

Centre for Geo-Information

Thesis Report GIRS-2014-06

GEOSPATIAL NARRATIVES WITHIN THE CONTEXT OF ENERGY TRANSITION

A MULTIPLE CASE STUDY

Daphne Bol

5 June 2014



WAGENINGEN UNIVERSITY

WAGENINGEN UR



Geospatial narratives within the context of energy transition

A multiple case study

Daphne Bol

Registration number 900619091060

Examiners:

Dr. ir. R.J.A. van Lammeren

Prof dr. ir. A.K. Bregt

Ir. R.M de Waal

A thesis submitted in partial fulfilment of the degree of Master of Science
at Wageningen University and Research Centre,
The Netherlands.

5 June 2014

Wageningen, The Netherlands

Thesis code number: GRS-80436
Thesis Report: GIRS-2014 -06
Wageningen University and Research Centre
Laboratory of Geo-Information Science and Remote Sensing

'Storytelling is the most powerful way to put ideas into the world today'

- Robert McKee -

ABSTRACT

Stories are told to shape the world around us. Also when we talk about nowadays planning activities like the planning of renewable energy transition. Stories are not only about the content, The way these stories are communicated is also of interest (Potteiger and Purinton, 1998). In this thesis the focus is on narratives (stories) within the context of renewable energy transition and the use of GIS to communicate these stories. The thesis works towards a Narrative GIS set up where stories about renewable energy transition can be visualized by GIS techniques. The main objective of the thesis is as follows: *'to set up a Narrative GIS by the use of 'PDOK data' within the context of energy transition'*. The research makes use of two cases in the Veenkoloniën, a former peatery region in the northeast of the Netherlands, to examine a roadmap of how to come to a Narrative GIS set up for energy transition. The thesis starts with an introduction which focus on the research objectives. Also the question why storytelling is important in the planning of energy transition are discussed. The first part of the research focusses on several concepts which play a role in storytelling, renewable energy transition and GIS are discovered and out of these theories, a theoretical framework of how to establish a Narrative GIS set up is developed. This theoretical framework is applied to examples of Esri's 'Storytelling Maps'. The second part of the research elaborates on the development of a Narrative GIS set up. The Narrative GIS set up follows the earlier developed theoretical framework and focusses on the extraction of themes which play a role in the narrative of renewable energy transition; the development of an ordering system for geo data which can be used in a GIS environment; the selection of usable datasets; and the use of telling techniques in the Narrative GIS. At the end this approach leads to a Narrative GIS set up which is applied to two selected cases. The outcome of the second part is a filled in Narrative GIS for the two cases. Also the Narrative GIS set up is judged on its external validity and its contribution to the geo-information science. The research showed a creative solution of using GIS applications to contribute to complex processes like renewable energy transition. However, more research is needed to get a better understanding of the complexity of narratives and its use in GIS applications.

Keywords: renewable energy transition, GIS, narratives, storytelling, Narrative GIS, Veenkoloniën

ACKNOWLEDGEMENT

The use of geospatial narratives and the planning of energy transition: the subject of this master thesis which is part of my final year of my master degree Urban Environmental Management at Wageningen University. This thesis is in line with my major Geo-Information Science and is an important part in my year of graduation.

This master thesis can be seen as a mirror of all what I have learnt in my master and in my bachelor degree and is in line with my personal interests and ambitions. This subject is directly linked to my master degree since energy transition is the focus of this thesis. Also my major is widely covered because of the use of geospatial narratives.

My interest for energy transition and the use of GIS applications comes from my bachelor degree where I followed several GIS courses. The broad applicability of GIS in several fields kept my attention and I discovered GIS as an useful tool in decision-making. Energy issues and more specific energy transition was another field of interest and that was the reason why I chose the master Urban Environmental Management after my bachelor Land Use Planning. This master programme offered me to combine two fields: energy issues and the use of GIS to contribute to the decision making process. The choice to use narratives in my research came from my thesis mentor Ron van Lammeren. He already did preliminary research on the use of narratives and he convinced me to use narratives as a focus within GIS in order to plan energy transition. Because of the relatively new topic there were not much references to be found on the topic and therefore the thesis was seen as a challenge for both me and my mentor.

During my research it became clear that GIS is much wider applicable than I thought. Also the term GIS embodies nowadays much more than 'making maps in GIS applications'. The use of narratives is a more abstract way of thinking and even with this high level of abstraction, GIS can make complex storylines more concrete and easier to understand: the perfect ingredients for good decision making.

Writing a thesis is easier said than done. There were also hard moments, especially these moments when I got stuck in the process and I wanted to quit the course and starting all over. Fortunately I didn't and therefore I would like to thank my thesis mentor Ron van Lammeren for giving me new insights when I got stuck and keeping on track. I also want to thank Renée de Waal and Karmijn van den Berg for their help to start up my thesis; my examiners for their time to judge my thesis; and of course my boyfriend, family and friends for their supporting words.

As a last I want to say that I hope that this research will contribute to further research on this topic.

