as something that needs to be pushed away. City services, too, need to be brought in. During village reform hard choices needed to be made in order to decide which services could be preserved and which could be parted with.

During the site visit health care and, to some extent, groceries by far surpassed education in importance in interviewee accounts. This is highly atypical in comparison to the other case study villages. While it is tempting to assume a causation in the cohort's older average age and associated change in importance I believe the picture is not that simple. Looking at other case study villages with a comparable age structure there was no such trend.

For grocery shopping Yahel residents rely on their own *markolit*, a convenience-style supermarket within the village. It is likely this higher reliance on locally sold groceries is a remainder of the traditional kibbutz way of life that saw the kibbutz as nearly entirely self-reliant. Residents cherish their markolit's selection of fresh produce.

For larger shopping trips residents drive to Eilat usually on a weekly or fortnightly basis. Residents complained about high prices in Eilat even though the remote city is VAT exempt

in order to reduce consumer prices. Some residents even reported on bringing in bulk goods from trips to the centre. There are no delivery options for Yahel but residents reported on ordering in specialist goods like coffee via postal services. Plans for a community garden are still in its infancy.

> *You learn to bulk shop. It's 45 minutes to Eilat. We go there once a week. […] Things in Eilat are more expensive. Eilat is VAT free but things are still more expensive. We have no online shopping available. We get fresh produce twice a week; people shop for fresh produce in the kibbutz. – a kibbutz member, Kibbutz Yahel*

> *My wife hates to go [to Eilat to shop]. I go [to Eilat] once a week. There is also the [markolit] for little things. Some people here have small vegetable patches. But you can buy fresh produce here. It's a very nice shop – a kibbutz member, Kibbutz Yahel*

> *You can survive on the Markolit but the supermarket gives you a choice. And it's cheaper. – a kibbutz member, Kibbutz Yahel*

Before the reform of the kibbutz members were employed by the kibbutz on allocated duties. This changed when personal life and finances were privatised. While some kibbutz members still work for kibbutz businesses – usually in management positions – others have taken to income from outside the kibbutz. At the time of study according to kibbutz statistics forty percent of kibbutz members and many non-member residents worked outside kibbutz businesses. Jobs are to be found either with the municipality or as telework – an option interviewees described as a loathed necessity. One couple even lives in the north during the week in order to access work and only returns to the kibbutz on weekends.

> *When all we had left was a dog [when the children had left, and we had no more responsibilities in Yahel] we decided to move back to the north during the week. – a member-couple, Kibbutz Yahel*

> *I am a computer programmer. I can work from home a lot. It is not what I want but it is possible, yes. – a non-member resident, Kibbutz Yahel*

Like most kibbutzim Yahel originally had its own child care and education infrastructure. Today it only retains a kindergarten and children are driven to the municipal centre, about half an hour's school bus ride away, for primary and secondary education. Residents described the school system as good and, due to the assistance of a good school bus system, did not complain about the comparably short commute. At the very most parents of school-aged children did comment on their children having "friends all over the area" which might cause parents to have to drive their children more often.

There is good local education from grades one to twelve. Only some people send their children to boarding school for the gifted. – a father of school-aged children, Kibbutz Yahel

Health care in Yahel is unusually comprehensive compared to other villages. The reason lies at least in part in the historically highly developed health care system in the kibbutzim. While Yahel's own clinic has been closed in favour of a larger regional clinic at the municipal centre about thirty minutes away the village retains a high level of service provision. The village's nurse – now working at the municipality – still provides minor services at the clinic several times a week. In addition, the village has its own fully equipped ambulance for first aid. The kibbutz pays for comprehensive medical insurance for its members that guarantees not only a high level of care, but also allows access to a consulting doctor via telephone 24/7. In emergencies, the agency will even send a doctor from Eilat to their patient within the kibbutz and has access to a special medical airplane for emergency airlifts.

Together with basic service provision at the regional clinic the level of medical service provision is so high that one couple even decided to relocate a ninety-year-old family member from the United States to Israel in order to allow for better medical care.

Kibbutznikim [kibbutz members] are very spoilt. Nurses and doctors do everything for them. Twenty years ago, you could get everything 24/7. In communal villages [moshavim] they know there won't be too much services. But kibbutz members get used to having all that services. – an Israeli-born kibbutz member, Kibbutz Yahel

As is typical for remote villages in this study it is specialist treatment that can become a problem for residents. While the next hospital in Eilat is only about 35 minutes' ambulance ride away from Yahel this hospital, as well as the next larger facility in Be'er Sheva have been described by residents as "like in a third world country". Consequently, residents prefer to access specialist medical care in Tel Aviv.

Especially during extensive treatment this requires residents to stay in Tel Aviv overnight, or even for prolonged periods. One interviewee, for example, recounted his experience when he had to be treated for cancer requiring long in-patient and out-patient stays in Tel Aviv. In such cases the kibbutz supports members as much as possible and pays for hotel rooms or even for apartment rent. Residents, however, understandably still reported on the situation being very stressful to the sick person as well as on any relatives who might not be able to visit them in hospital or during out-patient treatment. Some residents further reported putting off treatment because of these problems of accessing a hospital which might cost them multiple days off work even for a relatively easy procedure.

It's a problem if you have to go to the Merkaz [the central Tel Aviv / Jerusalem area] for specialist treatment. It's a problem if you have complicated diseases like cancer. In that case the kibbutz helps you rent an apartment in the Merkaz. – a kibbutz member, Kibbutz Yahel

When I had to have radiation therapy every day I stayed in a hotel in Tel Aviv. It was horrible. That [the health care situation] is a major disadvantage. It's also tough if relatives are in hospital. – a kibbutz member, Kibbutz Yahel

When it comes to leisure activities Yahel, too, profits from its kibbutz history. Next to a range of sporting facilities and even a country club Yahel has a rich cultural life. Next to seasonal events and cultural activities in the kibbutz or at the regional centre Yahel's community centre features weekly music-, and sushi nights that are well-frequented by members. The Shabbat services at the village's synagogue are frequented by a small group of regulars while the following Shabbat dinner in the dining hall is still a weekly event for most member families. However, even though the kibbutz's infrastructure was arguably better developed than in most other villages in this study, members described access to culture as a major disadvantage to living in a remote location.

Access to culture is another problem. [Museums are far away]. I loved going to Broadway plays. – a kibbutz member, Kibbutz Yahel

I have to go to the centre to see my friends and for culture. There are a lot of events that are brought here but it's not the same. For instance, my wife recently went to Tel Aviv to see [the musical] "Hair". – a non-member resident, Kibbutz Yahel

Even though most aspects of private life have long been privatised the kibbutz maintains a social safety net for its members. This social safety net works similarly to social security in many European countries providing free health care, unemployment and disability benefits, as well as pension funding. Working members pay a certain percentage of their income into a kibbutz fund from which such expenses are paid. The kibbutz hopes to eventually reach a balance that will allow them to decrease residents' payments. Although access to this social safety fund has been limited to those who have used up their private funding, residents still see this safety net as a main boon to kibbutz life. One resident even described it as being worth keeping up with the less desirable elements of kibbutz life.

But we are still a kibbutz. There is a high level of mutual support in areas like education, health care and the pension system. – a kibbutz member, Kibbutz Yahel

There is a sense of security. By law kibbutzim have to have a [social] safety net for members. It's the only difference [these days] [between a kibbutz and

a moshav]. It also limits salary difference [between members]. For instance, the pension can't be cashed in ahead of time. – a kibbutz member, Kibbutz Yahel

The Village as a community

Yahel defines itself by being a reform Jewish kibbutz, that is a kibbutz that strives to apply a modern interpretation of ancient Jewish religious texts in its everyday and economic operations. One example reported refers to the Jewish religious commandment of "leaving the corners of the field" so they could cater for the poor. One member of the original settling cohort describes their own approach:

We looked at it and figured we would just be feeding the camels if we did that. So instead we used the profit for social services. For instance, we host underprivileged children from Eilat. Or we take diabetic children camping through our guest house. – a kibbutz member, Kibbutz Yahel

The ideas and ideals of Reform Judaism are meant to impact on every aspect of life in the kibbutz creating less of a socialist utopia (Zilbersheid, 2007) as some of the other kibbutzim attempted, but a reform Jewish utopia where the kibbutz approach was merely used as a tool.

It was this reform Jewish community that brought the original group to the kibbutz. Like other interviewees in this study they came striving to make a place their own, where they could live according to their own social rules even where they deviated from mainstream norms. Like other interviewees in this study the residents of Yahel described their longing for community and how they perceived a strong community as vital when living in a remote place. However, in stark contrast to the other studies somewhere along the way something appears to have gone wrong for kibbutz Yahel.

At the time of the visit Yahel's Achilles' heel clearly was its community. This study has only confirmed Miles' (2007) and Elad's prior (2000) research. Both had described the village community as in a severe crisis. Interestingly, though, interviewees repeatedly reported on the importance of community for settling in a remote, harsh environment.

You really need community commitment to settle a place like this. – a kibbutz member, Kibbutz Yahel

I lived in the city but I found I wanted the community, I wanted to [come here] because of the challenge. – a kibbutz member, Kibbutz Yahel

In order to survive here you need people, you need a community. The communities that have the best changes [of survival] are the largest communities. – a kibbutz member, Kibbutz Yahel

However, rather than feeling secure in their community residents repeatedly described feelings of being locked into the village. For some, the perimeter fence (see Figure 33) has

become a symbol of being caged. Residents fear that living and working together destroys their community. The situation was repeatedly described as one of "not being able to get away" with residents complaining there was talk about work at the lunch table in the communal dining hall. Residents also complained about not being able to "get away" if there were disagreements with their neighbours.

We are living in a community surrounded by a fence. There is only one way of coming and going. People feel independence once they drive out. Others are petrified of live outside the fence. – a kibbutz member, kibbutz Yahel

It's hard that you can't separate work and pleasure. Work never stops. If I don't like my neighbour I have a problem. I have to work with them and I have to live with them. – a kibbutz member, kibbutz Yahel

Some suspected that the feeling of security within the village fence allowed people to "act up". The behaviour is best described as one of egoism and selfishness. Interviewees speculated the reason for this behaviour might be in Yahel's profound lack of human capital, both within the community and within businesses: people simply knew they are impossible to replace.

People allow themselves to act in a specific way. There are manners of speech and unpleasantries. And there is bad service because out here it's all take it or leave it. People know they are hard to replace. Human finesse goes down the drain. – a kibbutz member, Kibbutz Yahel

Another problem that might "lock in" residents are the high real estate prices in the cities, as one newer resident recounts:

Some people feel like that in secluded places. They can't leave because they are used to the large, cheap real estate. – a non-member resident. Kibbutz Yahel

Elad's (2000) observations show clearly that these levels of discontent with their community have been ongoing for at least a decade and a half. In general, happiness levels within the community seem to be considerably lower than in all other communities in this study. Parents even reported on not wanting their children to return to Yahel as they believed their children would find a better life in the city.

Figure 33: Aerial view of Kibbutz Yahel (source: www.yahel.org.il)

Retaining and attracting new members, as well as a qualified workforce is, indeed, one of Yahel's major challenges. Despite what appears to be their best efforts the community has neither succeeded in bringing back its own children, nor have they succeeded in retaining new residents let alone find new kibbutz members. While the skyrocketing real estate prices in Israel's central regions bring repeated waves of new residents, so far most of them have left again eventually. There is no consensus on the reason, but it appears a lack of the right kind (i.e., high paid and highly qualified) of available jobs, delays in development of new residential land, as well as a failure to include new residents into the community seem to play a role. During the site visit it was evident that old and new residents did not usually mingle. Some residents believe the lack of returning children that could bridge the gap between the generations might be to blame.

Yahel has already changed dramatically from its Reform Jewish and kibbutz roots and is now prepared to allow a "moshav within the kibbutz", that is it allows new families into the village even if they are not prepared to follow the strict requirements of kibbutz life. To this end Yahel is preparing to open a new block of residential land and even considers giving new families access to farm land. However, this does not appear to be enough to attract or retain a dedicated cohort similar to Be'er Milka and Ein Tamar.

We have been talking about [bringing in new families] for years but people just come in waves and then they leave [again]. They said it was because we wouldn't build [new houses] but I think that is only an excuse. [New residents] just weren't happy enough. – a kibbutz member, Kibbutz Yahel

At the same time Yahel's businesses complain about a lack of workforce and are starting to look towards less human-intensive endeavours as Yahel's settling cohort reaches retirement age. Algae farming and solar farms appear to be potential answers to Yahel's worker shortage.

With all this said there is a serious question as to why residents remain in Yahel at all. While for younger residents it might in part be a question of money in the face of inflated housing prices in the centre, kibbutz members have set precedents by successfully moving away in the past. Some residents described a pragmatic view of staying so they could access the kibbutz' social safety net but this, too, is not true for all. It appears many kibbutz members stay mostly out of a feeling of having a mission to "green the desert" and create a Reform Jewish utopia even under the harshest of circumstances. Even though their utopia has failed, the remaining group will stand with their village and the ideals that made them found it.

Summary
Yahel is in many respects an outlier within this study. As a Reform Jewish kibbutz settled by predominantly foreign-born individuals it has a high level of cultural remoteness not just in comparison with the cities, but also in comparison with its direct environment of "classic" secular kibbutzim. Yahel is thus a good example of the stark differences between remote villages even in the same geographical area as described by Carson and Carson (Carson and Carson, 2014).

Researching Yahel means not merely analysing a village but allows a glimpse at what might well be one of the most extreme of adaptation techniques employed by remote villages: As a kibbutz Yahel decided to re-write the rules of social ordering, that is the relationships and rules that govern our life together as a society. Like many other of the most extreme outposts of humanity kibbutzim forgo privatisation of goods and internal market forces for a communal lifestyle. As alien as this approach may seem at a first glance it is nonetheless frequently observed in human outposts at the edge of habitability: In mining camps and research stations residents do not usually have to pay for living quarters, food provision, basic services and leisure activities. Rather, these costs are covered as a lump sum, usually by the employer or the organisation undertaking research. Personal funds are, at most, used for luxury-type purchases.

While in Israel the kibbutz approach was typical for the earliest pioneering villages it might not be a coincidence that the ideal of the kibbutz became obsolete as villages left behind their sparse founding years (Spiro, 2004). It is a real possibility that any early extra planetary village might, too, start out as a communal village where necessities are provided in a cash-free environment. Another option is shown by a hybrid form employed by some of Israel's moshavim – such as Ein Tamar's older neighbour Neot Kakikar. There the newly founded village started out as a kibbutz, thus as a socialist, communal village, with an agreement to privatise and transition into a moshav after the founding years. What Yahel, in this respect, stands for is that there is a choice of social ordering for remote villages that each comes with their own opportunities and risks.

What is further interesting about Yahel and starkly different from the other villages in this study is the origin of its residents. While foreign-born populations were present in most villages visited, in Yahel these were the majority with eleven out of a total of fifteen interviewees. This high percentage of foreign-born residents matched with observations and interviewees' accounts of the population's make-up. Yahel's population of US American and South African Jews meant a completely different level of cultural remoteness to the village's surrounding it that have a predominantly Israeli-born population. That is even though settled around the same time and in the same areas the predominant culture of villages in the same area are likely to be different from each other, therein creating cultural remoteness between the groups.

Within the sample of villages chosen for this study – a sampling approach that was actively biased towards well-functioning examples of remote villages – Yahel was the most troubled of villages. While extensive reform might have brought the village back on its feet financially its community appears to be failing and the village fails to attract and retain families. While this might make Yahel less applicable to the study it is however interesting because the phenomenon allows for glimpses into what might be causing troubles down the line for remote villages.

On an infrastructure level however, Yahel fits in with the rest of the villages in showing that challenges can be overcome. With the right amount of creative thinking and some external support problems of infrastructure provision and even of job availability can be overcome. If Yahel proves one point it is that community cohesion is the Achilles' heel of remote villages.

4.1.4. Glommersträsk (Sweden)

Introduction

Glommersträsk, situated in Arvidsjaur kommun just 200 kilometres south of the polar circle is the first case study village in Sweden. Founded in the late nineteenth century

Glommersträsk was part of the last wave of settlement activity into Sweden's north (Bylund, 1960). With an economy founded first on cattle- and later the timber industry, the village that sees itself as a "village of entrepreneurs" has survived severe economic crisis twice and has shrunk from a boom-time population of almost 3000 people to about 280 today. What sets this village apart from others is not just its entrepreneurial spirit, but a politically active community leadership putting a question mark to growth as the only way forward. Why, some have started to ask, cannot the village stay just as it is?

While the Israeli villages were dominated by a new or at most second-generation population many of Glommersträsk's families can easily trace their ancestry back to Glommersträsk's founding families. What is more, young adults from Glommersträsk and its surrounding villages come back and settle down in their ancestral village often, in the spirit of the older population, founding their own businesses and thus creating their own employment.

Glommersträsk's settlement history has been thoroughly recorded. Next to local researcher Erik Edström's chronology (Edström, 1993) the village was also researched by Swedish geographer Erik Bylund. Bylund's interest stretched beyond the village history (Bylund, 1971b) to the northern-western Baltic Sea area and its settlement history in general (Rudberg and Bylund, 1959; Bylund, 1960, 1971b).

Settled in the final decades of the nineteenth century Glommersträsk's early wealth was based on rich cattle grazing and hay grounds that could be won from drying out the lake at which the village was founded. Glommersträsk's boom time around the second world war saw the village develop into a small town with a rich cultural life and with a strong local identity. Today, only museums and empty shop locales in the village centre are witness to these boom years though they are still gladly remembered by village residents. When the cattle industry went into steep decline – at the time of this study there was only one beef cattle producer and a single milk cow left - the village instead turned to making wealth from its forests. Today, the majority of the village's businesses are centred around the forestry industry in some way, with cautious enterprises into the hospitality sector.

Generations of Glommersträsk's early spirit of entrepreneurship and a can-do attitude even in the face of decline have bred a group of economic and political activists. A cohort of veteran entrepreneurs steer not only the village's fortune in its village council, but are politically active in and beyond the regional level. Today, Glommersträsk is increasingly becoming aware of its role in a global economy and the environment. Topics like food security and environmental protection are becoming more important. Regardless of a slow but steady decline in population numbers Glommersträsk appears to be very much alive and forward-looking. The village cautions against the exclusive use of population statistics in order to distinguish between villages in decline and those that have a chance of reaching ongoing sustainability. A seemingly negative population development – i.e., a decline in population numbers – can

for instance reflect the disappearance of a larger past age cohort, rather than a net loss of young families which might better reflect a village's trajectory (Johansson, 2015).

Geographically, Glommersträsk is fairly remote for European standards. Glommersträsk itself serves as a local service hub for a number of smaller hamlets and single farms around it bringing the population serviced by Glommersträsk to about 1,000 people according to residents' estimates. The closest town to Glommersträsk is the municipal centre of Arvidsjaur 44 kilometres or about three quarters of an hour's car ride away. Arvidsjaur is a remote town with a population of 5,000 people providing most basic services. However, due to tension between Glommersträsk and Arvidsjaur connected to the region's settlement history and a better level of service provision residents often choose to forego services in Arvidsjaur and instead access them in the coastal towns of Piteå, Skellefteå, and Umeå. This phenomenon of a higher opportunism when accessing advanced services has been described before and is typical for remote villages (Carson and Carson, 2014).

Piteå, the province's capital of 22,000 residents is 110 kilometres away and often used to access medical services. The slightly larger (32,000) and nearer (90 kilometres) town of Skellefteå is used for shopping trips. The next larger town is the university town of Umeå, 210 kilometres away. Sweden's capital Stockholm is about 800 kilometres away but does not appear to play a major role in the life of Glommersträsk residents.

Being located close to the polar circle Glommersträsk is situated in an environment dominated by short mild summers and long, cold and dark winters that might only see an hour or two of sunlight each day. All aspects of human life and businesses need to be arranged according to this climatic extreme situation with the darkness having a tangible impact on the human psyche as well.

Glommersträsk is an excellent example to discuss the importance and potential of agency even in the face of what appears to be a lack of structure. On the example of Glommersträsk it can be shown that some services that are often perceived to be providable only by the outside – jobs, most noteworthily – can in principle be actively created by individuals' agency or the community itself even if outside support, i.e., structure is lacking. It can, however, also be shown how a lack of supportive structure can damage a village's potential for agency or at least the outcome of this agency.