Daphne Bol, 2014

INDEX

Abstract	p. IV
Acknowledgement	p. V
List of figures and tables	p. VIII
Chapter 1: Introduction	p. 1
1.1 Introduction	p. 1
1.2 Relevance of research	p. 2
1.3 Research objectives	p. 3
1.4 Thesis structure	p. 4
Chapter 2: Theoretical framework	p. 5
2.1 Objective 1	p. 5
2.1.1 Narratives, narrative inquiry and character development	p. 5
2.1.2 Narratives and the planning of energy transition	p. 8
2.1.3 Narratives and the planning of energy transition	p. 10
2.1.4 The theoretical framework	p. 11
2.2 Objective 2	p. 13
2.2.1 GIS and narratives/storytelling	p. 13
2.2.2 Elements of story maps	p. 14
2.2.3 Forms of visualization	p. 14
2.2.4 Theoretical framework applicable to ‘Storytelling Maps’ of Esri?	p. 20
Chapter 3: Case description	p. 24
3.1 ‘Wat weet een boer van saffraan?’	p. 26
3.2 ‘7Sprong’	p. 27
3.3 Narrowing down the research	p. 30
Chapter 4: Methodology	p. 32
4.1 Type of research and research design	p. 32
4.2 Data collection	p. 33
4.3 Analysis methods	p. 34
4.3.1 Objective 3	p. 34
4.3.2 Objective 4	p. 50
Chapter 5: Results	p. 52
5.1 Roadmap towards a Narrative GIS (Objective 3)	p. 52
5.2 Relationship between a Narrative GIS and the planning of energy transition in general (Objective 4)	p. 67
Chapter 6: Conclusion, discussion and recommendations	p. 78
6.1 Conclusion	p. 78
6.1.1 Stories that shape our world.... ..	p. 78
6.1.2 A Narrative GIS to express stories that shape our world.... ..	p. 79

6.2 Discussion -----	p. 81
6.2.1 Selected cases -----	p. 81
6.2.2 Reproducibility and reliability -----	p. 82
6.2.3 Selected datasets, used software and telling techniques -----	p. 83
6.3 Recommendations -----	p. 83
6.3.1 A future Narrative GIS: recommendations -----	p. 83
References -----	p. 85
Appendices -----	p. 89

LIST OF FIGURES AND TABLES

Figure 1: Elements of narratives (Potteiger and Purinton, 1998) -----	p. 6
Figure 2: Expanded version of the Freytag's pyramid (University of Wisconsin, n.d.) -----	p. 7
Figure 3: The stages of narratives can be told in different ways (Blok, 2005) -----	p. 8
Figure 4: Wind farm suitability map (Baban and Parry, 2000) -----	p. 10
Figure 5: Theoretical framework -----	p. 12
Figure 6: Important components of geo data: space, time and topic (Peuquet, 2002) -----	p. 15
Figure 7: Locating something (Esri, n.d.) -----	p. 16
Figure 8: Describing a place (Esri, n.d) -----	p. 16
Figure 9: Providing Directions (Google maps, 2013) -----	p. 17
Figure 10: Explaining a geography-related topic (Esri, n.d.) -----	p. 17
Figure 11: Comparing two or more themes (Esri, n.d.) -----	p. 18
Figure 12: comparing two or more places on one topic (Esri, n.d.) -----	p. 18
Figure 13: Showing change over time (Esri, n.d.) -----	p. 19
Figure 14: Forecasting the future (Esri, n.d.) -----	p. 19
Figure 15: The Veenkoloniën (yellow) (Agenda voor de Veenkoloniën, 2013) -----	p. 25
Figure 16: The four different sub areas with their own characteristics (Agenda voor de Veenkoloniën, 2012) -----	p. 27
Figure 17: In the left picture the shape and the development of the county is presented. In the right picture the shape and development of activities on the county is presented (Agenda voor de Veenkoloniën, 2012) -----	p. 28
Figure 18: The development of the Veenkoloniën over time: Agricultural society, industrial society, post-industrial society and the communication society (left to right) (Agenda voor de Veenkoloniën, 2012) -----	p. 29
Figure 19: All the pictograms refers to the collective approach: farmers, inhabitants, organisations, etc. work together in order to achieve several goals (Agenda voor de Veenkoloniën, 2012) -----	p. 30

Figure 20: Scheme of Potteiger and Purinton (1998) applied to the narrative of energy transition -----	p. 35
Figure 21: Analytical framework (de Waal, n.d.) -----	p. 35
Figure 22: Exploring the different steps of character development for all themes -----	p. 39
Figure 23: Data of the different steps of character developments consist of geo data that can be used in GIS -----	p. 40
Figure 24: Geo data can be classified in five different properties. All these properties can be characterized by its extent, resolution, accuracy and whether the data is used as reference or as theme -----	p. 40
Figure 25: Example model of ordering geo data in MS Excel -----	p. 42
Figure 26: Webpage of the 'PDOK' (PDOK, n.d.) -----	p. 44
Figure 27: Creating file geodatabase (ArcMap, 2014) -----	p. 45
Figure 28: WFS to Feature Class tool (ArcMap, 2014) -----	p. 45
Figure 29: Ordering Table of Contents (ArcMap, 2014) -----	p. 46
Figure 30: Select tool (ArcMap, 2014) -----	p. 47
Figure 31: Clip tool (ArcMap, 2014) -----	p. 47
Figure 32: Creating new model (ArcMap, 2014) -----	p. 47
Figure 33: Creating new Feature Class (ArcMap, 2014) -----	p. 48
Figure 34: Creating a HTML Popup (ArcMap, 2014) -----	p. 49
Figure 35: Example of HTML Popup (ArcMap, 2014) -----	p. 49
Figure 36: Elements of the narrative of energy transition -----	p. 52
Figure 37: Filled in narrative framework for the case study: 'Wat weet een boer van saffraan?' (WWBS) (van den Berg, 2013) -----	p. 53
Figure 38: Five themes in the analysed case. These themes have a strong interaction (van den Berg, 2013) -----	p. 54
Figure 39: Summary of results objective 1 -----	p. 55
Figure 40: Geo data used per stage WWBS -----	p. 56
Figure 41: Geo data used per theme WWBS -----	p. 57

Figure 42: Properties of geo data in terms of usage within the narrative of energy transition WWBS -----	p. 58
Figure 43 : 'WFS to Feature Class' window with the example of 'Natura 2000' (ArcMap, 2014) -----	p. 59
Figure 44: Model for clipping data for the Veenkoloniën (ArcMap, 2014) -----	p. 60
Figure 45: Map layer with selected datasets for the Veenkoloniën (ArcMap, 2014) -----	p. 61
Figure 46: Energy courtyard (yellow dot) in the Climax phase of the energy theme (ArcMap, 2014) -----	p. 62
Figure 47: HTML Popup of the Energy courtyard in the climax phase of the energy theme (ArcMap, 2014) -----	p. 63
Figure 48: HTML Popup of the movement from traditional farming to a more mix way of farming in the climax phase of the economical theme (ArcMap, 2014) -----	p. 64
Figure 49: HTML Popup of the rising action phase of the landscape theme (ArcMap, 2014) -----	p. 65
Figure 50: HTML Popup of the ribbon shaped environment in the introduction phase of the landscape theme (ArcMap, 2014) -----	p. 66
Figure 51: Filled in narrative framework for the case study: '7Sprong' (van den Berg, 2013) -----	p. 70
Figure 52: Geo data used per stage 7Sprong -----	p. 71
Figure 53: Geo data used per theme 7Sprong -----	p. 71
Figure 54: Properties of geo data in terms of usage within the narrative of energy transition 7Sprong -----	p. 72
Figure 55: HTML Popup of the spatial development (polygon) of the Veenkoloniën (big scale) in the climax phase of the social theme. The picture represents the polygon area (ArcMap, 2014) -----	p. 74
Figure 56: HTML Popup of the spatial development (polygon) of the Veenkoloniën (small scale) in the climax phase of the landscape theme. The picture represents the polygon area (ArcMap, 2014) -----	p. 75

Figure 57: HTML Popup of the history of Veenkoloniën in terms of the interrelations of agriculture, industry and society in the introduction phase of the landscape theme (ArcMap, 2014) -----	p. 76
Figure 58: HTML Popup with video. This HTML Popup shows a video of how solar panels work. This is part of the climax phase of the energy theme (ArcMap, 2014) -----	p. 77
Table 1: Theoretical framework applied to Storytelling maps of Esri ----	p. 20
Table 2: ‘7Sprong’ transitions (Agenda voor de Veenkoloniën, 2012) ---	p. 30

CHAPTER 1: INTRODUCTION

1.1 Introduction

'The way we see the world is based on stories. Stories enable us to explore the world, set boundaries of what is knowable and explain causes. In other words: stories are used to shape our world. But not only the content of the story is of interest, also the way these stories are communicated is of importance' (Potteiger and Purinton, 1998).

Telling stories, or narratives, is as old as mankind itself. In the beginning in oral forms, later on in the form of for example paintings, books or television. Storytelling or narratives play a significant role in our daily lives. Narrative inquiry refers to a wide variety of approaches that are concerned with the search for and analysis of the stories that people employ to understand their lives and the world around them. It is an approach to the elicitation and analysis of data that is sensitive to the sense of temporal sequence that people, as tellers of stories about their lives or events around them, detect in their lives and surrounding episodes and inject into their accounts (Bryman, 2008). Potteiger and Purinton (1998) state in their book 'Landscape Narratives: Design Practices for Telling Stories', that a story or narrative consist of the story *what* is told, and the means of telling or the way *how* the story is told.

Energy production and use is both a critical component of the socio-economic landscape as well as a key driver of the climate problem. With a significant proportion of climate change deriving from the predominant use of fossil fuels to generate this energy, any serious response to the climate problem will require changes to the prevailing energy landscape (Curran, 2011). This phenomenon of modern energy transition related to renewable energy sources and more efficient energy use can be characterized by the fact that this transition requires new insights in spatial organization and land use arrangements (Selman, 2010). Some researchers highlight the transformation of spatial organization by using stories in general. Sandercock (2003) sees planning as a project of social transformation. In order to develop cities and landscapes, the combined effort of many people is required. It is not only about mobilizing resources and power, but also about organizing hope, negotiating fears, mediating collective memories of identity and belonging, and daring to take risks. These new insights will involve new methods for doing planning work, including the ability to recognize the knowledge and value contained in people's stories about their experiences and relation to places and the capacity to construct new stories connective the past to possible futures which could be invented by collective effort. These thoughts of transformation of spatial planning in general can also be applied to the more specific planning of energy transition where new methods of using stories are central.

Despite of the fact that stories are everywhere around us and that narrative inquiry can contribute to planning practices, geo-information systems (GIS) are still considered as a tool for the processing and analysis of quantitative data rather than qualitative data. The latter is often output of narrative inquiry. Geo-information plays a crucial role in the planning of energy transition because of its capacity in data integration from different sources; data analysis; and visualization (Trung, et al., 2007). The application of GIS within the planning of energy transition can be seen in the energy potential analyses where suitable locations for renewable energy, based on map layers which contain quantitative data, are sort out. To realize a better connection with several geo-information dependent disciplines which have to deal with processing and analysis of qualitative data, like human geography and land use planning, there is a rising need for integration of qualitative data with quantitative data within GIS (Sheppard, 2001).

The leading thread of this research follows the earlier mentioned elements of a narrative: *what* story is told and *how* is this story told. The *what*-question will focus on the planning of energy transition. The *how*-question will focus on the visualization of the planning of energy transition in a GIS-environment. The use of narratives, in this case energy transition, is still not a usual approach within the geo-information science notwithstanding its contribution to the planning field. In this research I will attempt to bridge the gap between the use of qualitative data and the quantitative data based environment of geo-information systems. The research aims for the development of a Narrative GIS set up where the narrative of energy transition can be used in a GIS Environment as a map in order to contribute to the visualization and planning of energy transition.

The next sub chapters will pay attention to the relevance of the research, research objectives and at last the thesis structure.

1.2 Relevance of research

As noted before geo-information systems are still considered as a tool for the processing and analysis of quantitative data rather than qualitative data. GIS have already proven its value in the planning of energy transition when it makes mainly use of quantitative data.