Environmental challenges

Glommersträsk's position close to the polar circle means the village is subject both to the sub-arctic climate and to a near-arctic annual light cycle. With winters of down to -40°C and at times only an hour between sunrise and sunset there might be an expectation of

Glommersträsk residents loathing winter and favouring summer. Quite the contrary is the case. The majority of respondents described winter as their favourite season where they got to "play in the snow". Cold, they believe, is only a matter of the right clothes and even children will spend long hours outside with their friends during winter.

We have the nature. That's what I missed in Stockholm; I missed the winter. You have to appreciate the winter in order to live here. – a resident, Glommersträsk

I like the winter. It's worst in autumn just before the snow comes. Spring with light, sun and snow [is great]. In late spring when it's wet I can't be out. – a resident, Glommersträsk

The best time here is early spring and late winter. Most people don't really like the middle of summer. Autumn is also beautiful. The colours are beautiful and there is good air. And it is berry and hunting season. Summer is just a few days anyway. You have barbeques and enjoy. You don't do anything. You don't waste good days to get work done. – a resident, Glommersträsk

The village and municipality provide the infrastructure needed to enjoy winter by means of illuminated cross-country skiing slopes. Residents have their own snowmobiles that they will drive for practical, as well as recreational purposes. In general, there is an expectation that anyone moving to Glommersträsk will like the winter which only contributes to the idea that living in Glommersträsk is "not for everybody", although perfect for some.

Next to a preference for winter, Glommersträsk residents also report on a special affinity for the autumn, a season dominated first by the berry picking season and later by the yearly moose hunting season. Moose hunting is so popular in Sweden that many residents will take leave off work in order to participate. Glommersträsk residents regard the pine forests that surround Glommersträsk for tens if not hundreds of kilometres as their "supermarket" cherishing the access to fresh mushrooms, berries, meat, and fish as a feeling of freedom.

I love living in the village. I love hunting and fishing and talking. A lot of very fine produce, for instance the moose, is taken for granted [by residents]. People eat moose all winter. We also buy reindeer meat. And don't forget about the berries! But Bo would have told you all about them. We make [sauces] and juice to drink in winter [from those berries]. – a resident, Glommersträsk

I hunt all autumn so there is much to do in autumn. – a resident, Glommersträsk

People here like hunting, fishing and working in the forest. If you have the money to buy land it can be a good life. – a resident, Glommersträsk

Figure 34: A late winter day near Glommersträsk (M.Pfaffl 2015)

In terms of warming their houses Glommersträsk's original houses are predominantly traditional wooden houses with a thick layer of insulation – traditionally sawdust, nowadays usually high-tech materials – between two layers of wood. Residents described this traditional building technique as so good that often one or two wood ovens would warm a whole house. Other than more densely populated areas in Scandinavia Glommersträsk is not connected to a distant-heating plant but households have to cater to their own heating needs. Due to the easy access to firewood wood ovens remain the village's favourite source of heating. Other systems burn wood or grass pellets that are produced by a Glommersträsk company. Heat pumps, a technology similar to reverse-cycle air-conditioning, are becoming increasingly popular as a source of heating.

Interestingly, while passive housing, i.e., houses that are so well insulated they require virtually no additional heating, is technically and financially feasible it is not popular in the area. One resident house builder explained his preference for low-energy housing with the complicated ventilation systems that need to be employed in passive houses.

For passive housing, you need special ventilation which is rather noisy. That is the reason why we aren't producing so many passive houses. – a resident and builder, Glommersträsk

Residents, often born-and-raised near to the Arctic Circle have developed a wide range of adaptation techniques to winter. With most streets frozen over and – at least outside the built-up areas – unlit, motorists rely on spiked tires and additional lighting in order to travel safely during the winter months. Engine heating units that can be connected to household power are another necessity in order to protect engines from the extreme arctic conditions. Pedestrians – children as well as adults – use reflectors or reflective vests in order to be visible to motorists in the darkness.

We have big car lights. They are pretty good. We have lots of reindeer [on the roads]. We also use reflectors [on our clothing] if you want to survive. The kids think they don't look good and are in the way. Now we use reflective vests. No one cares what they look like. – a resident, Glommersträsk

The lights on our machines [harvesters] are really good. They are like UFOs. – a resident and forestry professional, Glommersträsk

It has long been known that prolonged darkness can have detrimental effects on mental health. In Sweden, this phenomenon is often described as that of the "summer Swede" and the "winter Swede", referring to large differences in openness towards others during the seasons. In particular, individuals with professional responsibilities for others reported on needing to be aware of the effects of Glommersträsk's long winter. Many reported on "feeling tired" during the winter months. Respondents stretched the need to look after oneself during the dark periods of the year "doing things you enjoy [and] eating the right kind of food." The Christmas festivities are a welcome distraction during early winter.

You see [the impact of the darkness] in humans. Especially between October and December before the snow comes. It's rainy and it's dark and you are just waiting for Christmas. Sometimes it's the same after the snow is gone when it's rainy. – a resident, Glommersträsk

However, near the Arctic Circle every season comes with its own challenges. The forestry industry especially needs to arrange its activities around large differences in temperatures that can damage the timber. In addition, snow melting and rain during spring and (to a lesser extent) also during autumn lead to limited accessibility for large forestry machines. The forestry industry has had to learn how to arrange its production activities around seasonal realities in order to maximize productivity. For instance, wood lots closer to main streets are usually reserved for less accessible conditions so machines can keep working and timber might be stashed next to the road for later pick-up.

Early spring, when forest floors are soft is the worst. Machines can't travel. April to May and in Autumns is when it rains most. We have been doing it so long it's not a problem anymore. It's about planning and stockpiling. We save places with better road connections [for the wet season]. – a resident and forestry professional, Glommersträsk

The building industry likewise needs to adapt to low arctic temperatures. While artificial lighting can easily be brought in, bulky gloves and regular pauses can slow down construction work.

The village and its infrastructure

In Glommersträsk there is a feeling of profound political remoteness not just towards the political decision makers in Stockholm, but also towards its immediate neighbourhood, the municipality in Arvidsjaur. Tensions between Arvidsjaur and Glommersträsk are a result of the localities' different settlement histories. Glommersträsk, the older of the two settlements and former regional service capital, has throughout its recorded history (Bylund, 1947; Edström, 1993) seen itself as a 'village of entrepreneurs'. Arvidsjaur, in contrast, is a former military town, founded by the Swedish army. Where Glommersträsk prides itself in "making it themselves"; in taking charge instead of waiting for others, there is a perception of Arvidsjaur as dependent on outside help. Residents describe this perception of Arvidsjaur as a place where "they need five people to cut down a tree". Naturally, this cultural clash leads to tensions between Arvidsjaur and Glommersträsk.

There's a different kind of people in Arvidsjaur. Many [residents of Arvidsjaur] used to be with the ministry of defense. If they need to cut a tree in Arvidsjaur it takes five people to do the job. In Glommersträsk we must do it ourselves. – a resident, Glommersträsk

In practical life, the implications of cultural differences between Glommersträsk and Arvidsjaur strengthen Glommersträsk's identity and its will to provide as much service as possible itself. It appears most of the smaller villages and hamlets surrounding Glommersträsk –often sharing Glommersträsk's rather than Arvidsjaur's settlement history – side with Glommersträsk in the conflict. Villagers will often forego accessing services in Arvidsjaur and rather drive to coastal towns as a matter of local pride. Where Glommersträsk residents confess to, for instance, performing shopping trips in Arvidsjaur this is a topic they might – if jokingly – be called out on by the village. What adds to the tension is a difference in predominant political orientation between Glommersträsk and Arvidsjaur. Thus, some of the conflict plays out at a regional political level. Glommersträsk residents feel they are not being heard by the municipality, and neither do they feel that they are being taken seriously in their needs.

In recent years, the bitterest battleground of this in-fighting between Arvidsjaur kommun [municipality] and Glommersträsk's village council has been the educational system. Until recent years Glommersträsk has had not just child care and a primary school, but also a secondary school so children could stay within their village until the age of sixteen. Due to a drop in student numbers Arvidsjaur kommun closed down the secondary school after intense resistance which left Glommersträsk only with a primary school for children until the age of thirteen. Older children now need to travel to Arvidsjaur or to the coastal towns in order to attend school.

The community appears to ultimately have made its peace with losing the secondary school. However, after the closure of the only other village primary school in the province, in the municipality in Moskosel fears are now rising about also losing the elementary school. Residents perceive the possibility of losing the elementary school as a threat to their existence over fears that young families might not come back or even move away if there was no primary school in the village. The commute to Arvidsjaur is simply seen as too long for such young students. Glommersträsk residents feel they are not being heard by the municipality and that their fears are not being taken seriously, or even that the municipality simply does not care about them and their village. During a meeting with a representative of Arvidsjaur municipality it appeared the municipality had indeed not understood Glommersträsk's fears. The municipality representative reacted with genuine surprise when asked about Glommersträsk's highest priority; the village's fears about losing its primary school.

> *[If the school went] that would be the death of the village. Families with small children would leave; children are too young for the commute. They need to get [out of the house] at seven and only get home at five or five thirty. – a resident, Glommersträsk*

> *We are always living with the threat of the school being closed. There are five or six children per year, so it's a [so called] B-form school with two combined classes [each]. – a resident, Glommersträsk*

> *We are afraid Arvidsjaur kommun will close the school [in Glommersträsk]. Then families will relocate [to be closer to the school]. They just closed the school in Moskosel. [The school in Moskosel] was a very good school. In a smaller school you know every child. Children from here are very successful. – a resident, Glommersträsk*

What might add to the problem is the unofficial nature of Glommersträsk's village council. While being a long-standing institution within the village that enjoys broad acceptance, there is no mechanism for including the council in municipal decision making or even just consultation. Rather, the municipality employs its own experts in questions concerning planning for the villages that can choose whether or not and to what extent to consult with

village representatives. A large personnel turnaround in these positions has only added to the alienation between the village council and the municipality.

The second most important infrastructure Glommersträsk risked losing at the time of this field research was its last remaining supermarket. This *ICA nära* franchise, a long-running family business was not just a surprisingly well-supplied grocery provider but, as a *servicepunkten* [service point] also provided postal services, access to prescription drugs and alcohol, as well as managing the village's petrol station. While customer numbers had been on a slow but steady decline for decades due to the loss in population, this had not put the store at serious risk so far. According to interviewee reports what had kept the shop alive was a distinct commitment to shopping locally rather than in Arvidsjaur.

We lose 1-2% every year which is not good but so far we could handle it. – the store owner, Glommersträsk

I was surprised how big the store was. I had never been in there passing through from Arvidsjaur. People are faithful to their community. [The store owner] is great at listening to customers and getting things they need. That would never happen anywhere else. For instance, I just told [the shop owner's wife] about a kind of butter I wanted, next time [I visited the store] they had it. – a recent arrival, Glommersträsk

What did however cause concern over the future of the grocery store, was the store owner's intention to retire with no replacement in sight. While at the time of this study merely a dark shadow over the village's future service provision the shop's owner did announce his retirement in mid-2016, about a year after the case study visit. After unsuccessful attempts to find a successor some of the village's entrepreneurs decided to take things into their own hands. This group of entrepreneurs took over the former ICA store and transferred it to *Handlar'n,* a Swedish grocery store chain that is becoming increasingly popular for small country stores. In doing so the group not only guaranteed their store's future existence but also preserved at least two full-time jobs and a number of part-time and summer job opportunities within the village. According to social media the store was well established in 2018.

And the question how long we can keep the store. It is a little worry about the future but not as much as I thought. – a resident, Glommersträsk

Next to *Finnbergs*, as the grocery shop continues to be known as, local food production plays a role for access to fresh produce within the community. While most of the former farms have been closed down many residents continue to grow their own produce. Potatoes, the staple of the Swedish diet, as well as lettuce and root vegetables are popular. Some families use small greenhouses or green frames to prolong the short subarctic growing season. Residents

also keep chickens, cattle and sheep with produce being traded within the community. Fresh produce from the forest – berries, mushrooms, game and fish - is dried and frozen to last most of the year with moose being the most common meat in many households year-round. So normal has the consumption of local produce become that when invited for dinner in one of the local households the hostess actually apologised to me for there "only" being moose stew with local berries and mushrooms on the menu.

Many people grow their own potatoes, carrots, tomatoes, salads and onions. We are quite self-sufficient. – a resident, Glommersträsk

I wanted to have animals because it gives life [to the farm]. It's not for the money. The meat tastes good. We have cows, sheep, 35 chickens and we will get pigs. [Our neighbor] takes care of [the animals] when we are in our summerhouse. We grow potatoes, tomatoes, lettuce and flowers. [The wife] looks after that. We pick berries and mushrooms [from the forest]. – a resident, Glommersträsk

Young people want to be self-sufficient again like the old were. – a resident, Glommersträsk

The village has a restaurant, *Gula Villan* [the yellow house], that was re-opened by a foreign-born family only a few years ago. Next to making a modest income serving lunches to passing truckers and tourists Gula Villan has developed into a village meeting space. In particular the older population meets at the restaurant for lunch turning Gula Villan into a space akin to an unofficial village parliament for Glommersträsk's politically active entrepreneurs. Gula Villan is special in another little-known aspect, namely, in that it serves meals exclusively cooked from local produce. Even the heat that warms the restaurant is created from the grass pellets produced from a local business.

Like most remote villages in this study Glommersträsk has a rich offering of after-school and social activities. Next to a range of sporting facilities including a hockey hall and lightable cross-country skiing track, volunteers arrange for a range of activities and festivities throughout the year. Glommersträsk also has a church built during a short period of religious reawakening in the otherwise fairly atheist village. Today, typical for the mostly non-religious Swedish population, the church serves mainly as a meeting point and service provider for after-school and retiree activities.

As for medical care Glommersträsk continues the pattern set by Israeli villages. While medical care is lacking, residents have chosen to accept the lack in medical care as a part of the risk

and difficulties associated with living in an area away from medical care. As was observed in other villages this behaviour of acceptance even extends to those with chronic diseases such as diabetes, Parkinson's' disease, chronic heart conditions and even cancer, or other disability. This study included two Glommersträsk residents with severe medical conditions and several reports of medically severe situations yet none of the interviewed persons saw them as a reason to contemplate a move closer to medical infrastructure. At least one severely disabled young person also lives within the village aided by in-home care and personal assistants.

If something really bad happens we might not be able to get to a doctor in time. But we know and accept that. – a resident, Glommersträsk

While there are weekly nurse visits to Glommersträsk most residents prefer to drive to Arvidsjaur for routine medical care. As for other remote villages this drive can be time-consuming especially if needing to be arranged around already long commutes. Parents also complained about a high staff rotation with the Arvidsjaur clinic – typical for rural and remote clinics in Sweden and a well-known problem for remote communities around the world – struggling to find and secure personnel.

I […] need to get to Arvidsjaur for check-ups. It's hard to combine appointments [for different children or with different specialists] because not all the doctors are there all the time. – a resident, Glommersträsk

Specialised medical care usually needs to be accessed in the provincial hospital of Norrbotten province in Piteå but residents will sometimes prefer to go to the closer hospital in Skellefteå instead. Those with chronic disease reported on usually accessing specialist care even further away in larger cities, according to personal preferences. This group will access care where it is most practical due to social contacts from their own student years or family living there.

Our daughter lives in Umeå so that's no problem going there to see the doctor's. – wife of a chronically sick resident, Glommersträsk

As for emergency medical care Glommersträsk's part-time fire brigade provides first-level medical care with transport onwards to either Arvidsjaur or the provincial hospital in Piteå. In some cases this can result in a chain of transport from one hospital to another as one resident described:

I was really sick five year ago. I took the taxi to Arvidsjaur. They sent me to Piteå via Glommersträsk. In Piteå they sent me to Luleå by ambulance. I had anaemia and an ulcer. After two nights they put me in a bus back home. I got a little scared between Piteå and Luleå. – a resident, Glommersträsk

The major point in which Glommersträsk is different from other villages in this study is its commitment to entrepreneurship. Regional development funds have brought larger business interests to the area. However, these seemingly exciting projects – a conference centre and railway testing infrastructure most recently – have yet to materialize. More importantly Glommersträsk residents believe in creating their own jobs. A local IKEA sawmill provides some jobs for both Glommersträsk residents and residents of the surrounding villages. While some residents do commute to Arvidsjaur for work Glommersträsk has a high population of company owners and thus a high level of self-employment and availability of jobs. In fact, multiple business owners complained about a lack of workforce available.

The most important are the companies. Glommersträsk is a village of companies. The first settlers were entrepreneurs. We need to help these companies. In the 1980s Glommersträsk was huge on companies, - a resident, Glommersträsk

We have small companies with tradition. Glommersträsk is the only village that pays more tax than it gets back. – a resident, Glommersträsk

You have to be an entrepreneur out here. Farmers had to take care of themselves, they could only trust their own kin. – a resident, Glommersträsk

Glommersträsk residents appear to look down on other villages that have made themselves dependent on only one large company or on government jobs. In their eyes these one-industry villages are doomed if companies eventually wind down; the future, they believe lies in taking charge of one's own jobs.

Most of Glommersträsk's businesses are centred around the forestry industry in one way or another. Local businesses produce timber products like doors, kitchens and whole houses. Others provide services for the forestry industry and a recently started business processes local berries for wholesale to supermarkets. The last remaining cattle farmer has changed his business model to one of organic high-end meat. Increasingly, village entrepreneurs have a focus on sustainability and locality with many of the aging entrepreneurs promoting Swedish products and especially food security through locally grown produce. Most of these businesses provide a limited amount of employment not just to Glommersträsk but also to the surrounding villages. Both for jobs and services Glommersträsk retains a role as a local hub for a population of around one thousand people from the immediate area – according to residents' estimates.

This large availability of jobs does not however mean that job availability was not a problem for Glommersträsk residents. While jobs are available – and entrepreneurs complained about difficulties in filling openings – matching available expertise to that sought by the companies was described as a problem. There were reports both of young people willing to move back but unable to find a job, and companies unable to find specialized personnel.

It can be hard to find labour because there aren't so many people here. That is true both for skilled and unskilled labour. – a resident, Glommersträsk

There are no jobs to give to people that want to move here. [But] we have a lot of land to build on; We can found more factories. – a resident, Glommersträsk

The challenge Glommersträsk faces in its ongoing job provision is evident in the retirement of Jan Finnberg, owner of the only remaining grocery store: Glommersträsk's population of entrepreneurs is slowly but steadily nearing retirement age with no successor in sight for many of the businesses.

Society has changed a lot. It was easy to start a company in the mid 1980s, now it is very hard. – a resident, Glommersträsk

We have fine companies here. But [their owners] are very old. – a resident, Glommersträsk

While some new businesses have been founded during recent years, new and old business owners alike complain about a changed climate for business foundation between the 1980s, when the last wave of entrepreneurship took place in Glommersträsk and today. Locals feel it has become harder to both found and run a business not just due to world market competition, but also due to a lack of support by Swedish institutions and a large number of EU rules that need to be fulfilled. These rules especially hit the already struggling dairy industry and seem to have played a role in its demise in Glommersträsk while at the same time preventing an eventual revival.

If you want to develop small villages what you don't need is more rules and requirements. [On the contrary] you need more free space for people with new ideas. – a resident, Glommersträsk

The brother in law grew lots of potatoes and sold them to [a large supermarket chain] and to shops in Skellefteå but eventually the paperwork and company criteria killed it. Now he just grows for the family and private buyers. It's getting too hard to sell to supermarkets. – a resident, Glommersträsk

What has attracted new businesses to Glommersträsk appears in part to be family ties and a positive attitude towards entrepreneurship within the village and its families. Young entrepreneurs also report on receiving mentorship from Glommersträsk's veteran entrepreneurs. In general Glommersträsk's development fits in well with its surrounds in

Västerbotten county[11], that has become a leader in green innovation over the last years (Grunfelder, Rispling and Norlén, 2016).