Because of new insights in planning practices, the use of stories, and therefore qualitative data, gets more room and can play a role in the planning of energy transition due to its ability to express people's experiences and relation to places and the capacity to construct new stories connective the past to possible futures which could be invented by collective effort (Sandercock, 2003). Eckstein adds to this, and I think this citation reflects the relevance of this research the best: "*Stories are verbal expressions that narrate the unfolding of events over some passage of time and in some particular location. Stories use language to frame what has happened to a set of characters in a particular time and place. Although maps, numerical data,*

computer models, and innumerable other sources of information must be interpreted to reveal meaning, I do not include those processes of data collection and interpretation in my definition of story unless that interpretation takes the form of story as I am defining it (...) I use this definition in an attempt to distinguish between the modes of planning theory and practice that rely on quantitative data and computer-generated models to describe structures that set the stage for decision making, and those more marginal modes of planning theory and practise that attend to continuously unfolding and competing narratives that create visions of the past, present, and future, and thus impinge on decision making. This distinction, like most distinctions, blurs under close examination. However, I think there is often a lot to learn by minding the gap: planners have adopted quantitative techniques of projection as if they described the most probable future (truth) and as if that were desired (ideal). A focus on storytelling emphasizes the elusiveness of truth and the complexity of desire. For those who want to plan for a sustainable future, these qualities must be acknowledged and explored" (Eckstein, 2003).

However, the problem is that at the moment there is not much research done on the use of narratives in combination with GIS, notwithstanding the increasing significance and recognition of storytelling in planning practices like energy transition. The development of a Narrative GIS set up tries to bridge the gap between the use of qualitative data and the quantitative data based environment of geo-information systems. The research purpose is not to generate a specific Narrative GIS set up what can only be applied in one case, but to explore the possibilities of using narratives like energy transition in a GIS environment more in general. The relevance of this research is more focussed on the creative use of GIS in combination with narratives to inspire GIS specialists, decision makers, planners, etc. and can serve as a stepping stone for further research on this topic.

1.3 Research objectives

As noted before the focus of this research is on geo-information systems and the narrative of energy transition. In order to do this research, two cases on energy transition in the Veenkoloniën, an area in the Netherlands, are used ('Wat weet een boer van saffraan?' and '7Sprong'). At the end of the research, the following overall research objective will be achieved: *'to set up a Narrative GIS by the use of 'PDOK data' within the context of energy transition'.*

The following research questions need to be answered in order to achieve the sub objectives which together lead to the overall objective.

- Objective 1: Explore theoretical concepts within the field of narratives, GIS and planning of energy transition in order to develop a theoretical framework to set up a Narrative GIS.
 1. What are the characteristics of a narrative?
 2. How are narratives used in the planning of energy transition?

3. What role plays GIS in the planning of energy transition?
- Objective 2: Explore to what extent the theoretical framework is applied to the existing 'Storytelling Maps' of Esri.
 4. What are Storytelling Maps?
 5. To what extent is the theoretical framework applied to the existing 'Storytelling Maps' of Esri?
 - Objective 3: Set up a Narrative GIS for the case 'Wat weet een boer van saffraan?' by using the theoretical framework.
 6. What themes play a role in the narrative of energy transition by using the case 'Wat weet een boer van saffraan?'
 7. What data can be used as geo data in a GIS environment?
 8. How can you analyse this geo data?
 9. How to visualize the geo data in a GIS environment in order to become a narrative?
 - Objective 4: Establish a relationship between the developed Narrative GIS (according to the theoretical framework) and the planning of energy transition in general by evaluating the developed narrative GIS setup. This will be done by using the 'control case' '7Sprong'.
 10. What characteristics of the developed Narrative GIS can be used more general?

In the next subchapter the thesis structure will be presented.

1.4 Thesis structure

Now the research is introduced and the research objectives and questions are set out, the thesis structure will be presented. The research makes use of two loops. The first loop focusses on the development of a theoretical framework. First the theory will be analysed and after that synthesize of these theories to a theoretical framework. Also applying this theoretical framework to the 'Storytelling Maps' of Esri is part of the loop. In this first loop (chapter 2) objectives 1 and 2 and research questions 1, 2, 3, 4 and 5 will be addressed. After that, in chapter 3, the selected cases for the Veenkoloniën region 'Wat weet een boer van saffraan' and '7Sprong' will be explored. The second loop of the research consist of the development of a Narrative GIS set up by following the earlier presented theoretical framework. Chapter 4 analyses several parts of what a narrative GIS set up consists of and synthesize these parts to a workable Narrative GIS set up which is in chapter 5 applied to the two selected cases. Also the external validity of the Narrative GIS is judged in this second loop. In this loop objectives 3 and 4 and research questions 6, 7, 8, 9 and 10 will be addressed. The thesis will conclude with the discussion and conclusion where the main findings of this research will be shown and some topics for discussion will be raised. Also, the thesis raises some recommendations for further research.

CHAPTER 2: THEORETICAL FRAMEWORK

In the previous chapter an introduction of the subject was given and the research objectives were presented. In this chapter, the first 'loop', theoretical concepts wherein the research takes place will be explored. It will highlight important concepts like narrative inquiry and the planning of energy transition and the role GIS play in relation to these concepts. Also, this chapter will provide a theoretical framework which will be applied in the next chapters. This chapter is divided into two parts. Part one focusses on the first objective as presented in chapter 1. The second part focusses on the second objectives where the created theoretical framework is applied on the existing Storytelling Maps created by Esri.

2.1 Objective 1: Explore theoretical concepts within the field of narratives, GIS and planning of energy transition in order to develop a theoretical framework to set up a Narrative GIS.

This subchapter is divided into 4 paragraphs where the characteristics of narratives will be explained. Also the role of narratives and GIS within the planning of energy transition will be explained. The last paragraph combines the theoretical concepts into a theoretical framework which will be used in the rest of the research.