The main reason I came here is because of the good network. Glommersträsk is a good place to start a company. – a resident, Glommersträsk

The village as a community

As discussed in the example of Yahel, above, community cohesion can be a village's Achilles' heel and intergenerational relations especially can be problematic. Here, again, Glommersträsk surprises with both a high level of internal cohesion and strong inter-generational relationships. As a community Glommersträsk people believe in taking charge themselves; that is, they believe in strong agency. This includes not just a lively social life and local political activism, but also an active approach towards welcoming new and returning residents.

There has always been that spirit of "if we don't get it from the municipality we just do it ourselves". Maybe that's why we aren't falling apart; because we are not dependent [on the municipality]. – a resident, Glommersträsk

In Glommersträsk people create their own. – a resident, Glommersträsk

In Glommersträsk political and community leadership lies mostly with the older entrepreneur veterans. This cohort steers the village's internal affairs from a village council that, even though not recognised by municipal offices, enjoys broad support within the village. Interestingly, while the council themselves have actively invited in young members, most of the villages' younger population report on trustingly leaving politics in the hands of the elderly. This younger cohort prefers to focus on their families, careers and enterprises leaving the steering of the village to a cohort they believe has more time to take care of it.

While demographic development still points downwards for Glommersträsk according to latest census data many young families are returning to Glommersträsk. These families follow the migration rhythm described by Johansson (2015): While almost all young people leave their origin villages at some point in order to access secondary and tertiary education – often followed by a period of city living – young adults return in their early thirties in order to provide their children with the same experience they themselves had.

[11] Glommersträsk while part of Norbotten county, is situated only kilometres from the county border to Västerbotten.

We must help bring children out into nature. But that's not easy in the city. Here we can do many things and it doesn't cost a thing. I see only good about growing up in a village but we must understand it. – a resident, Glommersträsk

Usually these returning adults bring back a spouse from the city or another village with them. Unfortunately, there was no data available as to whether the intake of young families was sufficient to ensure a replacement population and thus population sustainability in Glommersträsk but anecdotal evidence speaks of "about half" of any graduation year returning. In addition, the village occasionally attracts entirely new families from the surrounding area or even elsewhere in Sweden. This intake of young families is added to by a group of returning retirees – either city people looking for a calm environment or returning villagers. Recently, the village has also started taking in a number of refugees or, as the community refers to them "new Swedes". Social media is witness to the community reaching out to these new residents with Swedish language cafés and all kinds of help where it is needed but it is not yet clear whether they will stay in the village long-term.

Other than providing their children with the safe and close-to-nature experience this cohort of young parents also described an affinity for the more communal village lifestyle. Therein an often-quoted phrase was that of gossip being "the best and the worst" about village life.

The rumours are a good thing and a bad thing. They are good because they mean people care. And they are bad because you need to be able to handle them. People "know" things that didn't happen. – a resident, Glommersträsk

New residents who were interviewed – a retiree couple from Stockholm and a young woman from Arvidsjaur who had recently joined her Glommersträsk-born boyfriend – reported on being welcomed within the village contrary to their fears about closed-in village mentality.

People are very friendly and open-minded. We had heard so much about it being hard to get into a village without the "history". But it was no problem at all. – a resident, Glommersträsk

What appears to unite the community is a strong sense of local identity and their commitment to keeping the village lifestyle. This lifestyle, as it was described during interviews, is one that is close to nature and enjoying rather than tolerating the extreme climate, and with a high level of community cohesion. Residents experienced that they could always ask for help, quite akin to the "extended family" community idea described in the Israeli villages:

Everyone is helping everyone else. You can always ask for help. – a resident, Glommersträsk

In residents' eyes while the villages might "not be for everyone" it was important to keep them alive as an alternative for those who thrived in the village.

Alone of the villages in this study, Glommersträsk does not see growth to higher numbers as the only possible way forward – even though most Glommersträsk residents alive today very well remember the times when Glommersträsk was a small city rather than a village. On the contrary, residents see their village as "good just the way it is" – as long as they can manage to keep the grocery stores and primary school which are seen as vital to the village's future.

Summary

Glommersträsk sees itself as providing an alternative lifestyle to city life, albeit one that "might not be for everyone". In stark contrast to all other villages in this study Glommersträsk does not believe it necessarily needs, or even should, grow but that it is sufficient to retain the population and level of service provision they now have. To Glommersträsk residents, village life as a distinct lifestyle is good just the way it is. Residents stress that rather than tolerating the extreme sub-arctic climate they thrive in it with this affinity for the village lifestyle, entrepreneurism and the sub-arctic climate providing identity and common ground for the village's strong community.

As a "village of entrepreneurs" Glommersträsk prides itself in its agency and its independence from outside forces. As far as employment is concerned, Glommersträsk has succeeded in becoming mostly independent from large companies or government job provisions through entrepreneurism and self-employment. However, in a highly-specialised employment landscape with highly educated individuals, matching jobs to available expertise can be challenging. Another challenge faced by entrepreneurs in Glommersträsk is a reported lack of government support for new businesses. This reduced and more bureaucratic support in particular is seen as a threat to their blossoming entrepreneurial landscape.

The transition from one generation to the other is a challenge for Glommersträsk as it is for most other villages. Glommersträsk has succeeded in bringing back and retaining many of the young generation as well as an entirely new population. However, many of the village's highly active cohort of entrepreneurs are now nearing retirement age putting not only vital village service, but also jobs in danger with successors not to be seen for many businesses. On the political plane likewise, Glommersträsk needs to succeed in generational change with village leadership predominantly in the hands of an aging population while a new generation prefers to focus on family life. It remains to be seen whether younger residents will, as hoped, transition into both economic and social leadership roles as their children grow up.

While Glommersträsk's residents have long been resigned to the low level of medical service provision, access to primary education is seen as the keystone to Glommersträsk's future. It is in the threat to the primary school that Glommersträsk's long-standing rivalry to the neighbouring municipal capital of Arvidsjaur plays out. Glommersträsk's tense relationship with Arvidsjaur also reflects the large influence of settlement history.

In general, Glommersträsk community leaders, a cohort politically active both within and outside the village, complain about a high level of political remoteness. That is the group feels they are not being heard both by regional politicians in Arvidsjaur and especially by national leadership in Stockholm. Residents recounted high levels of misinformation of central Swedish residents and experts as to actual living conditions in Sweden's remote north. Glommersträsk is an excellent example of the tension caused by political remoteness.

The village further sheds a light on agency as a means for covering for seemingly lacking structure. Amongst the villages in this study it at least appears as if Glommersträsk is a good way towards achieving sustainability without giving up on its village lifestyle.

4.1.5. Resele (Sweden)

Introduction

The threat of losing their school is what prompted the old parish of Resele into action in the early 2000's. After decades of steady decline, this area of dispersed settlement had reached a breaking point and its remaining young families understood that there would be no future for their home hamlets if the primary school closed. What happened over the following decade was a PR campaign that has put Resele on the real estate map and brought young families from the city to Resele in order to fulfil their "little Swedish dream": a red house in the countryside.

Figure 35: The little Swedish Dream of a red house in the countryside (M. Pfaffl, 2015)

The term "Resele" describes an area of dispersed settlement comprising the former parish called "Resele" within the bounds of the community of Näsåker. Small hamlets and lone farms spread out over an area of almost twenty kilometres on both banks of the Angermanälv River. This open settlement landscape without an easily defined village centre presents a special challenge for Resele both from an infrastructure point of view and as a community.

Resele, adjacent to a small regional service centre of Sollefteå upon which it is highly dependent, is the least remote of the villages included in this study. It is, however, a fascinating and rare example of how villages on the brink of demise could and in fact have been revived. Resele also offers insights into how geography and planning can influence community (re-)building. On a cultural scale Resele is reminiscent of other, more remote villages included in this study: The young families of Resele are striving to create a new, different society in a location that for many city-dwellers is seen as harsh and unwelcoming. Resele is a good case for the influence of agency exercised by a small number of individuals. As a village on the brink between classic ruralness and remoteness, Resele shows the threats of dependence in a more classic periphery-and-centre relationship.

Resele is situated further south and thus further away from the polar circle than Glommersträsk, 520 kilometres north of Stockholm. While not subject to winters as cold and dark as those closer to the polar circle Resele nonetheless sees climatic extremes. Summers are short and mild with long sunshine hours while in winters there are only short sunshine hours and temperatures that can reach below -20°C.

Part of a formerly well-settled rural agricultural landscape, Resele is continually becoming more remote as villages depopulate into hamlets and jobs and services are moved away from the small towns in the area. While only 27 kilometres from the regional service hub of Sollefteå the next larger towns are located on the coast, around 140 kilometres from Resele. As is typical for remote villages, there is no clear preference in access to services between a number of coastal towns with some families even preferring to drive all the way to Stockholm for special goods and services.

The Resele area's traditional farming industry has almost disappeared – leading to the near-demise of the village. Rather, next to some small business enterprises predominantly in forestry and increasingly in the hospitality industry the majority of Resele residents depend on government jobs in neighbouring Sollefteå. At the time of this study Resele's neighbouring town of Sollefteå, 27 kilometres from Resele, was under threat of severe job and infrastructure losses through government spending cuts. Aware of this dependence the village strives to create sustainable entrepreneurship in order to lessen its dependence on government jobs and create more jobs and business opportunities for young families.

Due to the high interest of families fleeing the inflated housing market in Sweden's large cities and towns for the more community-oriented lifestyle and cheap housing of the countryside Resele is struggling with what seems to be an unusual problem for small villages: severe housing shortage. As is typical for Sweden many of Resele's large old farmsteads are still in the possession of those families that have left the village for the cities, often generations ago, and are now used as summer houses. With real estate prices still way too low to be an incentive for city-dwelling families to sell their summer houses Resele has both families willing to move in but unable to find housing and a large number of dwellings that are empty for most of the year. This inhibited growth was one of Resele's most acute challenges at the time of this study.

Resele's second challenge was that of creating a resilient and cohesive community. With village leadership depending on a small group of people struggling to juggle family obligations, jobs and businesses with their volunteering activities many of Resele's newly-founded interest groups are at risk. The village further struggles from tension between the older generation of remaining Resele-born residents and the new cohort of residents who have relocated from towns and cities. Tension also existed between the southern and northern river banks due to both historic rivalry and rivalry surrounding the formation of a future village centre.

On top of internal tension Resele also had to work on forming its own village identity and – importantly – its own name and post code. The latter succeeded just after this field study bringing new postal services into the village.

Environmental challenges

Resele is subject to a sub-arctic climate with short, mild summers and long, dark and cold winters. Even in the old wooden houses that dominate the settlement landscape in Resele this climate is well catered for. With good insulation – traditionally from wood shavings and moss, double and triple glazed windows, as well as wood-fired ovens in lounges and bedrooms, houses stay warm year-round. With no access to Sweden's distance heating system, heat pumps are becoming increasingly popular especially among the aging population concerned with having to cut and carry firewood.

However, in Resele's large and often poorly maintained road network streets can become slippery and dangerous during winter. While the better developed northern side of the Angermanälv provides easy access to route 90, a well-built and maintained national route, southern bank residents struggle to cross over icy bridges and neglected rural roads.

> *Some of the roads are really dangerous even though I have a four by four. Last winter I almost slid off the road. I didn't go to town for a month after that. You are totally shut in because the roads are so bad. – a southern river bank resident, Resele*

In general though, Resele residents report on an affinity rather than a dislike for winters even though this affinity to their respective climatic extreme is not as well developed as for Be'er Milka, Ein Tamar and Glommersträsk residents. In contrast to these other villages the affinity for winters was only rarely quoted as the decision for moving to the remote village. However, residents still reported on a general liking for the winter and the change of the season and strove to see the positive even in more challenging aspects of the climate. Those interviewees who had grown up in Resele and later returned to start their own families reported a higher affinity to the climate than their city-born spouses or new resident families.

> *It is incredibly windy and grey here which is kind of a drag. – a new resident, Resele*

> *You have to live not just in but with the nature. You have to adapt, for instance if things freeze while you are building. You have to change your plan [according]to the circumstances. – a new resident, Resele*

> *You use the snow rather than hate it. I like skiing and making snow angels and sledging and … It's no problem. It's quite nice. You just put some cloth on. Pure snow on a sunny cold day is awesome. – a resident who returned to Resele after growing up there*

I go to the Norwegian border much in winter. I play in the snow. We have a real winter. – a resident who returned to Resele after growing up there

Although Resele is well below the Arctic Circle and never gets entirely dark during winter, sunlight hours are still limited between October and March. While in general this sub-arctic light cycle is a fact of life, rather than a challenge for residents, for those already struggling with winters the lack of light only added to the problem. Some mentioned the possibility of psychological consequences of the lack of light but nobody recounted any first or even second hand examples.

I think if you are prone to depression you can't [live here]. My brother could never do it. – a resident, Resele

Resele residents try to get as much of the remaining light as possible during winter. While only one resident directly talked about spending time outside in order to catch sunlight winter outdoor sports are a typical hobby for interviewees.

In Resele the community had a special idea for coping with winter cold and darkness. Cold, dark and rainy, but without the snow needed for winter sports there is little activity during late autumn. In response, the community has brought in their own holiday of *kakfrossa* in order to break up the cold and dark months and bring some distraction to the community.

Kakfrossa is when we are baking cookies. It's in October when there is nothing else but it is cold and dark. October is a good month for that kind of thing. – a member of byalaget, Resele

The village and its infrastructure

The importance of having a high quality local primary school was identified by a large number of interviewees in all villages visited for this study. While village residents are prepared to compromise on secondary schools and accept commute times they want their younger children to be close to home in order to stay in the village. Often as the number of school-aged children shrinks after the initial settlement wave, local primary schools come under threat of closure. Resele, after decades of losing young families, reached this point in the early 2000's. The threat of losing the primary school was the wake-up call for the area's remaining young families.

Most residents of remote villages believe that keeping a primary school is the key to a village's survival. Without access to a primary school they believe young families are not going to return to or move into a village.

Young people must love to live here and see it as a safe place to raise their family. Being a good place to raise children is the most important because if

people remember it like that they will return after university. – a community leader, Resele

In Resele, the remaining young parents of the area scrambled to organize into the *Flytta Till Resele*, i.e., "move to Resele" group. This group rallied aggressively to bring more young families into the village in order to increase student numbers and rescue their primary school. Ultimately, it was this initial group that pushed a new generation into village politics and gave rise to other initiatives that together revived the village.

The Flytta till Resele group decided what their village needed was first and foremost publicity. This group was not the first to identify that remote villages, while in their eyes a place of high quality of life, suffer from a bad reputation as backwards according to the city population. Resele's residents believed people would come if only they knew about the village.

After rejecting initial ideas for adverts in Sweden's major newspapers due to exorbitant costs the group decided to simply put the whole village on sale on *blocket.se*, one of Sweden's major online portals for selling everything from dishwashers to houses. While the advert was quickly taken down for breach of conditions it did create media coverage for the village and its problems. The group later re-submitted their advert as one for guided tours of the village for a symbolic price. Members of the *Flytta till Resele* group showed curious families around the village and its empty houses. Besides being shown a picturesque settlement landscape with beautiful old houses those that had first met the village during these tours and had in the meantime moved to Resele reported on the helpfulness of simply having someone their own age they could ask about village life.

[When we did advertise Resele] there was good response. People wanted to come and visit. We gave tours. We showed them houses and our infrastructure. People said they got answers to questions. For instance, [they wanted to know] whether it works having children in kindergarten and working in [Skellefteå]. – a resident and member of the Flytta till Resele group, Resele

What undoubtedly helped Resele attract new residents were the cheap housing prices in the area, often only about a tenth or less of a comparable house in Sweden's major cities. Families fled the inflated housing prices but many also reported on fleeing what they perceived to be increasingly bad living conditions of crowdedness, crime and a lack of access to nature and general space to "make their own".

The Flytta till Resele group's plan began to work and attract entirely new families, alongside returning adults who had grown up in the village. Resele's success in re-attracting a young population led to even more media coverage, access to funding and a strategic plan (Norström, 2013) and consequently to a further improvement of living conditions and in-migration numbers. Less than a decade after they saw themselves confronted with a possible

school closure Resele found itself with a young village council, a completely re-furbished school, rejuvenated village store and many new families in what seemed to become an entirely rejuvenated community. The village literally became a poster child for the possibility of change when featured in a 2015 poster exhibitions travelling large parts of northern Sweden (Lundgren, 2015a).

There is a really good spirit among young people since the school crisis. I would dare the politicians to try and close the school now. – a resident and mentor to Flytta till Resele, Resele

However, Resele's newly found population and popularity rush did not remain without problems. Soon, new families had taken up all available houses matching a very distinct set of criteria as one interviewee described:

Swedish people want the same thing. They want a pretty, big house. Preferably they want an old house. They want a big block of land and the ability to have animals. That's the Swedish little country dream with a red house. But the house they want also can't need maintenance and it has to be cheap. – a member of Flytta till Resele

Remaining sellable properties were too small, on small blocks or in need of maintenance and thus proved to be unsellable. More families were willing to move in but not willing to compromise on their idea of living the "little Swedish dream". Opening up new residential lands was not an option due to comparably high building costs, so the only way forward for the group was to try and persuade more families into selling. There are two groups holding on to property fit for young families in Resele: city-dwelling successors of old Resele families holding on to family homes as summer houses and elderly families without children holding on to large houses they no longer use. This well-known phenomenon in the depopulated Swedish country side is described as "loving your village to death", i.e., holding on to the family property in the countryside at all cost, even if it slowly kills the village.

It is the first group of city-dwelling residents that the *Flytta till Resele* group thinks needs to be targeted in order to open up more houses for young families. However, the group has also been approaching those among the elderly population they believe might be willing to downsize in the near future. Brokering swaps between families that want to up- or downgrade has also become increasingly important in order to accommodate as many families as possible.

The villages are literally dying. Why do people in Stockholm feel a right to a weekend house that really isn't a weekend house? It should be more expensive to own a vacation home that could also be used as a full-time home. – a resident and member of the Flytta till Resele group, Resele

Even before the European refugee crisis of the summer of 2015 Resele had started to take in refugee families. While a potential to bring in a new population, this move, driven by Sollefteå municipality, rather than the village itself, is mostly one of earning money for a municipality stretched for money. This differentiates Resele's refugee intake from that which later happened in Glommersträsk where the community itself made a conscious decision to actively welcome refugees into their community. The former retirement village in Resele was given a new life as asylum seeker housing. Village volunteers help the refugees, who are otherwise mostly left to their own devices, with Swedish classes, as well as cheap household items and clothing from a church-driven second-hand store. Refugee children attend the local primary school. However, the Swedish community and refugees do not appear to mix on a daily basis. Among reasons given was the uncertainty of their future visa status where deportations had seen refugee children disappearing from classrooms. Swedish Resele parents reported they wanted to spare their children from this traumatic experience by discouraging friendships to begin with.

A number of the refugee families reported on a general willingness to stay in the village they have started to treasure mostly due to its calmness and easy access to nature. However, low skill levels, language barriers and bureaucratic challenges mean there are usually no jobs available for refugees forcing these "new Swedes" to move into the cities once they receive asylum status and the right to work in Sweden. Herein one difference between Resele and other villages in this study becomes apparent: in all other villages entrepreneurs complained of a lack of labour with all skill levels. In Resele with its dependence on jobs from Sollefteå rather than its own entrepreneurs this is not the case.

Other aspects of Resele's revival have, however, been success stories. When the local grocery store was up for sale due to the former owner's retirement one young local-born resident decided to take over. With the assistance of mentors from the village and municipality Moa Berglund bought the old shop and turned it into a new *Lanthandel* [country store] partnering with the *Handlar'n* chain. She turned the neglected store some interviewees reported they hardly knew existed, into a well-stocked store focusing on local produce. In addition, Moa and her partners lobbied successfully to adopt Sweden's *servicepunkten* program.

The idea of creating a *servicepunkten*, a service point, is one of providing more services to rural and remote areas. Service points can provide a range of services, some of which are not normally available at supermarkets, such as postal services, order of prescription drugs and alcohol, enabling residents to access these products locally while providing small stores with additional income and clientele. In order to qualify each service point needs to deliver at least three services out of a list of five: an order-in pharmacy, order-in bottle store, postal services,

provision of internet access and a tourism office. Some service points even offer free delivery of goods to elderly customers not able to visit stores.