2.1.1 Narratives, narrative inquiry and character development

Because of the high dependence of narratives in this research it is of importance to know what these narratives are and how they can be extracted from different sources. The way we see the world is based on stories. Stories enable us to explore the world, set boundaries of what is knowable and explain causes. In other words: stories are used to shape our world. But not only the content of the story is of interest, also the way these stories are communicated is of importance. *Narrative* refers to both story, what is told, and the means of telling, implying both product and process (Potteiger and Purinton, 1998). These narratives are sensitive to the sense of temporal sequence that people, as tellers of stories about their lives and surrounding episodes and inject into their accounts (Bryman, 2008). Eckstein (2003) state in her book 'Story and Sustainability: Planning, Practice, and Possibility for American Cities', that Stories are verbal expressions that narrate the unfolding of events over some passage of time and in some particular location. Stories use language to frame what has happened to a set of characters in a particular time and place. Therefore narratives, or stories, exposes two dimensions: time and space. Figure 1 shows a visualisation of the concept 'narrative'. As noted before, a narrative consist of the story, what is told, and the means of telling or the way how the story is told. The story itself consists of three main elements. The first one is 'character', where objects, persons or constructions are meant. The second one is 'event'. Events refer to the explanation of characters experiences or activities. The third one, 'setting', refers to the environment in which the events take place. Those three elements together will develop a time-bounded (when does the event takes place) and spatial (where does

the event take place) plot (figure 1). This plot or character development will be explained later in this theoretical framework.



Figure 1: Elements of narratives (Potteiger and Purinton, 1998)

The discipline that focuses on the search for and analysis of these narratives people employ to understand their lives and the world around them is called narrative inquiry. Narrative inquiry has become particularly prominent in connection with the life history or biographical approach (Bryman, 2008). However, narrative inquiry is not exclusively concerned with the elucidation of life histories. The term narrative inquiry is often employed to refer both to an approach – one that emphasizes the examination of the storied nature of human recounting of lives and events - and to the sources themselves - that is, the stories that people tell in recounting their lives (Roberts, 2002). Narrative inquiry entails sensitivity to: the connections in people's character accounts of past, present, and future events and states of affairs; people's sense of their place within those events and states of affairs; the stories they generate about them; and the significance of context for the unfolding of events and people's sense of their role within them. It is the way that people organize and forge connections between events and the sense they make of those connections that provides raw material of narrative inquiry (Bryman, 2008). In this definition of narrative inquiry the people refer to character; the past, present and future events refer to events; and the context for the unfolding of events to setting. There are different models available of narrative inquiry provided in existing literature but these models are less relevant for this research since the research does not primary focus on the extraction of narratives itself but on the visualization of already extracted narratives.

As noted before the three elements of a story 'character', 'event' and 'setting' develop together a time-bounded and spatial plot or character development. The narrative structure is subject of research for many years. Centuries ago Aristotle mentioned already the consistent structure of 'a beginning', 'a middle part' and 'an end'. Centuries later Freytag (1900) expanded Aristotle's structure. The Freytag's pyramid-like diagram of five main tragic stages (introduction, rising action, climax, falling action, resolution) evolved into a broadly applicable structure directed toward

narratives. After this pyramid many other researchers added more aspects to this triangle and the pyramid became more advanced and complex (Ohler, 2008). Figure 2 shows an example of the expanded Freytag pyramid (six stages).

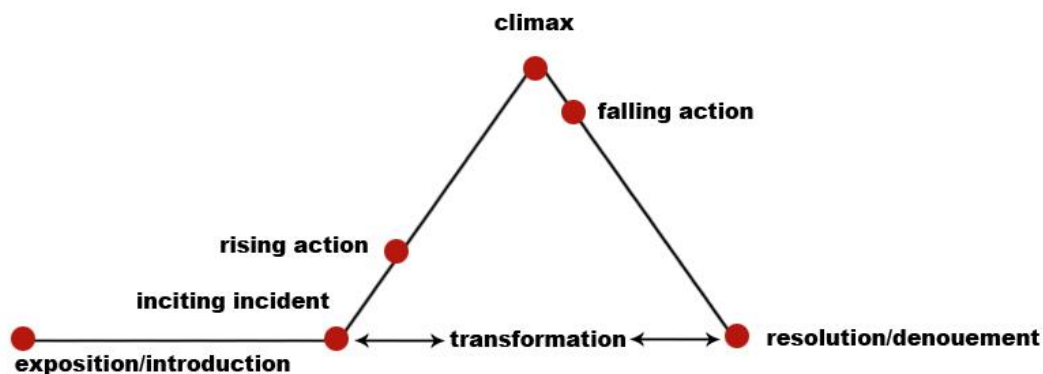


Figure 2: Expanded version of the Freytag's pyramid (University of Wisconsin, n.d.)

Basically Freytag's pyramid can be seen as a simple visualization of the structure of narratives. The pyramid starts with the exposition or introduction where the characters will be introduced and sets the scene. The inciting incident is the moment where the first problem is introduced and this problem will drive the rest of the story. The process of rising action refers to the increasing intensity of the event over time. This process ends in a climax what can be defined as a turning point when the event and situation change dramatically better or worse. The process of falling action can be characterized by prolonging suspense and confronted difficulties. Question will be recognized and sometimes answered. The central character of the story typically overcomes conflict in this stage. The last stage of resolution is the stage where all remaining issues are reconciled. A sense of normalcy is reinstated. Characters, choices, and actions are validated and future possibilities are presented. After this six stages there is a transformation over *time* visible in *character*, *event* and *setting* in comparison with the first stage (University of Wisconsin, n.d.). This pyramid can be used to structures the narrative and therefor is refers to the earlier mentioned 'what' question.

But not only the structure of a narrative is of importance for telling a story. Also the way this story is told is of importance and refers to the mentioned 'how' question. All these stages can be told and presented in different ways. Moviemakers or book authors for example make use of several telling techniques. Sometimes it is necessary to stress the begin part more than the end or vice-versa. Figure 3 shows these different telling techniques. The dotted lines show the different stages of a narrative. A story has a certain time scale (a time period over which the story is told). Because not every part of the time period is equally important, the told story may use only some parts of these whole time period. During the telling some parts can be changed in order (flashback/flash forward) and/or speedup/slowed down when some short parts in time can be told very extensively and large parts in time can be told

very shortly. This all depends on what part of the story is important to bring up the message of the story (Blok, 2005).