Resele's store and service point, which also runs an adjacent petrol station, are looking forward to providing even more services to Resele residents turning the store into a true village centre. After the end of this field study store owner Moa Berglund and other Resele community leaders succeeded in bringing back Resele's own postal code. Having their own postal code is important not just to the village's identity, but also signifies parcel services can now be made available at the store. The lack of package delivery services from and into the store had been quoted as problematic by a number of residents and business owners. As an additional project, Moa and her business partner think about refurbishing the area in front of the store into a real village centre with outdoor seating and potentially even expanding the store with a café overlooking the Angermanälv. The Lanthandel already includes a small self-service café frequented by village residents.

> *You know it's remote when you order things. UPS and others only come here twice a week. It might take a lot longer to get things delivered, for instance car parts. We are trying to get our own ZIP code so they will deliver daily. Sometimes you need to drive to Närsåker to pick up parcels. – a resident, Resele*

> *The ZIP code and our own mail address means identity. It is also important for companies and finding addresses. But there are not so many practical consequences. – a resident, Resele*

The Landhandel is Resele's only real village meeting space; its only real *third place* (Oldenburg and Brissett, 1982) with Resele's single restaurant open only during the short summer months. A number of residents had complained about this lack of meeting spaces and opportunities to "just get a coffee".

> *There is no meeting place in the village, no coffee or anything. Maybe Myregården [the restaurant] during summer. I want a place to sit down and relax. I want the store to be a meeting place for social networks. – a resident, Resele*

> *The biggest con is that there are no coffee shops nearby. I really miss that. I miss sitting outside. Also, there is no nice place to eat. – a resident, Resele*

> *I miss having an "out" place. A coffee or something – a resident, Resele*

Even more troubling is Resele's pronounced dependence on neighbouring Sollefteå for jobs. With only a small number of jobs available within the village and a limited number of entrepreneurs most residents commute to Sollefteå predominantly for jobs within the government. While at the time of this study in late spring 2015 residents reported on an

abundance of jobs in Sollefteå the threat associated with this dependence was obvious soon after when the government unveiled plans to downsize Sollefteå's hospital. A sudden loss of jobs due to government downsizing has the potential of quickly stifling if not reversing Resele's renewed growth.

In addition to fear around jobs the downsizing of the Sollefteå hospital has also awoken fears among some of the city-socialised population as to medical services, as was obvious in social media. This fear of losing access to medical services was unique among the case study villages. However, at the time of this study health care was not a major concern for Resele. With the proximity to a full hospital in Sollefteå and more advanced care on the coast residents felt well looked after. Concerns were voiced only around emergency evacuation capacities due to a reported shortage of medical helicopters in the north of Sweden.

Aware of the risks associated with Resele's dependence on Sollefteå some of Resele's old and new residents have decided to take matters into their own hands when it comes to job creation. The young entrepreneurial landscape around Resele is dominated by a wide variety of concepts. Next to remaining classical agriculture striving to market their product in niche markets and/or locally there are professionals offering their services to remote customers, a tulip farm, a deer farm and a farmer trying community supported agriculture.

Community supported agriculture is a concept wherein the farmer sees him/herself as a service provider to families or institutions. Similar to part-ownership in an agricultural enterprise member families pay a certain amount on a monthly basis year round – thereby covering the farmer's own costs, as well as providing them with an income – and in return receive produce from this farm (Bloemmen *et al.*, 2015).

Resele further hopes to increase its branding as a tourism region offering an open cultural landscape and its own Natura 2000 nature reserve. Since the end of the field study a bakery has opened in Resele while the tourism industry has become more important with small bed-and-breakfasts or farm stays supplementing residents' income. A local entrepreneur plans even on building a new retirement village both allowing elderly to remain in the village and freeing up houses for new families.

> *If you don't find a job [in Sollefteå] you have to make your own. You can't wait and see if the job comes for you. You have to fix it by yourself. – a resident, Resele*

> *Good people move here. [Resele] attracts people that want to run businesses in forestry and in earth moving. – a resident, Resele*

As for other remote villages, additional incomes play a role especially for Resele's remaining farms. This follows a general trend to multifunctional agriculture in Europe (Bjørkhaug and

Richards, 2008). Combinations between agriculture and hospitality are common in Resele. However there are also forays into self-marketing either in the local store or one known example, through opening their own store in neighbouring Sollefteå.

For some of Resele's population, however, the main problem is to be found outside the village confines. For a region rich in natural resources, there seems to be acute political remoteness from the capital of Stockholm. Even though northern Sweden's vast water and wind resources provide the backbone for Sweden's green power industry its municipalities feel they are not sharing in the wins. While power plants provide a small number of specialised jobs municipalities feel they are missing out on both dearly needed tax income and a say in their resources' use. Tourism providers in particular complain about a problem in coexistence between tourism and green power generation and feel they are not being heard.

> *The kommun [municipality] needs to think about where to build windmills. There needs to be more communication. The ultrasound [from windmills] is damaging. Tourism and windmills don't go together. – a resident and tourism provider, Resele*

In general, Resele residents complained about not feeling represented by Sweden's city-dwelling political elite. With the larger parties not paying attention smaller parties have taken to representing rural and remote community's needs. However, even though these parties might enjoy high levels of support within remote communities they lack the overall voter numbers to have an influence on national politics[12].

> *We pay the same taxes as Stockholm does but we get less. There are higher taxes in the countryside. The tax level is set [in part] by the kommun and often people in smaller kommuns pay more taxes. – a resident, Resele*

> *Maybe we have to cut Sweden in half. We have the resources [in the north]. We might get the money [if we are our own country] *jokes* We need Stockholm because that's where they run Sweden. That's the only reason we need [Stockholm]. We don't need Stockholm. – a resident, Resele*

Recently, the issue has been aggravated by plans to combine the regions of northern Sweden into one "large region" of *Storrnorrland*, Great-Norrland. Norrland residents feel this move will further decrease their influence on national politics, but their outcry does not seem to be a major topic in Stockholm.

[12] The Swedish political system, in contrast to the Australian one, is based on coalition governments and a large number of often highly specialized small parties.

The village as a community

As a community, Resele faces considerable threats. Not merely is there tension between the predominantly young members of the *Flytta till Resele* group and remaining older residents, but the small group of activists also seems to be stretched near breaking point. The village further appears to lack cohesion which makes it easier for tensions, for instance between northern and southern river bank residents to flare up around issues of village development. It appears Resele's proximity to and dependency on Sollefteå only enlarges the problems with village cohesion. It needs however to be noted that as a young community with a high development momentum the current troubling situation does not necessarily predict a trajectory toward more serious friction, but might just be a momentary state in the middle of social re-ordering and community building.

According to reports from some village residents, it was not just the vital threat to the primary school that triggered Resele's rejuvenation, but also a disruption in village politics through to the relocation of a former community leader. Some believe that only through the new group coinciding with this momentary gap in traditional leadership was it possible to achieve enough momentum for ongoing change within the community.

Either way, tensions between older and new residents were tangible at the time of this study. With the young generation, some of them city-born, effectively having taken over the village council the older generation is excluded from most areas of village politics – a move younger residents feel is necessary in order to achieve change and rescue their village. At a meeting I was able to sit in during the field study, tensions between old and young were glaring. Save for a small number of middle-aged residents and the small elder-dominated volunteer group around the refugees there is virtually no perceivable dialogue between young and old. Residents in their middle ages, without children and thus excluded from activities surrounding the school reported a feeling of exclusion from the village community.

> *Resele lacks a village centre. There are also much north-south [tension]. There seem to be legacy issues here. We young people try to focus on the future rather than the past. – a resident, Resele*

On the other hand, additional village leaders are direly needed in Resele. Resele's village leadership is dependent almost entirely on a young cohort that needs to juggle child rearing and careers or businesses with village politics. The group of village leaders appears to be a shrinking one with many interviewees reporting they had to quit their roles in community leadership due to time constraints. Village leadership now lies in the hands of only a handful of individuals often active in a number of different groups simultaneously. One interviewee described the resulting problem as the example of the Swedish concept of an *eldsjäl* [fire soul], that is a highly-dedicated person who "burns" for a cause:

There is that idea of eldsjälar [fire-souls] turning into eldsstjälar [fire-stealers]. That's when one person steals the fire from the community. So if that one person walks away they take all the know-how with them. – a resident, Resele

For the residents of Resele, often socialized in a city, there appeared to be less awareness as to the importance of volunteering in order to take charge of one's own services as a community. Those involved with volunteer-based organisations complained almost without exception of a lack of volunteers. Once more, what might add to the problem is Resele's proximity to and tight relation with Sollefteå. Residents reported on having "their circle", i.e., their group of friends of interest groups, in Sollefteå causing them to spend less time and invest less heavily in Resele's community. Further, the high number of residents commuting outside the village makes it harder for them to reach volunteering or part-time services. This is a problem for instance for Resele's part-time firefighting service:

It's hard to find people. Maybe that's because they don't have flexibility at their jobs. They also have to be at the fire station within seven minutes which prevents some people from joining. – a part-time fireman, Resele

It appears Resele needs to decide on either creating a tighter community with residents spending more of their time within the village and its interest groups – that is becoming more similar to most other remote village of this study – or on entering a stronger periphery-centre relationship with Sollefteå wherein they would effectively outsource social services to Sollefteå. At the time of this study there was an ongoing discussion within the village as to whether or not Resele should become more self-sufficient or simply see itself as a suburb of Sollefteå with strong proponents for either side to be found within the village.

What Resele is clearly lacking is any kind of village meeting space. While there are a number of locales available for planned group activities there is no openly accessible forum; no coffee or restaurant, weekly markets or other place where people could mingle in a third space environment. As in Glommersträsk the church plays only a very small role in people's life with the majority of the population atheist. That is, the village simply lacks spaces and opportunities for community building beyond interest groups and cohorts.

What adds to the problem is the village's dispersed layout that prevents any kind of natural community centre. While during the latest decades service buildings seem to have somewhat clustered around the school, church and village store on the northern river bank, the large sporting hall and homestead with its cultural activities are still located on the southern river bank, up to 15 minutes away by car due to bridges. Community leadership, especially surrounding the Lanthandel's owner are aware of the problem and are trying to further cluster community and commercial buildings around the church. Predictably, this has caused

resistance from southern bank residents already suffering from less well maintained roads and a longer route to services.

While most villagers stress the importance of community not just for their decision to migrate return to a remote village, but also for providing services and safety, Resele's community is struggling. Building stronger cohesion, distributing the burden of community leadership over more people and creating village meeting spaces are probably the largest challenges the village will be facing over the coming decade. Above all the village needs to decide if it wants to be a tight-knit community more typical for remote villages, or if it contents itself with becoming a suburb of Sollefteå.

Summary
Resele is the least remote of the villages visited for this study. Rather, the former parish that is attempting to forge an identity as a village appears to be an example of a village on the line between self-conscious remote village and rural periphery in a close dependence to its town. What makes Resele interesting and applicable for this study is its successful approach of attracting young families and rescuing vital services.

When the village's primary school faced closure the village experienced a threat to its existence. Its remaining young families launched an impressive PR campaign in order to attract new families. This first initiative in turn gave birth to further initiatives developing the village. In the end Resele attracted not only new families and managed to rescue the school but also rejuvenated its village store and re-arranged village politics by way of shifting its village council into the younger generation's hand. Although it had started to run into early problems the village appeared geared to ongoing development on a number of fronts at the time of this study.

In many respects Resele faces the same challenges as other remote villages. It needs to provide a certain level of services and activities in order to survive, but at the same time struggles to secure the resources – be it monetary, political or people - needed to supply these services and activities.

It is most of all the access to human resources in form of volunteers that troubles Resele. With a city-socialised population used to being provided services by someone else, Resele also has to compete for volunteers and social attention with neighbouring Sollfteå. As a result, the burden of village leadership rests on the shoulders of a small group with already stretched resources. This delicacy, of course, has been observed before in remote villages where small changes can have a large impact (Carson and Carson, 2014).

Resele is a fascinating example of not merely the opportunities, but also the difficulties connected with a more classical centre-and-periphery relationship. Its proximity to the small town of Sollefteå often appeared to be both a curse and a blessing. While providing for jobs and services the proximity to a town makes Resele not just dependent on development that is out of their hands, but also causes problems with community building and cohesion.

Albeit vital for remote communities, especially when it comes to their capability to use their own agency to develop the village, community cohesion is Resele's Achille's heel. While the young generation bonds over their shared experience and children even those only slightly older feel excluded from their own village causing glaring tension. It appears Resele's population fleeing inflated real estate prices in Sweden's centres has yet to understand the importance of community.

What Resele shares with Yahel, is the difference in the relocation motive of its residents. The cohort of young families moving into Resele reported on mostly feeling pushed out of their old residences by high real estate prices, rather than pulled into Resele by the village's specific conditions and environment. That is reports on an affinity for landscape and climate, as well as the traditionally more community- and agency-driven lifestyle in a village were considerably rarer than they were for those villages that reported higher levels of community cohesion. However, it needs to be noted that this trend was considerably less pronounced in Resele then it was for Kibbutz Yahel.

Even though its nature as a borderline-remote village – or maybe especially because of it – looking at villages like Resele can provide us with an insight in the adaptation techniques and struggles associated with living in remote locations and extreme environments.

4.2. Reoccurring themes

For this study five villages were visited in two distinct regions. During two field study periods in January / February 2015 (Israel) and May / June 2015 (Sweden) a total of 76 people were interviewed. The majority of these key informants were community leaders and / or persons with special knowledge in an area of interest.

Table 3 gives an overview over the case study villages, their settlement history and environment. For Resele's population data is missing due to the difficulties in defining the Resele area, which is a settlement area, rather than a clearly defined village. In general, population data needs to be understood as an indicative value as settlement reality can be somewhat more complex than political village boundaries are. While for Be'er Milka and Kibbutz Yahel boundaries of influence are clearly definable that is not always the case. When

looking at Ein Tamar one needs to remember the close relationship to its sister village of Neot Hakikar – within walking distance of Ein Tamar and slightly larger at around 45 families. In a similar vein while there is readily available population data for the village of Glommersträsk itself the village is part of a landscape of dispersed settlement with little hamlets and lone farms. Residents estimated the sphere of influence serviced by Glommersträsk infrastructure as high as one thousand persons. Thus, political boundaries as used for statistical population data might not accurately display the sphere of influence and identity around Glommersträsk.

	pop.	type	location	settlement history	neighbourhood	next towns	environment	climate	who are the residents?
Be'er Milka	35 families	agricultural moshaf	Ramat HaNegev regional council, ISRAEL	founded in 2008 by the private initiative "Or Movement" in order to exercise sovereignty over the area	small cluster of settlement with an older, more well-serviced kibbutz at its centre	Be'er Sheva (74 km), Dimona (73 km), Sderot (120 km)	sandy desert with seasonal sand storms and seasonally flooded valleys	arid but comparably mild; cold nights and hot days, little rainfall	recently relocated young, well-educated, often environmentally-minded families. There is a restrictive selection process when joining.
Ein Tamar	35 families	agricultural moshaf	Tamar regional council, ISRAEL	founded in 1982 by the Israeli state in ooperation with the military and Jewish Agency	slowly growing together with the slightly larger and older moshaf of Neot HaKikar	Dimona (47 km), Be'er Sheva (82 km), Kibbutz Ein Gedi (67 km)	Dead Sea Valley with unique air composition, surface subsidence; threat of earthquakes in the Dead Sea Transform; seasonal flooding	very hot and humid but with little rain; lacks the hallmark day-/nighttime differences of the desert climate	the original settlement cohort of well-educated farmers now in their late working years, as well as returned children and new young families with their children
Kibbutz Yahel	45 families	agricultural reformed kibbutz	Eilot regional council, ISRAEL	founded in 1978 by the State of Israel in cooperation with the Jewish Agency and Reform Jewish movement	no immediate neighbours but on the northern tip of a ~35km long stretch of kibbutzim with a shared municipal centre	Eilat (65 km)	rocky desert with some seasonal flooding and some earth quake risk	hot arid; cold nights and hot days, little rainfall	remaining kibbutz members (mostly foreign born reform Jews), as well as a mobile cohort of non-member residents
Glommers-träsk	280 people	forestry village	Arvidsjaur kommun, Norrbotten, SWEDEN	settlement startd in the late 19th century. Population peak of 3000 people in the 1940s, steady decline since	multitude of hamlets and lone farms in the area but no comparable villages	Arvidsjaur (44 km), Skellefteå (90 km), Piteå (110 km)	sub-arctic forest and wetlands; subject to the arctic light cycle	cold in winter, mild in summer; high rainfall during autumn and snow melting during spring impacts on forestry	locally-born residents, sometimes with city-born spouses, some newer arrivals.
Resele	500 people; 25 new families since 2008	old parish; dispersed settlement	Närsåker kommun, Väster-norrland, SWEDEN	settlement dates back until at least the middle ages. Rapid decline during the second half of the 20th Century	glesbygds-landscape to either side of the village with villages and towns of all sizes, however no apparent partner villages	Näsåker (17 km), Sollefteå (29 km), Örnsköldsvik (104 km)	hilly forest land, dominated by the Ångermanalv river, some remaining open pasture	cold in winter, mild in summer; high rainfall during autumn and snow melting during spring impacts on forestry	an older cohort consisting of remaining locally born residents; a younger cohort of recent relocations with their spouses and children

Table 3: Overview of the case study villages

The settlement situation in Israel is unique both due to its history and the current political situation. As a result of the hostility in both terrain and the political climate at the time of settlement Israel brought into existence two distinct types of self-sufficient agricultural settlement: the kibbutz and the moshav. The kibbutz is a communal, socialist-type village where everything is given from kibbutz members "according to their capability" and given to members "according to their needs" (Spiro, 2004). That is, the kibbutz is a cash-free environment with allocated work duties and a high level of self-governance through so-called "committees". The moshav is a somewhat less radical form of village but has been heavily influenced by the kibbutz movement. While in a moshav business and daily life are privatised – i.e., members own their own houses, cars, and are responsible for their own agribusinesses on allocated plots – the moshav idea also puts a heavy emphasis on communal life. Residents pay high taxes and even have to pay their way into the moshav, but in return receive both extensive services and a social safety net including eventual retirement funding.

Two of the three Israeli villages were moshav-type villages, with one being a reformed (i.e., partially privatised) kibbutz. The footprint of both the moshav and the kibbutz movement were clearly visible and explain the most striking differences to the Swedish villages. A further large difference was settlement age. With the Israeli villages, due to a more recent settlement expansion into the less hospitable desert south of the country, villages were only between thirty-eight and eight years old. In Sweden, the last major wave of inland settlement took place at the end of the nineteenth century putting the newer villages at an age of around 120 years (Bylund, 1971b; Müller, 2015).

Villages in this study shared characteristics – including of course their location in a remote and harsh environment and small population size – but also showed distinct characteristics. Most villages had areas of expertise where high levels of adaptation could be observed while the same village might be lacking in another area. However, clear trends were visible across both regions and all five villages.

- With the exception of Kibbutz Yahel, interviewees described their harsh environment and climate as giving them a sense of place and identity. For many the harshness and unusualness of climate and terrain were strong pull-factors in their decision to migrate or return to their villages. Interviewees went on to stress that rather than perceiving their location and environment as a disadvantage there were ways of turning this unusual environment into an advantage for both business ventures and the attraction of the right type of resident.

- The interviewees in this study stressed their capability of having an impact on their direct environment and on the community they were living in because of the small and dynamic nature of village life. For many it was this ability to have an impact that governed their decision to move to a remote village.

- As was to be expected access to infrastructure was an issue. However, with the exception of primary schooling residents were willing to compromise on services and often saw the lack thereof as a natural part of living in a remote area. To some extent this notion even expanded to employment as shown through a higher willingness to commute longer distances, telework, undertake unusual employment arrangements and small-scale entrepreneurship.

- Residents expressed feelings of disconnection from their respective country's urban mainstream society; they felt urban residents were misinformed about the realities of remote life and even though "it might not be for everyone" remote life offered a unique lifestyle.

- In all villages interviewees stressed the importance of community and of a willingness to "make it yourself" in a remote environment. They did, however, also see the problems with tight communities – such as gossip and an inability to "get away" – a notion which was repeatedly voiced was that of the community as "the best and the worst about village life".

Some of the villages had access to nearby small towns, often around 45 kilometres' distance. Typically, even if this closer service centre was available, residents reported on accessing most services in the next larger town (80-100 km away) in order to have access to a bigger selection and lower prices. Travel to the capital played only a limited role.

Demographically, the populations of villages in this study were similar to each other across both regions. While there is no representative data available, the younger generation of those interviewed often reported having a high level of education (often at Bachelors or even Masters level). Accordingly, many were professionals looking for highly-skilled jobs or self-employment options. Motives for relocation could be found in one of two groups: either they made a conscious decision to relocate to a remote area in order to access local decision making and the natural surroundings, or they felt pushed out by what they perceived to be crowded and non family friendly conditions in the centre.

4.2.1. Differences between the regions

When it comes to challenges reported by residents – and often to adaptation techniques – villages in both regions showed large similarities, but there are also noteworthy differences between the regions. These are important to note because they identify observations that are likely to have less to do with living in a remote village in a harsh environment, and more to do with each region's general circumstances. These examples show how external influences, for instance a change in political climate or access to support, can drive villages to develop new adaptation techniques.

Village age

While in Sweden the last major wave of inland settlement happened around the late nineteenth Century, settlement into Israel's southern desert is considerably more recent. That is, the age for villages visited for this study is only thirty-eight (Kibbutz Yahel) to eight (Be'er Milka) years. Thus, the cohort that was interviewed still, in large part, matched the initial settling cohort, as well as their direct descendants. While this young age allows for a fascinating insight on village foundation and the processes that leads to specific adaptation techniques to be developed it also makes it harder to gauge if villages are on any kind of a long-term trajectory to sustainability and self-sufficiency. The potential for crisis once the initial generations are replaced has been seen in the example of Sabra discontent (Spiro, 2004) in older Israeli kibbutzim and can be a threat especially for village types that rely on large amounts of personal commitment.

In Sweden, in comparison, villages were, at around 120 years (Glommersträsk) and at least 500 years (Resele) considerably longer settled. For data gathering this meant that it could be hard for residents to relate to the concept of their lifestyle as a challenging one as they had lived it for many generations. Luckily, in both villages there was a cohort of recent (i.e., in the last five to ten years) relocation migrants who could easily relate yet still showed a general matching of data to the cohort that had grown up in the village. What further assisted in data gathering was the fact that even in Sweden all but one of the interviewees had lived outside the village for a period of some years before coming back, which allowed residents to relate better to the differences between urban and remote life.

Another function of the differences in village age are growth patterns. While the younger Israeli villages were, with one exception, still growing, and had not yet seen any periods of major shrinkage the opposite was true for the Scandinavian villages. These villages had once been larger, even to the point of being small towns, and had experienced large periods of shrinkage during the exodus from the countryside in the second half of the twentieth century. However, interviewees in both geographies stressed the importance of attracting young families – both their own children and entirely new families from the cities – to the village.

What they also had in common was a rather fuzzy idea about the ideal size for their village in an ideal future. Only one village, Glommersträsk in Sweden, questioned growth as their only viable option. Some of Glommersträsk's community leaders have started to wonder whether it might be possible for them to gain stability on or just above their current size, rather than grow to a bigger size.

Exotic village types

Israel's settlement history has led to the development of two village types unique to Israel: the kibbutz, a communal village with shared work duties on commonly owned land and shared goods and services, and the moshav, where, while cooperation is seen as an important pillar of life, lives and businesses are privatised.

The kibbutz is a money-free environment where the kibbutz as a whole owns everything and allocates to the member as needed. This village form is a reaction to both the geographically and politically isolated environments in which these villages were founded, and to experimentation with socialism within the Zionist movement. Following internal re-structuring from the 1960s and severe financial crisis during the 1990s and 1980s most kibbutzim, including the kibbutz visited in this study, are now so called "reformed" kibbutzim. While reformed kibbutzim retain their social safety provisions, as well as a measure of shared infrastructure and services daily life has been privatised and members now pay for these services.

The moshav movement was a reaction to the need for a less intrusive form of agricultural village. While the moshav movement retains the communal ideas of the kibbutz movement in a moshav members work on their own allocated plots of land – albeit often with the assistance of commonly owned assets – and own their own houses and consumer goods. Not dissimilar from a privatised kibbutz, the moshav finances extensive infrastructure and services through a tax from its members. It also shares with the kibbutz the possibility of moshav-owned infrastructure and even businesses in order to provide a social safety net for members.

Selective community building

In a regular village residents self-select according to the motives that brought them into the village in the first place – or caused them to stay. This self-selection can even be a negative selection due to a real or perceived lack of possibility to leave a village. Above and beyond this self-selection there is only a very limited amount of control the village community itself has over new arrivals, which can be problematic for this highly community-dependent village form.

Israel's settlement legacy, however, allows for a culturally accepted practice of in-depth screening of prospective "members" of kibbutzim and moshavim. New members not only have to buy themselves into the village and its businesses, but even need to undergo

extensive screening by existing members as well as external consultants such as psychologists or financial professionals. At the end of an extensive process the village community decides by vote about accepting prospective new residents. Communities believe that this ability to pick and choose members gives them a measure of security. Israeli village residents in this study also stress the importance of community and having the right people who can support and nourish their community. As a further effect of screening, villages have an ability to give preference to certain demographic groups, usually young families with or about to have children. Due to screening and financial requirements in the non-socialist moshavim at least first generation members are also usually especially well-educated and with a stable financial background. Unfortunately, this screening could, at least in theory embed racism.

Village Layout

Another difference between the regions that can be explained through Israel's settlement history is that of village structure. Israeli villages by and large still follow the old kibbutz blueprint with a dense clustering of residential units, usually surrounded by landscaped and recreational areas and with clearly defined main buildings (Rosenberg, 2012). This residential part of the village is usually delineated by a physical fence and a gate. Farms and farming infrastructure like sheds and packing houses can be located kilometres from the village area according to land availability. This village structure leads to clearly defined village centres and clearly defined village boundaries.

In Northern Sweden, the situation is not always as clear as can be seen in the comparison below, in Figure 36. While there might be a clearly identifiable core, village layouts can be considerably more diverse. Villages are part of a cultural landscape of dispersed small hamlets and lone farms which can make their area of influence hard to determine. Questions of identity and historic affiliation too can factor into the equation. In one example, that of Resele, the village lacked this defined village core altogether and instead consisted of a large area of dispersed settlement.

Figure 36: Aerial view of the core settlement areas of Resele, Sweden (left) and Kibbutz Yahel, Israel (right). Source: Google Maps 2019

Differences in Climate and Landscape

Obviously, the landscape and climate between the Israeli Arava desert and Sweden's circumpolar north are vastly different. The Arava is dominated by dry heat and a desert climate, Swedish Norrland by large differences in seasons with short, mild summers and long, cold and dark winters. While each village had to adapt to its specific environmental challenges overall the difference was strikingly small. Houses are built to adapt to the climate and allow a comfortable shirt-sleeve indoor environment year-round. Businesses adapted their practices, and more crucially, their annual routines to fit around the climate – often finding ways to profit from the unusual climate in the process. Residents adapted to periods during which the weather might force them to stay indoors or within their village.

Outliers

While the case study villages of this study were intentionally different they showed pronounced similarities in their adaptation techniques and attitudes towards their remote location and harsh environment. However, two villages, Kibbutz Yahel in Israel, and Resele in Sweden deviated from some of the behaviour that was observed as typical for the other case study villages in some areas.

Kibbutz Yahel was the only one of the villages where interviewees failed to express feelings of connectedness and a feeling of place in their landscape that was commonly reported in all other case study villages. In contrast, Yahel residents prided themselves on their success in "pushing away the desert" and "hiding the desert behind trees". Their motivation for moving to the desert was in the availability of a Reform Jewish community. However, if given a choice this group would rather have moved to a more central and less climatically extreme environment.

Yahel is noteworthy also for the demographics of interviewees. While interviewees were not chosen through representative sampling the interviewee demographic is still interesting to note. In having chosen predominantly community leaders and specialists, looking at demographics shows a picture of where power lies within the village. Figure 37 compares the interviewees in all villages according to their age group. It can be seen that those villages which had a recent large influx of younger people (Be'er Milka and Resele) also have a large number of younger community leaders. In Ein Tamar and Glommersträsk the ratio between younger and older interviewees is more even, especially if we take into account that the higher number of younger interviewees might at least in part be a result of active interviewing of returned children as this was an area of interest. Yahel, however sticks out with having almost exclusively interviewees who were community leaders from the older cohort. Those young people who were included in the study in fact had to be specifically recruited.

Whether as a direct result of its changed age distribution, because of a better availability or because of a lack of returned children, Yahel was the only village in this study where education concerns almost did not feature. While it is tempting to conclude this to be a function of Yahel's changed age structure those interviewees in other villages that did fall within the higher age groups did still, albeit not as vocally, voice concerns about the education situation. It is only in Yahel that this concern seems to be completely missing.

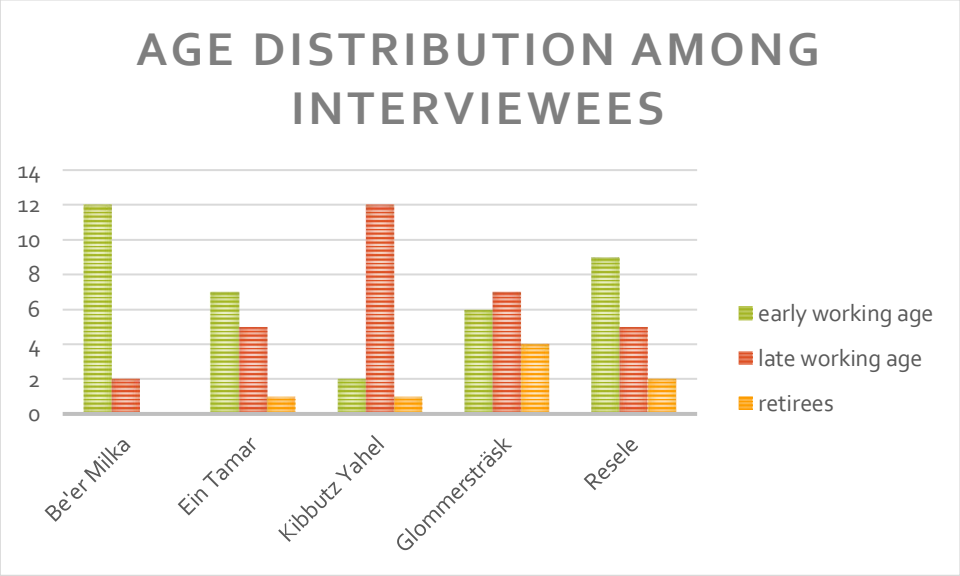


Figure 37: Interviewees by age group

Another way in which Yahel deviates from the other case studies is its large percentage of cross-country migrants. Figure 38 shows a comparison between all village by origin of interviewees. While a number of cross-country migrants are the norm for villages included in this study eleven out of Yahel's fifteen interviewees had migrated from another country – usually the United States or South Africa. Judging from observation inter-country migrants might be slightly overrepresented among interviewees compared to the general population

in all villages. However in Yahel inter-country migrants are a considerably larger percentage of both interviewees and the village population as a whole. It is unclear whether there is a connection between Yahel's apparent problems in accepting its environment, its failure to bring back adult children and the origin of Yahel's original settlement cohort.

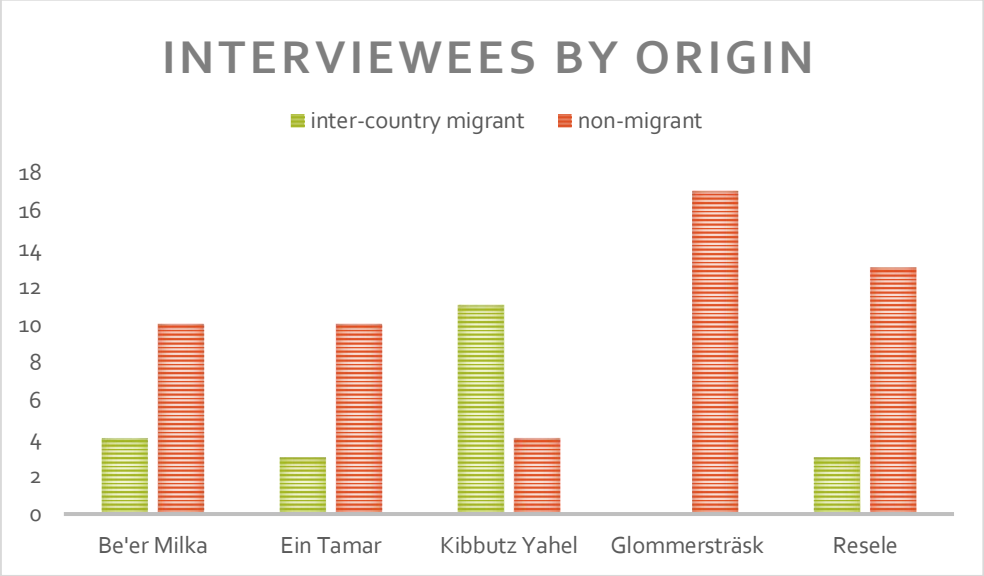


Figure 38: Interviewees by origin

The second noteworthy outlier in this study is Resele in Sweden. As a village in a very obvious and direct relationship with its neighbouring town of Sollefteå, Resele is a borderline case for remoteness. Its interviewees too, especially where the cohort that has recently relocated from the cities is concerned, often showed perceptions that were at odds with those in more remote locations. New relocations, while accepting the harsh environment and climate lacked the high regard for their environment that could be seen in large numbers in Be'er Milka, Ein Tamar and Glommersträsk. Those who had grown up in a remote village and later chosen to return did, however, react according to their peers in other villages. In many regards Resele appeared to be a case on the fringe between rural and remote that has not yet chosen whether to be in a dependent centre-periphery relationship with Sollefteå, or to become more self-sufficient as its surrounding settlement landscape continues to decline in infrastructure.

4.2.2. Re-occurring themes according to type of challenge

For the most part observations were similar across all villages and very clear themes emerged irrespective of region, village type or the interviewee's demographics. These challenges can be summed up in three groups. "Environmental challenges" are those challenges that are intrinsic to each region, such as terrain and climate, but also political instability in the region. These are challenges that are, by and large, outside the control of the individual and their

community. "Infrastructure challenges" refer to challenges associated with lack of access to infrastructure, for instance to schools or health facilities, but also jobs or political attention. While for the most part out of the control of the individuals and their communities these are human-made challenges that could, at least in theory be simply removed as challenges. Lastly, "community challenges" are challenges associated with what happens within the community; they refer to internal cohesion, generational conflict, or the ability of the individual to participate through for instance volunteering. While the provision of structure and guidance can assist in creating a climate that is favourable to good community outcomes it is, in the end, the community itself which creates and mitigates these challenges.

Environmental challenges

Environmental challenges are challenges of climate and terrain, as well as through geo-political realities such as war. They are challenges that are outside the control of both residents and decision makers. Thus, environmental challenges cannot be removed or reduced; they can only be adapted to. What is more, the principal possibility and willingness of adapting to environmental challenges is a prerequisite for the existence of a village in a harsh environment. Whether or not a challenge can be adapted to decides a locality's habitability and carrying capacity (Weeden, 1985) and accordingly changes in technology might expand the habitability of an area leading to waves of settlement into previously uninhabited territory (Bylund, 1960, 1971b).

Examples of adaptation techniques to environmental challenges include building techniques, cooling and heating technologies, changed perceptions and strong feelings of place towards a harsh environment, as well as farming or forestry techniques - but also adaptations of daily and yearly routines. In the case of Kibbutz Yahel residents tried to "hide" the harsh environment behind an artificial micro-ecosystem.

Non-negotiable challenges have two components in their coping strategies. For one there is dealing with the consequences: the building of lives and businesses around unfavourable environments. This simply needs to be done; being able to technologically mitigate consequences to a point that makes life feasible is what makes the region habitable in the first place. There is, however, another aspect to responding to harsh environmental conditions, namely, that of personal attitude towards the challenge. Residents can either focus their energy on pushing away or hiding the harsh environment as much as they can, or they can embrace it, seeing beauty in sparsity and uncontrollable forces of nature. These different attitudes are mirrored also in adaptation strategies; communities can either opt to change their environment in a brute force approach, or they can strive to change themselves, their businesses and lifestyle to a certain extent. Science fiction author Kim Stanley Robinson (Robinson, 1993, 1994, 1996) described this phenomenon strikingly in the example of his fictional early Martian village as that of "Terraforming" (making like Earth) of the landscape

by the settlers, yet at the same time their "Areoformation" (making like Mars) through adaptation to Mars.

The protection of residents against the harshness of their environment is of uppermost importance. This is usually done through building techniques that provide an agreeable climate year-round no matter what the outside conditions. The most important of these building techniques is the provision of thermal mass, that is of reducing the heat exchange between the inside and the outside as much as possible. A high thermal mass can be achieved either through thick walls, or using an especially insulating material. Technology to achieve this high thermal mass is not new. Early examples are for instance the cob or *adobe* houses. In Sweden insulating materials, such as wood chips and moss have provided thermal mass since the initial settlement of northern Sweden.

In addition to buildings with a high thermal mass, buildings can be artificially cooled or heated. While artificial cooling techniques, with some exceptions like Middle Eastern cooling towers, are rather new, artificial heating, usually through wood fires is an ancient technology. Importantly, the better insulated houses are, the less energy needs to be expended on cooling or heating. Residents need to decide on the trade-off between building and operating cost.

In agriculture, technology has opened land formerly seen as sterile to gainful agriculture. Especially in Israel, where remote villages are usually based on agriculture, the full extent of development was easily visible: Greenhouse technology with automated high-tech irrigation and fertilising technology allows farmers a high level of control over their fields. Even in salty grounds special pulsing watering techniques have succeeded in pushing salt out of the ground making the land fertile. Dairy farming becomes possible through artificial cooling and techniques such as spraying cows with water. In subarctic forestry, artificial lighting and heated operator cabins have enabled year-round operations. Other technological adaptations are air-conditioning units and heaters in cars but also artificial lighting for arctic light conditions or engine heaters.

Infrastructure challenges

Infrastructure challenges are brought about through the realities of politics and economics. While these challenges might be mostly out of the control of residents they are at the control of decision makers and can, at least in theory, be eliminated as challenges or at least decreased. For example, residents might have a limited level of influence over whether or not their school is closed or a bridge is built. For the most part residents have to adapt to the infrastructure realities in their village. For infrastructure challenges especially, residents can have options to fill gaps through their own agency, through volunteering or village initiatives. Examples of infrastructure challenges are education, medical care, accessibility by road and

train, access to training and financial support for enterprises and initiatives, access to and quality of telecommunication.

Electricity, water, sewerage, garbage and telecommunications were provided at a sufficient level in all case study villages. The two main infrastructure challenges were health care and education. Interestingly, health care did not play as large a role for interviewees as was to be expected. While clearly understanding health services to be lacking, especially when it comes to specialist treatment, residents reported on accepting a low level of health provision as a part of living in a remote area. This perception included even interviewees at advanced ages, or those who were chronically ill. Rather, residents of four out of the five villages (see Outliers above) stressed the importance of education facilities for their villages. Having a primary school within the village was seen as of vital importance for the village's survival as it was believed that without a primary school families would move away. Secondary schooling, for most village youth, meant long commutes. While residents voiced their wishes for a closer secondary schooling option this, too, appeared to be a shortcoming that families were prepared to live with to an extent.

In grocery shopping, there was a difference between the Israeli villages where long shopping trips to the nearest town were the norm and the Swedish villages. In Sweden, while out-of-village shopping does happen there is also a certain trend back to local grocery stores. This trend might be reinforced by the *servicepunkten* (service point) concept wherein grocery stores can offer a range of specialist services such as prescription drugs, alcohol and postal services. Thus, services that had previously been lost to the towns can be brought back into the villages while at the same time providing local grocery stores with additional income streams. Revived village stores can also act as important community meeting places, a phenomenon that was also seen in Israel.