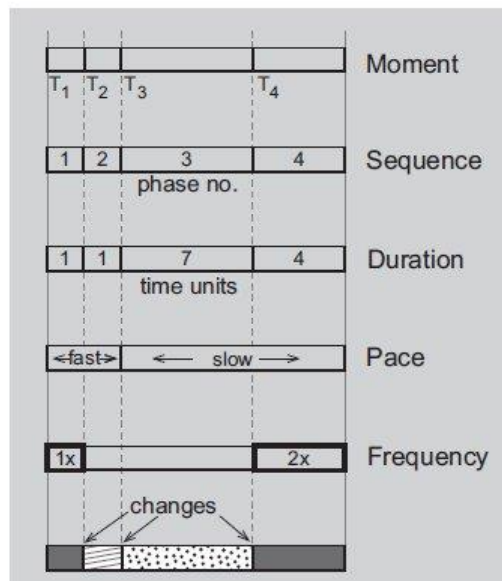


Figure 3: The stages of narratives can be told in different ways (Blok, 2005)

2.1.2 Narratives and the planning of energy transition

In the previous subchapter important concepts like ‘narratives’ and ‘narrative inquiry’ were explored. Also the six phases of a narrative and the way how these phases can be told are discussed. In this subchapter, the research will focus more on the usability of narratives in the planning of energy transition. More insights will be given on energy transition and the role of narratives in the transition towards renewable energy landscapes.

Much research is done on the use of new technologies of energy production that must be combined with measures to increase energy efficiency and curb energy demand in a context of coherent policies to tackle climate change. It is widely acknowledged that, in order to make any significant dent into the problem of global warming, changes to energy production and use need to be on a massive scale: substantial landscape transformation will be almost inevitable (Selman, 2010).

Because of the fact that another approach will lead to change it is needed to define the concept of renewable energy transition more clearly. Renewable energy transition can be defined as follows: ‘*a transition to new carriers, sources and technologies of energy and electricity generation, notable based on renewable energy sources. This general term is increasingly used to denote a society-wide system innovation with a focus on basic or fundamental activities, such as energy provision, transport and agriculture*’ (Rotmans et al, 2000). As noted before, this transition will lead almost inevitable to substantial landscape transformation. If a

landscape transforms due to transition to renewable energy we can define this as renewable energy landscapes: *'renewable energy landscapes are physical environments that can evolve in the basis of locally available renewable energy sources without compromising landscape quality, biodiversity, food production and other life-supporting ecosystem services'* (Stremke and van den Dobbelsteen, 2012).

The role of narratives in the planning of energy transition is not widely discovered. Today, some researchers see the significance of involving narratives or storytelling in planning practices in general. Sandercock (2003) sees planning as a project of social transformation. In order to develop cities and landscapes, the combined effort of many people is required. It is not only about mobilizing resources and power, but also about organizing hope, negotiating fears, mediating collective memories of identity and belonging, and daring to take risks. These new insights will involve new methods for doing planning work, including the ability to recognize the knowledge and value contained in people's stories about their experiences and relation to places and the capacity to construct new stories connective the past to possible futures which could be invented by collective effort. Nowadays the planning of energy transition can often be characterised by a bottom-up approach rather than a top-down approach (EO Wijers-stichting, n.d.). The idea of constructing stories invented by collective effort which connect the past to possible futures fits into the idea of participative planning and is often seen in renewable energy transition (Mahdavinejad and Amini, 2011). Therefore thoughts of planning as a project of social transformation can also be applied to the more specific planning of energy transition where new methods of using stories are central.

Also other researchers highlight the significance of storytelling in combination with planning practices. James Throgmorton sees planning itself as a form of storytelling. Throgmorton (2003) state that planning in general can be constructed as a form of persuasive and constitutive storytelling about the future. This claim depends on the assumption that planners stories about the future will necessarily have to begin from a contestable normative position. To be persuasive to a wide range of readers, planners stories will have to make narrative and physical space for diverse locally-grounded common urban narratives. This assumption presumes that powerful actors will strive to eliminate or marginalize competing stories, and that those powerful actors will induce some planners to devise plans (stories about the future) that are designed to persuade only a very narrow range of potential audiences. Also Barbara Eckstein mentioned the relationship between planning and storytelling. She states that storytelling is about setting community boundaries, including some audience members within its territory and excluding others. This boundary setting is inherent in the contract between narrators and audiences that all stories inscribe. Stories do have the potential to act as a bridge between engrained habits and new futures (Eckstein, 2003). These assumptions are in line with Sandercocks' claim of social transformation where plans (stories about the future) acts as an arena of negotiation and mediating of collective memories of identity and belonging.

2.1.3 GIS and the planning of energy transition

Now the concept of renewable energy transition is discovered and different authors who underline the relationship between planning and storytelling were explored, the role of GIS within renewable energy transition will be discussed in this sub chapter.

Before we can elaborate on the role of GIS within renewable energy landscapes, a definition of GIS is needed. The following definition is given by Esri in their 'Online GIS dictionary': '*GIS, acronym for geographic information system, is an integrated collection of computer software and data used to view and manage information about geographic places, analyze spatial relationships, and model spatial processes. A GIS provides a framework for gathering and organizing spatial data and related information so that it can be displayed and analyzed*' (Esri, n.d.). In this technical definition, GIS is seen as a tool for the processing of data in order to show relationships, processes, etc. However GIS has also a communicational aspect: the visualization of data in order to communicate findings to other persons. Because of the collaborative nature of energy transition, GIS can be seen as an effective and structured tool for the communication to third parties. Good communication is crucial for participatory planning, what is often seen in the planning of energy transition (Stremke and Van den Dobbelsteen, 2012).