Other services can be provided through volunteering. Within this study there are examples of assorted emergency response, and governance, but also of unusual fields such as policing. Part-time service provision also plays a role. It provides services such as hairdressing or agricultural services to the community and its businesses while at the same time providing residents with additional incomes.

Employment is classically seen as an externally-created challenge as employment in sufficient numbers is typically only created by large corporations or through government intervention. Within this study in this area of remote life especially, the possibilities of agency through self-employment and small-scale entrepreneurship could be observed. Villages

decided to "make their own" employment through small-scale entrepreneurship and self-employment. Unusual employment models, including multiple income streams, telework, self-employment and the like, are common within the villages of this study and it was mostly in fostering a self-employment and entrepreneurship-friendly environment, rather than in large corporations providing jobs, that villages saw their future.

All villages in this study reported on having found ways of utilising their landscape and its unique properties in order to generate an income for its residents. Landscapes can be used in two major ways: either through direct exploitation in for instance energy, agriculture or forestry, or for tourism. In most cases both added income streams for residents.

While technology makes agriculture and forestry possible it does not necessarily make them economic. It is through using the landscape, i.e., using that which is unique about the landscape and climate to the entrepreneur's advantage that market niches can be found. In Israel, desert farmers soon understood that they can service a need in the European export market by being able to grow and deliver fresh produce off-season – which was only possible through the area's harsh climate that allowed for unusual growing seasons. The tourism industry utilises the aesthetic value of many remote landscapes. Here, the key lies in clever marketing and in the provision of a comfortable environment for tourists as much as possible. Low costs of land, both for land-intensive primary industries and for residential land, can be another way of utilising remote conditions.

While remote villages are often dependent on the goodwill of local government officials for retaining basic services, relationships between villagers and their next towns can be strained. Interviewees report that they feel misunderstood, politically powerless and not supported by their local, provincial and national governments. At local government level, it was evident that officials rarely spoke directly to government bodies within the villages and were unaware of their needs and priorities. For the most part, this is due to a different settlement history, and a different identity wherein setting yourself apart from the town might even be a part of identity building within the village. An unawareness and lack of available research on remote villages, especially as they are a type of village different from the rural village, increases the level of miscommunication. In the most extreme case miscommunication and a feeling of pronounced political remoteness can ensue at all levels from provincial to national governance levels. The best outcomes were seen where villagers themselves were also active, often on a part-time basis, in municipal offices therein enabling a direct line of communication and an ability for influence on a municipal level.

Community challenges

Community challenges are those challenges that are created by and thus under the control of the village itself. While external factors can provide structure that fosters a favourable or

less favourable climate for response to community challenges it is ultimately village residents themselves who create the challenge. Interviewees repeatedly described the tight-knit community with its large impact and large contact surface with residents' personal life as both "the best" and "the worst" about village life. One example that was repeatedly voiced was that of gossip. Gossip, described as abundant in all villages visited, can be an inconvenience and factor of stress due to the lack of privacy it causes, but was also described as a way of caring for each other. It was through gossip, interviewees experienced, that community members learned about their neighbours' needs in time of personal crisis. That is, the village community has the potential to both improve and deteriorate life within the village. The same is true to a larger context with the community both being able to find solutions to common problems, for instance a lack of infrastructure, and to cause additional problems through conflict between different groups and individuals. Community problems are especially interesting not just because of their subjectivity to villagers' own agency, but also because of the large role many interviewees reported a good community played in their decision to remain or relocate (back) to a remote village.

Examples of community challenges are community cohesion, inter-generational tension and internal political tension. Problems with retaining population can also be in large part a community-induced challenge.

Community cohesion is important for remote villages due to their high reliance on volunteering for provision of services that might in more central locations be provided by the local government. While a range of volunteering activities from internal governance, via sporting and leisure activities, to emergency response facilities was observed during this study there were also threats to volunteering. A large number of volunteering jobs need to be performed often by a small group of active citizens within the community which makes the community as a whole vulnerable to loss or inactivity of only one person. This is the principle of delicacy of remote villages, as described by Carson and Carson (2014), that means that a small group of people can have a high impact on a village. Extensive commuting can also reduce the volunteer pool. Commuters are, for instance, not available for emergency response activities that require a quick response. Commuting teenagers or teenagers attending boarding school cannot fulfil their roles as babysitters, leaders and mentors for younger children.

Especially in Israel, the choice of new residents was seen as critical in ensuring safety and community within the village. Israel's unique settlement history has enabled the design of a sophisticated screening process before allowing new permanent residents to join a village. In the Swedish villages while no such control mechanism exists there was an understanding of

a certain amount of natural selection of village residents. Residents voiced the opinion that while "perfect for some", village life was certainly "not for everyone", thus those that did not fit in with the community and its rather special perception towards life in a remote village would naturally not move to a remote village or leave again eventually. In both the Israeli and the Swedish example there was an underlying perception of feeling special and different towards the mainstream population as living in a remote village in a harsh environment.

Inter-generational change was a recurring theme in this study. Often, new settlement happens in waves meaning there are spikes in certain age groups leading to times of change from one generation to the other. Finding ways of achieving these generation changes can be challenging. In this study while two villages appeared inclusive and welcoming of the younger generation in political decision making and key services, in the other two there was a pronounced rift between the old and the new generation[13]. Such a rift can paralyse decision making and put an even greater strain on an already stretched small group of actives.

Extreme environments can also play a major role in identity building. Residents define themselves through their resilience, and in many cases through their affinity towards the extreme landscape and environment that surrounds them. In addition, a shared identity can be built through a shared history, and through industry affiliation. This definition of identity via history and employment can be a contributing factor to problems with generational succession if the new generation does not share the old's story and probably even ventures into new areas of business.

The village layout can play a role for community building. Where a village has a logical and functional centre with third place localities, meeting points develop naturally where village populations, irrespective of age group or profession, mingle. However, where this village centre is lost, because of village structure as dispersed settlement, or because of the loss of infrastructure and shops, remoteness can grow within the village, in the process exacerbating pre-existing rifts. This phenomenon puts an additional emphasis on the importance of retaining basic services in the villages beyond their pure function of providing groceries.

Liveability and migration patterns

In the background chapter two, it was discussed how liveability and especially liveability indices are based on the perceived needs of city populations. Remote villages, when ranked against the same indices cannot but fail. Thus, liveability indices based on the needs of a city-dwelling population but applied to remote villages have become a part of the problem of

[13] Be'er Milka is excluded from this topic due to its young age, meaning no generational change has taken place there yet.

artificial marginalisation of remote villages (Figueiredo, 2009; Gilbert, Colley and Roberts, 2016).

In this study, in accordance with scholarly findings (McKenzie, 2011; Rauhut and Littke, 2014; Hedlund and Lundholm, 2015; Berck, Tano and Westerlund, 2016) out-migration rates among young adults who have grown up in remote villages were almost a hundred percent. What is not as well-researched is the return of parts of the village youth after a period of typically around five to ten years, i.e., once tertiary education is completed and young adults settle down with their own families (Clark and Withers, 2007; Rauhut and Littke, 2014; Johansson, 2015). What is interesting about this phenomenon in the light of this study is that re-migration means that for these returned young adults living in a remote village was a conscious decision taken during adult life. The idea of re-migration as an active choice *against* the city and *for* the village is a concept that is different from any perception of youth remaining in their villages due to a lack of motivation or opportunity to move away.

The decision to move to a location means the individual or family liveability is perceived to be higher in the target place for specific reasons. These reasons for living in the village rather than an urban area are consequently what determine high levels of desirability for the migrant. According to Dorigo's (1983) simplified version of the push and pull laws governing migration, each decision to move is a culminated assessment of pull- and push factors as depicted in Figure 39. Push factors are hereby factors that push the migrant away from the location of origin (i.e., a city), while pull factors pull the migrant towards their target origin (i.e., the village). Respondents in this study identified both categories of factors in their individual decision to move back to the village.

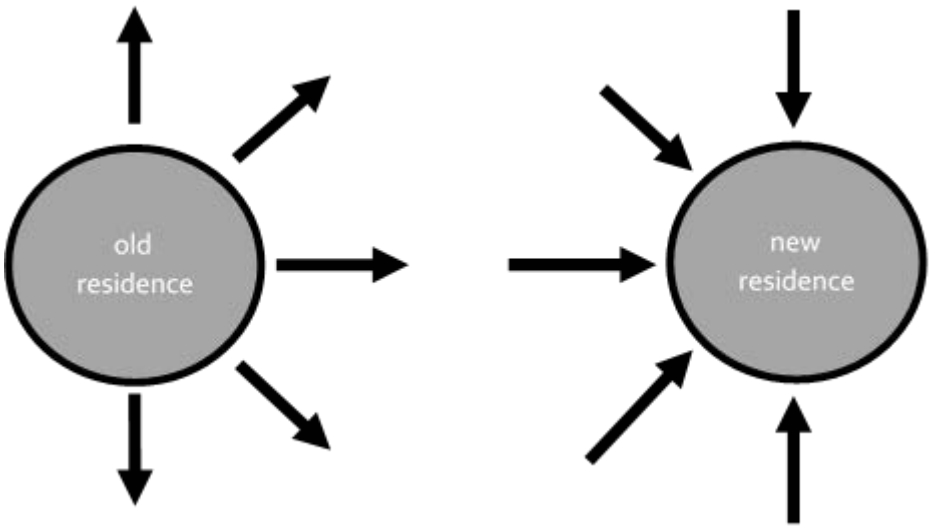


Figure 39: Pull- and push factors leading to migrations (after Dorigo 1983)

Some push factors – i.e., factors that pushed residents out of urban living spaces - played a more important role in those villages that have already been identified as outliers earlier: Kibbutz Yahel with its lack of a sense of place, and Resele in its borderline position as remote village and heterotopia. For residents of these two villages the availability of affordable real estate played a large role in their decision to move, i.e., they felt pushed out of an inflated urban housing market. A perceived lack of safety in an urban environment, especially for children, was a factor throughout the interviewee cohort with interviewees describing a desire of being able to "let the children run free" without needing to worry about criminality or traffic. The third factor was that of a lack of community cohesion in urban localities where people "didn't know their neighbour".

More interesting among the motivations for moves back into remote villages is the second class of factors; the pull-factors. In looking at pull-factors, which were almost uniform over all five villages, it becomes apparent that for the remote village cohort it is the village's perception as a place different from the urban mainstream. Residents reported on cherishing an access to nature and feeling a personal affinity towards the environment of their chosen village even though, or in particular because it was seen as undesirable by the mainstream population. More importantly, however, residents reported that they had decided on moving to a small village because they felt they could "make an impact" and "create their own", i.e., that they could create a new or different community with new or different rules of social ordering. Thus, in describing what had attracted them to their village, residents described the very nature of heterotopia: a safe place through its *separateness*, i.e., the state of being removed, from mainstream society where access was regulated through being limited to a certain type of people where residents were free to create a community with social ordering different from the mainstream society. The following chapter will describe in more detail the implications of understanding remote villages as unique types of settlement with their own challenges and opportunities, as *heterotopias*.

4.3. Summary

This chapter described in detail the case study sites and results from the 2015 case studies in five different villages in two regions. After the concluding summary of both regional differences and overarching themes this thesis will now move on to discuss the case study data against existing theory in order to arrive at new theory. The following chapter five will in its concluding section also look at the adaptability of findings for the hypothetical Martian village that informed the site selection and research design of this study. Subsequently, in the concluding chapter six the thesis will be summarised wherein a special focus will be given to discussing the impact that findings from this study can have on the field of human geography that heavily informs planning and policy practice. In order to explain the applicability of this study the concluding chapter will further include recommendations as to how to best utilise finding from this study.

5. Discussion: Remote Villages as Heterotopias

This chapter will discuss the concept of remote villages as heterotopias, that is *places of otherness* (Foucault and Miskowiec, 1986). In order to do so the chapter must first revisit the notion of remote villages as a distinct type of settlement. It does so in analysing the extensive Carson model of remoteness (Carson, 2011b; Carson *et al.*, 2011; Carson and Carson, 2014) against the findings from this study. This chapter will show how the Carsons' work can be extended on through understanding the relationship of the factors, or "D"s of remoteness identified by the Carsons. The chapter will then go on to explain the link between remoteness and heterotopia. The implications of remote villages' classification as heterotopias will be discussed in the following chapter six as shown below, in Figure 40.

In the case study data all five villages in two different regions showed a distinct overlap of challenges. Challenges related to terrain and geo-political situation (the "environmental challenges") were met through techniques and technology, as well as through a certain amount of adaptation by the individual. Analysing challenges related to infrastructure provision showed a clear mismatch between current provisions and residents' needs, but also the possibility to substitute an amount of absent external infrastructure provision with local initiatives. Throughout all types of challenges, the village community appeared to be both the villages' largest asset and its biggest challenge with generational change often being a point of friction.

Often, adaptation to challenges was at the same time a determination of identity for remote village residents. Villagers reported on a strong perception of place (Avriel-Avni, Zion and Spektor-Levy, 2010); they defined themselves through their resilience towards inhospitable environments, perceiving remote village life as "perfect for some but not for everyone". It became clear that, at least as seen from the perspective of residents, remote villages were a special and distinct type of village.

Figure 40 indicates that this chapter analyses the findings that were presented in the preceding chapter four against the existing literature as discussed in chapter two. The remote villages of this study conformed to the notion of remote villages not merely as a distinct type of village, but also to the notion of remote villages as heterotopias, that is of places with culture and potentially even social ordering (Hetherington, 1997) different from the urban norm (Foucault and Miskowiec, 1986; Vidler, Foucault and Johnston, 2014). As heterotopias, remote villages might be removed from mainstream society, but they are in constant interaction with it. Most noteworthy, heterotopic villages can become places of social ordering (Hetherington, 1997), that is living laboratories (Raven, 2015) where new approaches of social ordering can be tried out. If remote villages are indeed a distinct type of village and can even be heterotopias, places of otherness, then it becomes clear that planning

and policy paradigms need to be rethought to cater to a heterogeneous remote village landscape.

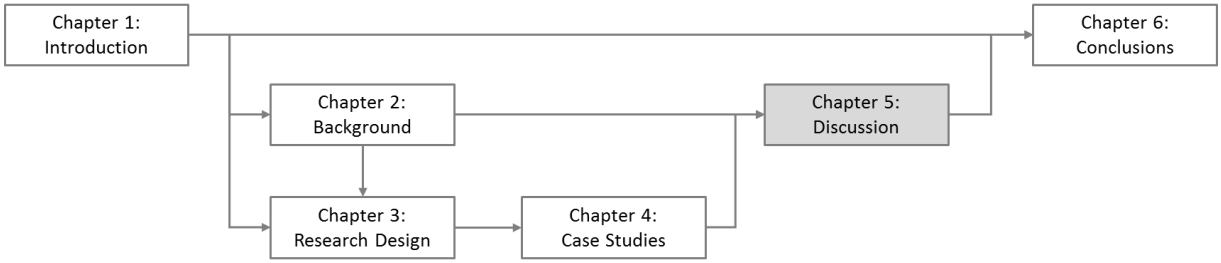


Figure 40: Thesis chapter structure and dependencies

5.1. Remoteness as a distinct type of settlement

Remoteness was long seen as an extreme manifestation of rurality and treated accordingly, especially in policy and planning practice (Cloke, 1985; Copust and Crabtree, 1996). Usually, remote or "marginal" villages are seen as inherently in decline and indices to identify such villages might even include a socio-economic component (Cloke, 1977; Cloke and Edwards, 1986), effectively producing self-fulfilling prophecies of remoteness. Only in more recent years have remote or "sparsely populated" areas been perceived as a distinct type of settlement with characteristics that defy the expectations for rural villages (e.g. Carson & Carson 2014; Figueiredo 2009; Gilbert et al. 2016).

Carson and Carson (2014), specifically developed a model describing the distinct characteristics of remote settlement (Carson and Carson, 2014). According to Carson and Carson remote villages are *disconnected*, *discontinuous*, *diverse*, *detailed*, *dynamic*, *distant*, *dependent*, and *delicate*. While the choice in naming might not always be self-explanatory, their findings have enabled analysis of remote villages against a specific set of attributes and thereby provided research into remote villages with an important new tool. Below I will relate the findings from this study to the Carsons' characteristics of remoteness. The implications of accepting remote villages as a distinct type of settlement, rather than just an extreme example of rural, led to a questioning of our current understanding of remote villages in human geography and thus in planning paradigms and practice for remote villages and potentially also other settlement types. In the following analysis, findings from this study are examined against the Carsons' criteria in order to establish the villages in question as examples of remote villages according to the Carsons' understanding.

Discontinuous

Settlement into remote areas appears to often happen in waves, rather than in a continuous manner (Carson and Carson, 2014). This could be seen both in the example of the Israeli Arava where settlement happened first by the kibbutz movement and later in the form of moshavim (Elad, 2000; Ben-Artzi, 2001), and in the example of Norrland, where an initial wave of independent homesteaders was later followed by government-driven migration (Bylund,

2000) and ultimately by the lifestyle-driven migration we see today. Usually, settlements have emerged for specific purposes (Carson and Carson, 2014), often associated with accessing natural resources or the exercise of sovereignty over border territory (Bylund, 1971b; Müller, 2015).

Diverse

Due to their discontinuous settlement history remote villages within any given area can be largely different from each other (Carson and Carson, 2014). This diversity manifests in different infrastructure, different needs and different populations groups, as well as cultural and demographic predominance. Importantly, that means that any single village in an area is not representative of the area as a whole (Koch and Carson, 2012).

While often different from each other in age by only a handful of decades villages in this study were built in different historic and political contexts, settled by different groups of people and might have had different infrastructure provisions during their early settlement phase. For instance, in Israel villages might have been settled during the kibbutz movement leading to kibbutz-type villages which would be inherently different from the only slightly later – or even contemporary – moshav-type settlements that lack the socialist background and ideology of the kibbutzim. The time of settlement also decides the political climate at settlement and thus the amount of assistance that was available and by what groups any assistance was provided. The historical context even determines the type of people who would move. These settlers can for example be a population pulled into a frontier by fiscal incentives, or a group pushed away from the centre because of a socio-political disconnection to living conditions there.

But even within the same historical context, villages in the same area can still be remarkably diverse due to villages' individual specialisation. This diversity might be due to access to a local resource as is the case for mining towns, or due to a special interest group founding a village. The latter was especially obvious in the example of kibbutz Yahel, a village that, while founded around the same time as its neighbouring settlements and even of the same kibbutz settlement type is very different from other villages in the area. In Yahel, this difference was caused by its settling cohort's culture as Reform Jewish and foreign-born that set them apart from the secular and to a larger part Israeli-socialised population of other villages in the area.

The consequences of this diverse nature of remote villages within one settlement landscape are remote villages having diverse needs, facing diverse challenges, and providing diverse opportunities. A blanket approach to planning in a remote area is thus likely to fail many if not most of the villages in the area.

Disconnected

Settlements in remote areas lack the pronounced core-periphery dependency that is typical of the relationship between centre and periphery (Carson and Carson, 2014). Residents of

remote settlements are often more opportunistic in their relationships to towns and in choosing where and how to access services. Typically, the nearest service centre – usually a small or mid-sized town – is skipped in favour of large, better equipped service centres. While opportunistic thinking is usually the driver for this skipping of smaller towns, in many examples historic differences between villages and their nearest town, caused by the discontinuity of remote settlement, add to this phenomenon.

This phenomenon of disconnection between villages and their nearest towns was observed in all case study villages. Especially when it came to accessing specialist medical services or cultural activities residents of all villages reported on regularly foregoing their closest towns, but not always favouring the capital cities. That is, rather than accessing the closest hospital, residents, who often described its services as lacking, travelled onwards to the capital or a larger coastal town even if that was hundreds of kilometres away in order to access a better service. The same was the case for cultural activities with the exception of those activities in the villages or local area. A further area where this opportunism was clearly visible was that of tertiary education. Even though local universities have been established in frontier towns, such as Be'er Sheva in Israel or Umeå in Sweden, residents were more likely to move to the national higher education centre, usually Tel Aviv for Israel and Uppsala for Sweden, to access tertiary education. It needs to be noted, though, that due to the young age of these frontier universities the effect might not be visible for another generation as education patterns change over time.

Residents of any given village did not have a pronounced relationship with any specific town as might be expected in a classic centre-periphery relationship. Rather, which town was chosen in order to access services was a matter of personal preference. Residents might go to a specific town because of family connections, connections from before their move to a remote area, practicability concerns, such as the fact that the trip can be combined with other errands, or simply the town's reputation in a certain area of specialisation. Thus, even when looking at the same family different services might be accessed in different towns.

Distant

Remote villages are distant from large centres, as well as from each other. In this context, distance can be relative and can be influenced by policy measures. For example distance is increasing as service nodes are removed (Carson and Carson, 2014). What is more, remote areas are usually defined by a low population density (Gløersen and Dubois, 2010), that is their populations can be distant to each other.

Distance in this context can be both spatial, i.e., in kilometres from each other and from towns, and cultural, i.e., through differences in culture that create remoteness even in spatially less remote places. Where cultural distance is pronounced, as was the case for instance between Glommersträsk and its neighbouring town of Arvidsjaur, residents might forego at least to some extent the access of services available in this place and opt for

accessing them in a place that is perceived to be more neutral territory. That is cultural differences, often caused by discontinuous settlement and diversity of settlement within an area, increase relative distance in remote areas. Attempts at quantifying remoteness via distance have been discussed in the background chapter two, where it has been shown that none of these indices is without its flaws. Ultimately, distance is a multi-facetted phenomenon as was seen in the example of these case studies. Distance includes not just cultural and spatial aspects, but distance is also dependent on accessibility through terrain and the mode of transport. A distant hospital, for instance, poses a lesser challenge to emergency medical services if a helicopter is readily available for emergency evacuation, as was the case in Kibbutz Yahel and Neot Ha'Kikar, as well as is typical for mining camps such as Osborne mine. In the opposite case, when helicopters are not available, as was the case in the Swedish case study sites, even eighty kilometres might prove to be too far away from a major hospital.

As Carson and Carson (2014) observed, relative distance can grow over time. In Israel, where policy might no longer favour villages, but instead focuses on enhancing infrastructure in frontier towns the phenomenon was not as present as it was in Sweden. Swedish policy groups such as *Hela Sverige Ska Leva* ("all of Sweden shall live") have long criticised the increasingly city-centric politic of their country and what they refer to as the *Stockholm norm (stockholmsnormen)* of infrastructure provision. For instance, Glommersträsk had just recently become the single village in its municipality that still retained its primary school and Resele, having already lost its aged care facility, was at threat of losing the closest hospital's maternity ward. Both events, made the villages in question more distant when it comes to service provision even though spatial distance remained the same.

Dependent

While remote villages might be less dependent on any given central location due to their greater opportunistic behaviour and disconnectedness as described above, they are very dependent in terms of political decision making. As Carson and Carson (2014, p.341) state "small populations, large areas of land seen as underutilised resources, and political realities relating to defence, population 'protection' and welfare, among other things, mean that external agents (such as distantly based governments, mining companies, missionaries) have been responsible for many of the decisions about the shape and nature of socio-economic systems in sparsely populated areas (Huskey, 2006)".

Remote villages are dependent on the socio-political context. In Israel, tension on the Israeli-Jordanian border during the 1970s and 80s facilitated the construction of villages such as Neot Ha'Kikar and Kibbutz Yahel out of a perceived need to protect the border and at the same time exercise sovereignty over potentially contested land. Later, when Be'er Milka was settled during the 2000s this focus had switched to the Israeli-Egyptian border, however the intent of exercising sovereignty over the Negev desert by settling it (Ben-Gurion, 1956) had

remained the same. Importantly, by the time Yahel was settled it was no longer the official Israel that supported such settlement, but NGOs and private interest groups. These changing political interests are mostly out of the control of the villagers, but at the same time have a pronounced impact in their lives through the availability of resources. While for example a right to utilities provision in remote areas remains as a legacy of a past where rural and remote settlement were a government priority, newer villages like Be'er Milka cannot depend on the availability of public money in order to fund their infrastructure.

In Sweden, a missing awareness of both policy makers and the city-dwelling general public for rural and remote themes and a missing awareness of the importance of national food security impact negatively on the development prospects of the villages and their populations. This lack in national interest signifies that funding for services becomes scarce – resulting in the closing of schools and hospital wards that threatened population retention in both Glommersträsk and Resele. Even laws, such as the Swedish petrol tax, can have a disproportionate impact on rural and remote areas. The Swedish example shows that such a dependence can go beyond the national level. The European Union can influence villages' prospects through the availability of Regional Cohesion Policy funding, but access to this money is tied to tight regulation that might be hard for individuals to fulfil.

Socio-political or geo-political developments and shifts, that are outside the control of the villages can have a pronounced impact on residents' lives. The result of this seemingly one-sided dependence is a pronounced feeling of political remoteness, i.e., a feeling of not being heard in political representation and feeling increasingly estranged from the centre that was evident in all, but especially in the Swedish context.

Detailed

In remote villages small changes can have a large impact (Carson and Carson, 2014). Carson and Carson somewhat clumsily describe this phenomenon as remote villages being "detailed". Remote villages being "detailed" means they have a tendency for what might at first appear to be a less significant factor to have a larger impact. The most obvious example of this capability for a small change to have a large impact is the Resele initiative. In Resele, a village that had seen large-scale and continuing decline, a small group of young families utilised a momentarily changed situation in internal politics to induce massive and so far, ongoing change. Within only a couple of years Resele has seen the relocation of a number of city families to the village that has in turn reinforced this ongoing change.

Resele also highlights the risk that this "detailed" nature of villages poses: Initiatives that were started through seemingly unimportant factors, can just as easily be stalled, or stopped by seemingly minor changes. For instance, in Resele, where important initiatives are supported by only a handful of individuals a seemingly unimportant occurrence in the personal life of one individual person could withdraw the support needed to keep initiatives

going and sustain development. Thus, a small event in one person's life can have a large impact on the trajectory of the village as a whole.

This large influence of the micro level on remote villages was also present in all other villages as an example of one common theme: that of having come to the villages in order to be able to make a change. That is, the "detailed" nature of remote villages; i.e., the opportunity to have an impact is what attracted many residents to living in a remote village in the first place.

Dynamic

In remote villages change is common. Carson and Carson (2014) see one reason for this dynamic nature in the transient nature of remote villages' population that is typical, especially for Australian remote villages.

This dynamism was clearly observable in all case study villages. In all villages in this study there was a flurry of activity when it came to creating the future. Israeli villages' residents were busy planning their village through different committees. In Sweden residents organised in comparable though less formalised interest groups, for example the "Flytta till Resele" [move to Resele] group or the Glommersträsk entrepreneurs' initiative in planning for a future after retirement of the grocery store owner. In remote villages small changes, such as those that can be made by a single person or small group, can have a large impact on the village. This means that change is a constant and natural occurrence.

What was not observed, however, as anticipated by Carson and Carson's (2014) explanation for the phenomenon, was a high transience of population. While the Carsons' described remote villages as having a "proportionally greater flow- through of human [...] resources" (Stafford Smith, 2008; Carson and Carson, 2014) the villages in this study were defined by population settling down and staying for extended periods of time, often into retirement age. Dynamism in terms of population was brought into the case study villages by the fact that with just one single exception among seventy-six interviewees in this study everyone had lived outside their current village at one time of their life. These observations match with new results from Sweden on migration and re-migration as a life-cycle phenomenon (Rauhut and Littke, 2014; Johansson, 2015). Apart from those who had moved to a remote village as an adult, village-born adults also usually leave their villages in order to attain an education and later choose to come back in order to settle down, typically in their early thirties. It is plausible that it this element of re-migration (Clark and Withers, 2007; Rauhut and Littke, 2014; Johansson, 2015) that replaces the dynamism through transient populations described by Carson and Carson (2014) in bringing new ideas and concepts from the cities into the villages as village-born populations return.

Delicate

Change in remote villages is typically dependent on seemingly insignificant factors that might be inconsequential in any larger settlement but have a large impact on the village. This leads to remote villages being vulnerable, because factors that have a large importance for a village can be overlooked through their detailed nature, or, as Carson and Carson (2014, p. 3) describe "particular characteristics of the socio-economic systems [that] are hidden from view". This "delicate", i.e., vulnerable nature of remote villages is highly problematic for planning and policy approaches, which can inadvertently damage a village through missing out on the small details that are vital for village development.

Sometimes villages' delicacy appears obvious at a second look. With the exception of kibbutz Yahel[14], residents of all villages in this study reported on a lack of regional government's understanding in regard to the importance of having a school close to the village. It appears to be the school that decides whether or not young families will move to or remain in a village, thus whether or not there is at least an elementary school within easy reach for the village can potentially decide a village's population development trajectory. In my own interviews with municipalities in both regions it was evident that planners and officials did not understand the implications of whether or not villages had a primary school, thus running the risk of cutting villages off from their vital supply of young families by shutting down elementary schools.

Even population development trajectories themselves can be obscured through disregarding details leading to decisions that damage villages almost irreparably. Johansson (2015) touched on this phenomenon when researching migration patterns from and into remote areas. While it is true and in accordance with the findings of this study that nearly all young adults leave the village in order to access higher education, policy makers and officials might overlook the implications of life cycle on migration (Geist and McManus, 2008). For remote villages this means that there is an often overlooked tendency for a portion of village-born young people to return to their home village or another remote village after an intermittent period of city-living in order to settle down and have children of their own (Rauhut and Littke, 2014; Johansson, 2015), usually bringing with them one extra person in the form of a spouse – a phenomenon repeatedly observed in this study. Thus, a high percentage of youth out-migration does not necessarily imply a negative long-term outlook for a village's population development. Making planning decisions based on youth out-migration, essentially committing a village to palliative care (White, Wall and Kristjanson, 2004), can have severe consequences for a village.

[14] See preceding chapter for "outliers"

Figure 41 shows the above described connections between the defining aspects or "Ds of remoteness" as identified by Carson and Carson (2014). Remoteness, as per the Carsons' understanding, is a complex phenomenon of inter-dependent aspects that cannot be understood in isolation to each other. This understanding of remoteness goes along with what has been observed in this study: remoteness is more than merely physical separation from another place, but rather is a combination of often inter-connected factors. Herein the individual aspects identified by the Carsons were clearly observable in the villages of this study, both confirming the working theory of these villages being remote, and confirming the Carsons' model's applicability to remote villages in different regions and cultures.

In the Carson model, a clear causal link connects aspects of remote villages' nature – what the Carsons describe as "discontinuous", "diverse", "distant", "dependent" and "disconnected" - as well as the way in which they react and adapt – aspects the Carsons describe as "detailed" (i.e., a high influence of the micro-level), "delicate" (i.e., vulnerable) and "dynamic" in nature. What seems however to be missing is an explanation as to why remote villages react and adapt in the way they do; why they typically are so "detailed", "dynamic" and "delicate".

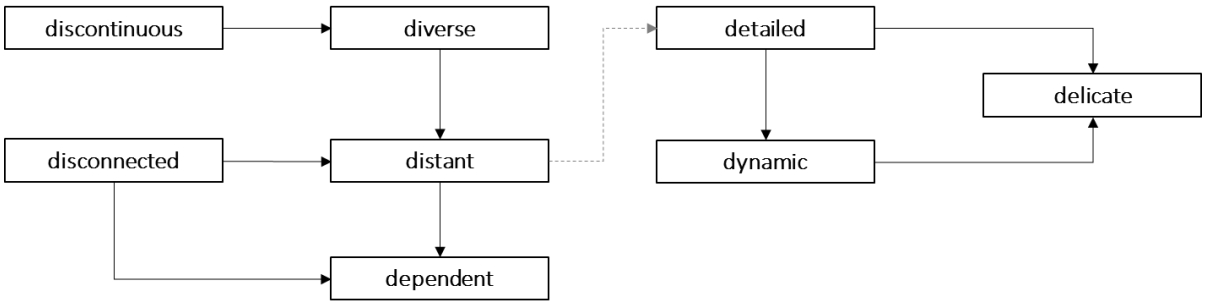


Figure 41: Connections between Carson and Carson's "Ds of remoteness" (extended upon Carson & Carson 2014)

Putting the aspects of remoteness in relationship to each other allows us to understand not merely what needs to be acknowledged when working with and attempting to understand remote villages, but it helps in understanding how these phenomena developed. The Carsons (Carson, 2011a, 2011b; Carson and Carson, 2014) have laid the groundwork to understanding remote villages by identifying the features or factors of remoteness. This chapter is able to add to this groundwork a layer of connection and relationship between those factors that explains in what way the observed factors cause each other. There remains, however, the need to explain the underlying phenomena that cause discontinuous, diverse, disconnected, distant and dependent villages to become detailed, dynamic and thereby delicate. The following chapter suggests that this missing link is heterotopia; in doing so I propose a theory as to why remote villages are showing the factors and features described by the Carsons. It is in understanding remote villages on this new level that we can then, in the next chapter, move on to discuss how to go forward from here to the benefit of both remote villages and the society of which they are a part.

5.2.Remote villages as heterotopias

This study suggests that remote villages have the potential to be heterotopias. The literature review chapter introduced the concepts of utopia, dystopia and heterotopia. It is the latter, *heterotopia* that best describes the villages of this study.

The notion of heterotopias as "effectively enacted utopias" (Foucault and Miskowiec, 1986, p. 22) was introduced into social scientific discourse by Michel Foucault. Whereas Foucault himself understands utopias as no-places, that is as places that cannot exist in the real world, he experiences heterotopias as very real, physical localities. Foucault describes heterotopias as places removed from normality, often through some kind of a barrier where entry is controlled. Entry to heterotopias is either mandatory or requires a kind of purification or permit. However, heterotopias are defined not merely through their restricted access, but also through the otherness of social ordering and the distinct deviance from the norm of their populations. Finally, heterotopias are defined through having a function towards the very mainstream society they are separated from (Foucault and Miskowiec, 1986).

Foucault offers a broad list of potential heterotopias. *Heterotopias of crisis* are for instance sacred sites or sites set aside for rites of passage – such as the boarding school or men's military service. *Heterotopias of deviation* on the other hand are locations that house a population deviating from social norms. While classic and often-quoted examples of heterotopias of deviations are prisons or mental asylums (Foucault 1986) these institutions lack the element of free decision in residents' relocation that alternative communities like the kibbutzim like to emphasise. Nonetheless, what all of these places have in common is that even though they are in some way removed from normality, heterotopias interact with and fulfil a function for conventional society.

The case study sites' physical separation from mainstream society was visible in their distance from the larger population centres, but also through a very different climate and terrain. While at a first look these villages might be accessible to everyone, such is not actually the case. Foucault when prescribing that heterotopias should have "a system of opening and closing" (Foucault and Miskowiec, 1986, p. 26) predicted heterotopias that seemed to be open to everyone, but are not actually so:

> *There are others, on the contrary, that seem to be pure and simple openings, but that generally hide curious exclusions. Everyone can enter into these heterotopic sites, but in fact that is only an illusion: we think we enter where we are, by the very fact that we enter, excluded.* (Foucault and Miskowiec, 1986, p. 26)

On a physical level, those travelling to remote villages might in fact require specially equipped cars or special knowledge of weather extremes, such as seasonal flooding. In the case of the Israeli villages the separation was even more pronounced through the existence of security

fences and gates. But for the villagers in this study it was most prominently the special mindset required that kept access to their villages and to their way of life restricted:

> *There aren't too many people who can live this type of life. For many it's the end of the world. For us … you just make your adjustments and there is no problem. (a village resident, Ein Tamar)*

> *People are different. Some would love to live out here. Even if that is only one percent of the total population that's more than enough for Resele. (a village resident, Resele)*

Besides the spatial aspect, access to heterotopias is also regulated by a deviance of population in their culture and social norms. Such was the case in the case study sites. This understanding of remote villages as a place where one can live according to a different set of social norms and "have an impact" was quoted as the most important reason for relocating to and living in a remote village.

> *We wanted to live in a place that is remote from standardised, commercialised mainstream lifestyle. We wanted to create a bubble where we can raise the kids safer, simpler and with more nature. (a village resident, Be'er Milka)*

> *My wife and I think a moshav is better for us [than the city]. [In a moshav] we can be involved in something bigger, we can be a part of the cake. (a resident, Ein Tamar)*

Figure 42 illustrates how the cultural aspect of heterotopia and remoteness can be—at least in part—self-induced by a village population that seeks to distinguish itself from the culturally dominant urban population. Village residents identify and define themselves via their perseverance over unfavourable environmental conditions and distance from service centres, hence they see remoteness as something that is desirable which gives them a perception of place (Avriel-Avni, Zion and Spektor-Levy, 2010). At the same time, harsh conditions and

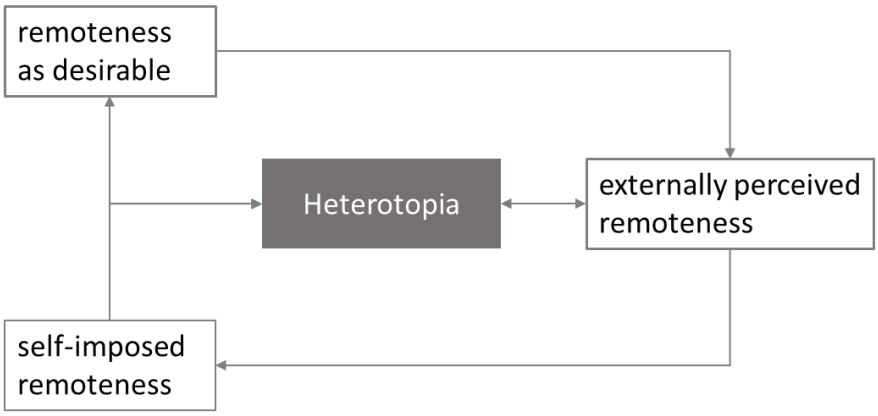


Figure 42: Heterotopia as a self-induced concept

cultural, as well as spatial remoteness also serve as a selection criterion influencing what kind of people choose to move to any remote location; harsh conditions attract a specific type of personality (Murray et al. 2005). This specific personality type contributes to forming a distinct culture within remote villages which in turn can increase cultural remoteness. Understanding heterotopia theory in this context of voluntary self-selection signifies that only through their challenges and their restriction of access can the village become this distinct type of heterotopic village as compared to mainstream society. It is, in a large part, these unique challenges such as caused by its remoteness that make a village a heterotopia.

Heterotopias, through their otherness can have rather strict formal or informal norms that must be followed by those present and that can be acutely different from norms employed by the outside world (Foucault and Miskowiec, 1986; Vidler, Foucault and Johnston, 2014). These characteristics of a tightly regulated environment were most visible in kibbutz Yahel. More than merely applying the social norms associated with being a kibbutz (Spiro, 2004) the community has even created a distinct Reform Jewish environment enforcing Reform Jewish values upon the individual.

> *An outsider wouldn't feel it [that this is a reform Jewish kibbutz] but living here you feel it; you feel it during holidays. There are the same issues here, there is theology. There are similar agendas to some political topics. – a kibbutz member, Kibbutz Yahel (non-member resident, male, working age)*

> *Reform Judaism affects Yahel beyond religious life. – a kibbutz member, Kibbutz Yahel (foundation member, female, late working age)*

Other villages described their informal norms less directly when referring to the large cultural difference between the village community and the town. An especially important norm in the village was herein the commitment to the community by way of helping as a volunteer or even just the pressure on the individual to opt for shopping locally rather than in the nearest town.

Foucault (Foucault and Miskowiec, 1986) describes *heterotopias of deviation*, that is places for those who do not fit or do not choose to fit mainstream social ordering. Remote villages are such heterotopias of deviation; that is of departure from the socio-cultural norm, if they provide a safe environment for those who want to live in a social context different from the urban mainstream. Research is emerging that supports this theory when reporting on different needs of remote populations (Gilbert, Colley and Roberts, 2016), the diverse and dynamic nature of remote villages (Carson and Carson, 2014), or even on the prevalence of different personality types upon remote populations (Murray *et al.*, 2005).