As noted before, GIS have already proven its contribution to the planning of energy transition. GIS play a crucial role in the planning of energy transition because of its capacity in data integration from different sources; data analysis; and visualization (Trung, et al., 2007). The application of GIS within the planning of energy transition can be seen in the energy potential analyses where the regional demand and supply of (renewable) energy can be visualized. In this way GIS helps to match this energy demand and energy supply. GIS can also be useful in locating new sources of energy like windmills or solar panels according to suitability criteria. These criteria will help to find the most suitable locations in an area for, for example windmills or solar panel farms (Ramachandra and Shruthi, 2005). Figure 4 shows a wind farm suitability map where different layers with different suitability criteria are overlaid.

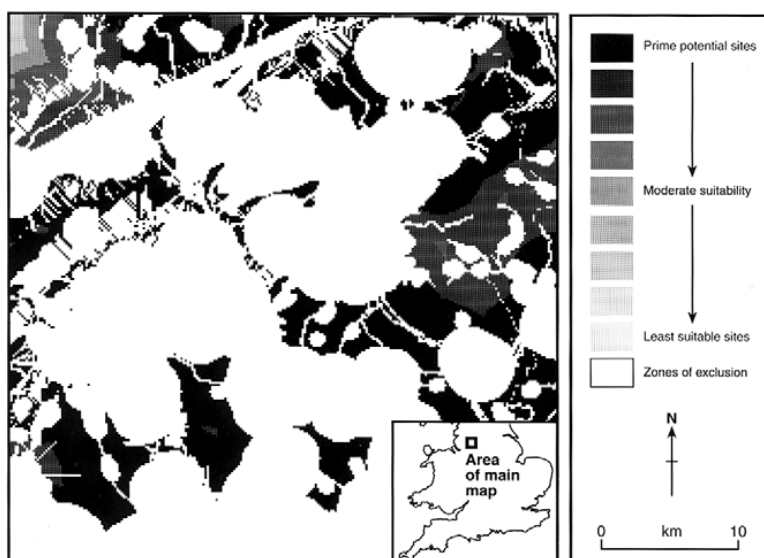


Figure 4: Wind farm suitability map (Baban and Parry, 2000)

According to above GIS can be used in different ways in order to support the planning of energy transition. The use of GIS applications cannot be ignored anymore in large scale spatial developments like energy transition.

2.1.4 The theoretical framework

In the previous paragraphs several theoretical concepts were discovered. Also the relevance of storytelling and GIS within the field of the planning of energy transition was explored. From this theoretical background, a theoretical framework is developed (figure 5). This framework will play an important role in this research. The framework as set by Potteiger and Purinton (1998) was used and expanded by other literature. In this research this theoretical approach will be used in order to develop a Narrative GIS.

In the next subchapter, the second objective will be central. First the general elements of story maps, as set up by Esri, will be presented. The reason why these story maps are used is because Esri is the first and only organization which actively tried to visualize narratives in a map. According to these elements different kinds of visualization are thinkable. Some stories are relatively simple, such as 'you are here' or 'here is how you get from point A to point B'. Some other stories are more complex, such as portraying causes and effects of phenomena, or establishing relationships between two concepts. For every story a matching visualization method is thinkable (Esri, 2012). After this introduction to Esri's Story Map I will compare their approach with the developed theoretical approach.