Foucault (1986) and Hetherington (1997) further predict that heterotopias are not merely removed from mainstream normality, but that they fulfil an important function towards it. Heterotopias are in constant interaction with the outside world; on the simplest of levels as heterotopias of deviation (Foucault 1986) remote villages provide a place for those who do not want to or cannot conform to the rules of mainstream society. What is more, remote villages have a capacity for innovation, for example in social re-ordering that can impact on social ordering even outside the confines of the heterotopia itself.

We wanted to be part of the new community that was going to fix the world.
(a village resident, Kibbutz Yahel)

While their function of providing an alternative for those who cannot or do not want to conform to mainstream social norms is obvious it has been argued that the function of heterotopias goes above and beyond this existence as heterotopia of deviance. As heterotopias, remote villages have a capability for *utopics* (Raven, 2015); that is the creation of new approaches of social ordering through the striving for a better place – a utopia. While in a constant interaction with the outside world heterotopias are removed from the dominant urban culture and, crucially, provide an environment where a different form of social ordering can be lived (Hetherington, 1997). Residents describe this phenomenon when speaking about their villages as places that are "not for everyone but perfect for some", and when they describe how they chose to live in a remote village because here they can build "a better place" for themselves and their children.

Heterotopias are places of social ordering; places where new attempts at the norms and rules that govern our relationships can be developed and tried. The following chapter will shed light on this potential for social ordering and its important function for mainstream society.

5.3. Remote villages as places of social ordering

Hetherington (1997) builds upon Foucault's notion of heterotopias by describing them as "places of social ordering" – or simply as places of utopics. *Utopics*, describes the process of striving towards utopia, creating new approaches of social ordering in the process. It is important to understand the difference between utopia and utopics: Utopics is the process of ongoing development in reaching towards utopic living spaces, while an utopia once it is reached is, as per its definition as the static state of an ideal society (Raven, 2015).

From the utopics point of view, it is the process of striving towards utopia that is important, whether or not utopia is ever reached, or indeed even can be reached, is of no effect. It is the process that produces a tangible result by mirroring and questioning the old order (Foucault and Miskowiec, 1986) in order to propose a new one. To illustrate the point Hetherington (1997) fittingly recounts the impact of the mall area constructed around the Royal Pavilion in Paris, which he identifies as such a heterotopia. The coffee houses of the Royal Pavilion provided a forum for debate removed from normality and, seemingly, offering protection for

those debating. Other historic examples of such heterotopias are for instance market places, places where the social classes could mingle freely, or festivals (Foucault and Miskowiec, 1986; Hetherington, 1997). In this function as a place of contact between different cohorts and classes the concept of heterotopia somewhat overlaps with the notion of *third place* (Oldenburg and Brissett, 1982), that is places outside the dual division of settled space in home and work environment.

Carson and Carson (2014) described the capability of remote villages for change when describing remote villages as "detailed" and "dynamic". This was repeatedly observed in the case study villages of this study. Being *detailed* in this context means that small changes can have a large impact on a village, which makes it easy to induce change. In describing remote villages as *dynamic* Carson and Carson recognize that change is common within remote villages. Carson and Carson (2014), while crediting the dynamisms of remote villages to a high level of population turnaround that was not observed in this study, are right in observing that change happens more frequently in remote villages. It is because of remote villages' identity as heterotopias and thus as places of utopics – which might well be caused by the fact that because remote villages are, in this sense, *detailed* change is easy to induce – that change is commonplace within remote villages.

As described above while the Carsons' (2014) have described the features of remote villages, an explanation for their cooccurrence was so far lacking. The results of this study suggest that the heterotopian concept can address this gap. Figure 43 highlights how heterotopia could better explain the Carsons' (2014) model: Regular change or dynamism in a small-scaled environment is a symptom of active social ordering. This active social ordering is itself a consequence of the heterotopian nature of remote villages brought about through the barriers to access diversity and distance as aspects of remoteness provide.

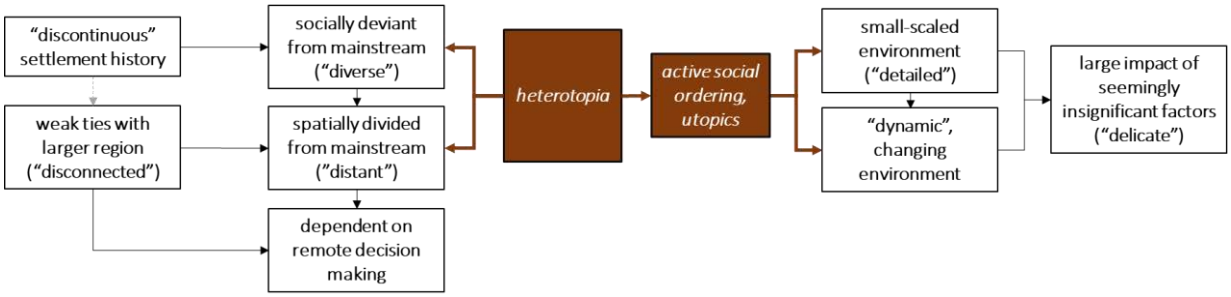


Figure 43: Heterotopia as the connecting element of the Carsons' (2014) aspects of remoteness

For instance, to explain from a more tangible example, the Israeli kibbutzim in general are an easily visible case of heterotopias and their capability for social reordering that in turn impacts on mainstream society. Through their unique circumstances of large amounts of, at

times radical, attempts of social re-ordering in their attempt to create a utopia during a time critical in Israel's nation building and with close ties to Israel's elites, "kibbutzim-generated" new social ordering which today influences almost every aspect of Israeli policy and society. A large body of research details the kibbutzim's role in areas such as defence (Drory, 2014), their model of educating an economic and intellectual elite (Kedem-Tahar, 2014), attempts at an alternative justice and prisoner re-integration system (Shoham and Timor, 2006; Rettig, 2010) as well as landscaping, planning, and architecture (Amir, Churchman and Wachman, 2005; Snir, 2007; Rosenberg, 2012). Kibbutzim also often stand out in their attempts at agriculture in climatically extreme regions and in their role in establishing green technologies and sustainable settlement practices (Bang, 2005; Snir, 2007; Palgi and Getz, 2014). In Europe the role of heterotopic remote villages for social re-ordering in the urban mainstream society might be less obvious but can nonetheless be traced for instance to the example of eco villages (Bang, 2005) and possibly transition towns (Connors and McDonald, 2010; Kenis and Mathijs, 2014).

5.4.Summary

This chapter put forward the theory that remote villages can be heterotopias. Remote villages being heterotopias can explain the features of remoteness described by the Carsons (2011; 2014). What is more, understanding remote villages as heterotopias enables researchers and policy makers to view them as contributors to society through being highly innovative living laboratories (Hetherington, 1997; Raven, 2015). Such an understanding of the potential of remote villages might lead to a major shift in policymaking for remote villages.

Similar attributes were observed in all of the case study villages. These observations could be shown to correlate with the features of remoteness described by the Carsons (2011; 2014). This chapter further demonstrated a relationship between the attributes described by the Carsons. The Carsons' (2014) model alone was, however, not sufficient to explain why remote villages have been observed to be dynamic places of change. This connection could, however be explained through a heterotopian nature of remote villages; that is through remote villages being places of otherness through their physical and social disconnectedness from mainstream society. In this chapter I was able to lay out proof that at least the villages in this study did indeed conform to the features expected to be observed in a heterotopia. Given that the case study villages also confirm to the features expected of a remote village according to the Carsons (2011; 2014) this is at least a strong indication towards a relationship between remoteness and heterotopia.

Heterotopias fulfil a function towards mainstream society (Foucault and Miskowiec, 1986). In its most simplistic form this function in the example of remote villages is that of providing a heterotopia of deviation, i.e., a place for people who cannot or choose not to follow

mainstream social rules. However, it is argued in accordance with Hetherington (1997) and Raven (2015) that heterotopias can further be places of innovation and social ordering; places where new attempts of social ordering can be developed and tried in a living laboratory environment. These new attempts of social ordering can later be adopted by and advance mainstream society.

Such an understanding of remote villages as in a two-way relationship with mainstream society signifies a departure from a theoretical understanding of remote villages merely as dependent beneficiaries. It makes a case for remote villages having a place and being important for society. The following conclusion chapter will go on to expand on how the findings from this study can be used to support remote villages in making use of their innovative potential.

6. Conclusions

This research suggests that remote villages can be highly innovative given their heterotopic, deviant nature apart from mainstream society, a quality Raven (2015) described as a living laboratory. Heterotopic remote villages' innovative potential can offset at least a part of any missing infrastructure, as was observed in all case study sites. What is more, the new solutions these villages may produce can, as for instance in the example of the Israeli kibbutzim, influence mainstream society.

As heterotopias remote villages are not merely removed, or remote, from mainstream society, they are in fact also in a direct relationship with it and fulfil an important function towards mainstream society. This function towards mainstream society that has so far been overlooked in research was described by making use of Hetherington's theory of heterotopias as places of innovation in social ordering (Hetherington, 1997).The preceding chapter, through analysing results from this study against existing theory was able to show that remote villages can be heterotopias.

The question that arises from these findings is then how to support remote villages in accessing and making use of their innovative potential. In this chapter I will use structure and agency theory to explain one way of improving policy and planning based on the findings of this study. I will then make recommendations on future research that is needed in order to further our understanding of and our capacity to plan for remote villages.

Finally, this chapter will connect to the opening proposition of this study, namely, future villages off-planet. It will be demonstrated that findings from this study while shown tom be applicable for existing settlements on Earth will also be applicable to this more exotic settlement.

6.1. The role of structure and agency in heterotopic remote villages

The problem that emerges from remote villages' diverse nature, as shown above, is that of allowing remote villages to access their potential while providing for their very individual needs. According to structure and agency theory a community, in order to function, needs both access to pre-defined rules and resources (i.e., *structure*), and the ability to exercise their own power (i.e., *agency*) (Chouinard, 1997; Connor, 2011; Skerratt and Steiner, 2013). Crucially, structure and agency typically rely on each other. Agency is needed to provide structure and structure is in turn required to enable agency. In the example of remote villages this cycle can be destructive: Seen as inherently in decline by way of a lack of visible agency, politicians allocate resources elsewhere and permit remote villages to slowly die (White, Wall and Kristjanson, 2004). As resources are lost from the village families move away or fail to return and the wider public becomes increasingly convinced of the villages' unsustainability.

As a consequence, the village becomes ever less able to exercise agency as it now has fewer resources or *structure* available; thus, it becomes less and less able to influence decision makers and to bring back those vital services, which in turn further reduces its possibility to exercise its agency.

Results from this study strongly suggest that what defines heterotopic remote villages is the strength of their agency. Through their immense innovative potential as heterotopias, remote communities are able to compensate for at least an amount of lost structure. Some services can be pooled into one "service point", others can be provided by volunteers. The absence of the government or large corporations for job provision can be compensated for by creation of small companies or self-employment, just to name a few of the examples in this study.

This strong agency is vital in another aspect as well: Remote villages' nature is such that even within the same area individual villages can be highly distinct from one another (Carson and Carson, 2014). This signifies that a common planning approach, especially where created and administrated from remote city locations, is in most cases not practical. It is however even less practical with regards to the resources needed to tailor solutions for each individual village from a central position.

While it is true that earlier approaches focusing on local agency, for instance approaches of localism, are not without their dangers (Pratchett, 2004; Evans, Marsh and Stoker, 2013; Osti, 2013) strengthening agency nonetheless appears to be the most feasible way forward when taking into account the findings of this research. In particular this research points out that it is through the possibility to exercise agency and the potential to replace or create structures locally that remote villages can best use their potential for utopics (Raven, 2015) and social ordering (Hetherington, 1997). However, strengthening remote villages' agency cannot be seen as an excuse for further diminishing the structures they have at their disposal. This research has shown that some structures, for instance primary schools, can be vital for remote communities. Future research needs to lead to a better understanding of how to best use those resources available in remote villages to create the *right* kind of structure that can in turn strengthen and foster the exercise of agency in order to fill gaps in structure.

6.2. Applicability to Mars Settlement

The extreme case scenario behind the research in this study was prompted by a hypothetic future Mars settlement. This approach, it was argued, enabled a different context for research, thus being able to move away from any pre-existing bias towards remote villages as chronically in decline. Further in this study it was assumed that because of the features of

case study villages and the hypothetical Mars villages findings would be applicable both for terrestrial villages and for any future Mars settlement. While the applicability to terrestrial villages was shown above the applicability and implications for Martian villages will be discussed in this section. As discussed in chapter two research for Martian settlement has so far focused primarily on the technological aspects and, upon these, mostly on the engineering problem of getting to Mars. Thus, as little prior research on the nature of any future Martian settlement is available this chapter has to use assumptions based on what research is available and what has been observed in this study.

Early villages on Mars are going to be places that are separated from terrestrial mainstream society by interplanetary space. Whether the population will be externally selected through a screening process or self-screening through financial or practical hurdles, those who settle on Mars are likely to consist of a cohort inherently different from the average population. Following the heterotopia theory such villages that exhibit the features of heterotopia (Foucault and Miskowiec, 1986) are also likely to develop different forms of internal social rules and social ordering (Hetherington, 1997). Thus, similar to heterotopic villages on Earth, Martian remote villages' remoteness can be expected to have both a physical, and a cultural component. Following the pattern seen in this study, political remoteness might be unavoidable.

This study has shown that many residents of remote villages perceive the harsh environment around them as providing them with a sense of place (Avriel-Avni, Zion and Spektor-Levy, 2010). The interviewees of this study perceive their environment less as a challenge and more as a source of opportunity, both in regard to their personal wellbeing and to business opportunities. Similar to today's heterotopic remote villages Martian communities will have to manage their life in a harsh environment, partially through technology, partially through psycho-social adjustments. It is very likely that, like respondents in this study, the cohort will have a sense of place on Mars that though being alien to the average human's eye will add to a developing sense of cultural remoteness.

Residents of the Martian villages will have to be highly innovative in order to survive a hostile environment. In time, technologies developed on Mars in order to adapt to the challenges in climate and terrain might very well surpass our expectations and enable residents to perform ventures earlier thought to be impossible. This study has only hinted at such development in both study regions, for instance when describing high-tech greenhouses and innovative new service provision concepts on Mars, magnitude could potentially be as large as

geoengineering and ecosynthesis on a planetary scale (McKay, 1993; Crossman, 2010). At the same time, residents of a future Martian village will need to find ways not just to use local resources to become self-sustainable, but also to produce export goods from their unique location. Many of the villages in this study showed how a seemingly harsh environment can be turned into an advantage through understanding and using its unique potential. For Mars, one such possibility is outlined in the idea of what Sylvan et al (2009) rather naively call the "inner solar system triangular trade" where Mars provides supplies for mining operations in the asteroid belt. Others might for instance be in export of non-material goods such as research, entertainment, or even tourism.

Since it can be expected that Martian villages will be heterotopias, the findings in this study will apply to them just as they do to villages that exist on Earth today. Like villages on Earth Martian villages can be expected to be defined by diversity, complexity and a dynamic nature. And like heterotopic villages on Earth they will house a socially deviant and highly innovative population. The expected extremely high level of education of early settlers will only enhance their potential to be places of utopics which develop new solutions through lateral development (Mascaro, 2016) on both the social and technological planes. That is, Martian villages will fulfil a clear function towards the mainstream society on Earth.

The most important learning from this study may be the importance of supporting any type of heterotopic remote village in exercising its agency. From this study a recommendation can be made for allowing the community of any heterotopic remote village to make its own decisions in a system supportive both in physical and in material infrastructure. Given the extraordinary dependencies and questions of exercising sovereignty at play this is likely to be a challenge, yet one that could ultimately be a driver of the village's long-term.

6.3.Research Outlook

When further researching remote villages, it is essential to understand the population at hand. Traditionally the expectation for rural and remote populations is that of a declining, economically weak population with low levels of education. That this is a biased view is especially the case when researchers fail to distinguish between rural and remote. The cases from this study severely question such a paradigm, where it is applied to all villages and populations within a broad category. Respondents of this study were often well-educated, self-employed or entrepreneurs and interview evidence points towards a possible incomplete interpretation of demographic data in respect to some village's future trajectory. Demographic research needs to update our understanding of remote populations in order to inform planners and policy makers. Especially planners and political decision makers need to more strongly take into account out-migration as a life-cycle event and look at potential re-

migration later in life when assessing the population trajectory of any village. However, such an assessment can be challenging to make as large quantitative datasets that distinguish between rural and remote populations or different kinds of remote villages can be hard to come by.

In this study a qualitative approach was used as might, indeed, be best suited for other studies into remote villages. However, additional quantitative datasets might be able to further research for example through being able to analyse larger trends or generalise for at least a certain type of village. Further research is to look at the possibilities for creating or collecting such larger, quantitative datasets and their utilisation. What is important in furthering the research on remote villages both on Earth and in preparation for future settlement off-Earth is a strengthening of inter-disciplinary dialogue. I believe much could be gained from a more pragmatic approach both on the boarders of disciplines, and on the choice of research methodologies and methods.

Further, while the case for remote villages as a distinct type of settlement is increasingly clear we still know very little about remote villages. This study has not provided much certainty as to the extent to which heterotopic remote villages might be expected to be found among remote villages. There might well exist a typology of different kinds of remote villages, each with different features, challenges and opportunities. Furthering our understanding on the different kinds of remote villages is important as planning and policy need to understand what part of the existing rural planning paradigm can, and what part cannot, be applied to remote villages or certain types of remote villages.

Another interesting area of study is the influence of connectivity and technology on remoteness. This study has been able to show some cases of connectivity changing remote living realities, for instance through the ability of tele-work or the easy access to goods and information via the internet. In the future advancements such as tele-medicine and 3D printing will add a further dimension to the benefits of connectivity. Further inquiry into the impact of connectivity and technology could improve the benefit residents can receive from such development. On a more theoretical basis the question of whether, given enough technological advancement and high enough connectivity, technology could remove the spatial aspect of remoteness altogether is of interest. This last question would be of special interest considering future off-Earth settlement.

Once we understand the population at hand it will be easier to learn how remote villages can receive the right kind and amount of structure, i.e., outside support, and how they can best be supported in exercising agency. Much of this will need to happen at the local level, which means a level of trust needs to be built between local planners and the remote population. Building this trusting relationship can however be a difficult endeavour due to historic disconnection and political remoteness. In particular, perceived levels of political remoteness were very high in some of the case study villages. This points to a need to better understand

the political aspects of remoteness and how remote populations can be given more access to the political process, especially where it concerns their livelihoods directly.

As for Mars, this study has demonstrated the influence of settlement history, resources available and any patronage or sponsorship for remote villages by external organisations. Whether Mars will be settled by public or private interest, for example, will have a large impact on the nature of settlement. In this respect research in preparation for any Mars village is constrained by the lack of knowledge about important parameters. This study has, however, laid out a number of common characteristics of heterotopic remote villages. With early Martian villages likely to be heterotopias it is in continuing research on heterotopic remote villages on Earth that the preparation for Martian settlement can be furthered best at this time. For example, furthering our understanding of different options of settlement planning and internal social ordering can be of value. In this regard the different types of villages existing in Israel might be especially enlightening.

As we move closer to settling on Mars more variables will become known, and more questions will be asked. Likely, scientific interest in remote settlement and the process of creating new settlement will increase. It is my hope in conducting this study to contribute to the development of a research process that will benefit both the new settlements on Mars and, eventually, beyond as well as existing remote villages on Earth.

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Appendix 1: Ethics & OHS

Human Research Ethics approval

Data collection methods were approved by James Cook University's human ethics committee in accordance with James Cook University's human ethics guidelines. Approvals H5768 (pilot study) and H5928 (subsequent case studies) were granted without additional conditions. However, for H5928 one human ethics officer recommended a more cautious approach when questioning interviewees in regards to situations that made them feel especially remote. The ethics officer pointed out a possibility of triggering memories of traumatic events. Use of the question was subsequently discontinued for reasons including but not limited to ethics concerns.

Safety and Security

The James Cook University (JCU) occupational health and safety department assisted in ascertaining an acceptable level of risk for the primary investigator during field studies. All field travel was preceded by comprehensive risk analysis in consultancy with JCU health and safety professionals. International SOS newsletters, as well as local news outlets provided the most important basis for ongoing risk awareness in the field, especially during travel to Israel.