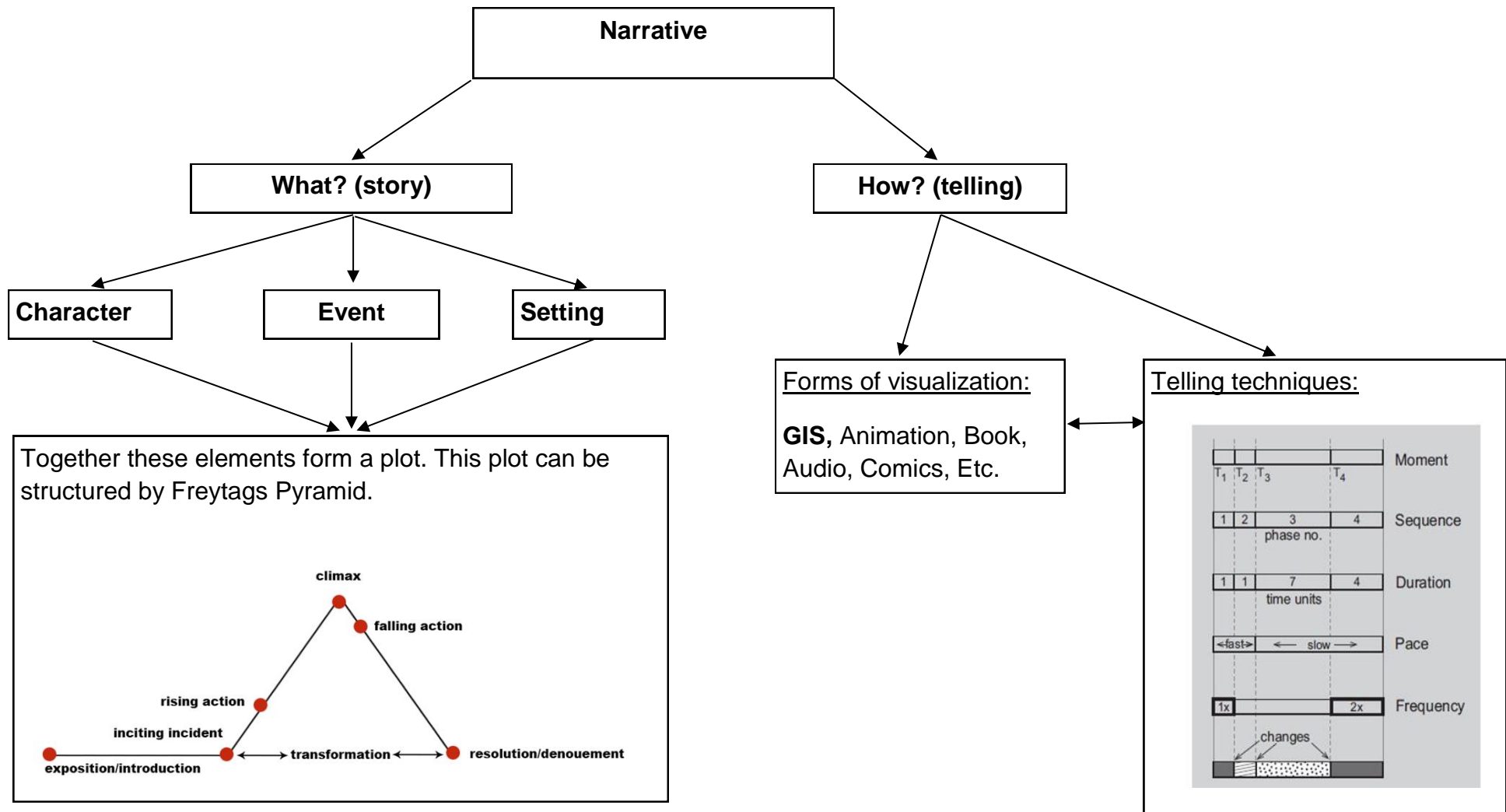


Figure 5: Theoretical framework

2.2 Objective 2: Explore to what extent the theoretical framework is applied to the existing ‘Storytelling Maps’ of Esri.

This subchapter is divided into 4 paragraphs where an introduction will be given about the use of storytelling in a GIS environment according to Esri. Elements of these story maps will be explained and some practical examples will be shown. At the end I will give an evaluation to what extent the developed theoretical framework can be applied to the ‘Storytelling Maps’ of Esri.

2.2.1 GIS and narratives/storytelling

This paragraph will elaborate on the relationship between GIS and narratives: the focus of this research. In order to see a relationship between GIS and narratives, useful concepts and frames, developed by Esri, will be explored.

This paragraph refers to the earlier mentioned how-question in figure 1. There are many forms of visualization of stories thinkable. The form of storytelling depends on what you want to present in your story. The first thoughts by how you can tell a story is through movies (animations), audio recording, written texts or even comic books. All these forms of storytelling visualize the presented story in different ways: in pictures, in heard words or in written words. But also graphs, tree maps, network diagrams or word clouds can be used to visualize stories (IBM, n.d.).

Not only these ‘classic’ or often used types of visualizing stories can be used. Also maps can be a useful way to express stories. As noted before, using narratives in GIS is still uncommon and not much research is done on this topic. Despite of that, narratives practically always refers to a place somewhere in the world. Because of this a spatial component is often present and usable in GIS applications. Esri recently launched their ‘storytelling with maps’, which combine intelligent web maps with web applications and templates that incorporate text, multimedia and interactive functions. Esri publishes these story maps with three goals: to demonstrate the power of GIS as communication platform; to showcase useful and important geographic information; and to help enable people to make their own story maps (Esri, 2012). Because of their aim to make these story maps accessible for everyone, they make use of easy to use templates and a guidance of how to make your own story map.

Maps tell many types of stories. They can for example summarize a situation, trace a route and show change over time. They can show patterns of movement and compare and contrast places. Maps can help planners to make plans, predict or model the future, and support the decision making process. Story maps combine maps with other elements that facilitate and emphasize the message the creator seeks to convey. Legend, text, popups and visualization methods like graphs and photos help interpret the map that form the centrepiece of the story. For the most part, story maps are intended for non-technical audiences and they present geographic information with the goal of informing, educating, entertaining, and

involving their audiences. Especially this last aspect is of importance in this research (Esri, 2012).

2.2.2 Elements of story maps

According to Esri, story maps share six general principles and elements: story, text, spatial data, cartography, supporting content and users experience. All these elements are present in every story map. 'Story' in this context refers to the message or concept that a story map is intended to communicate. A good story map delivers a clear message to a well defined audience and are usefull to that audience by providing a service. If the story is complex, it is possible that the story should be presented in several story maps. A complex story map may be acceptable in some contexts, but only when the intended audience is highly motivated. This can be problematic when talking about the planning field where clearness and communication are of importance. The text used in the story maps should be as brief as possible. The maps should tell the most of the story. The text is like a narrator or guide to help the user interpret the map. The third element, spatial data, is a crucial element in a story map. Without spatial data a story map can not be created. Spatial data can be extracted from different sources like satellite images or tabular data with location information. Because of the high amount of data available, only content that directly supports the message should be collected and included. In line with this is the presentation form of this spatial data. Good cartography is an attractive and understandable representation of spatial information. Forms of visualization will be discussed later in this subchapter. The fifth element, supporting content, is about popups, graphs and charts which can make a story more clear. However, too many elements can have consequences for the overview and the message of the map. As last, the user experience, refers to how understandable the design and presentation is for the intended audience (Esri, 2012).

2.2.3 Forms of visualization

As noted before, there are different forms of how to visualize a story. Because of the focus on maps and the use of GIS for the visualization of the narrative of energy transition, I will only explorer the cartographic visualization methods. Since not that much research is done on the development of story maps, the overview below is based on findings by Esri.

In order to create a map, geo data is needed. Geo data can be defined as a data set that has a spatial aspect or component which refers directly to a location on the surface of the earth. For maximum benefit with regards to geographic analysis, geo data has a thematic, temporal and spatial aspect that allows pinpointing a phenomena in space, time and topic (see figure 6). This is comparable to the three elements of a narrative (character, event, and setting) as noted in paragraph 2.1.1. However, not every spatial dataset includes a temporal component. Geo data is the most important data in a geographic information system and it can be linked to other

data sources using spatial, temporal or thematic relations. In every map geo data can be presented in three different forms: points (location), lines (routes) and polygons (areas) (Neumann and Freimark, 2010).

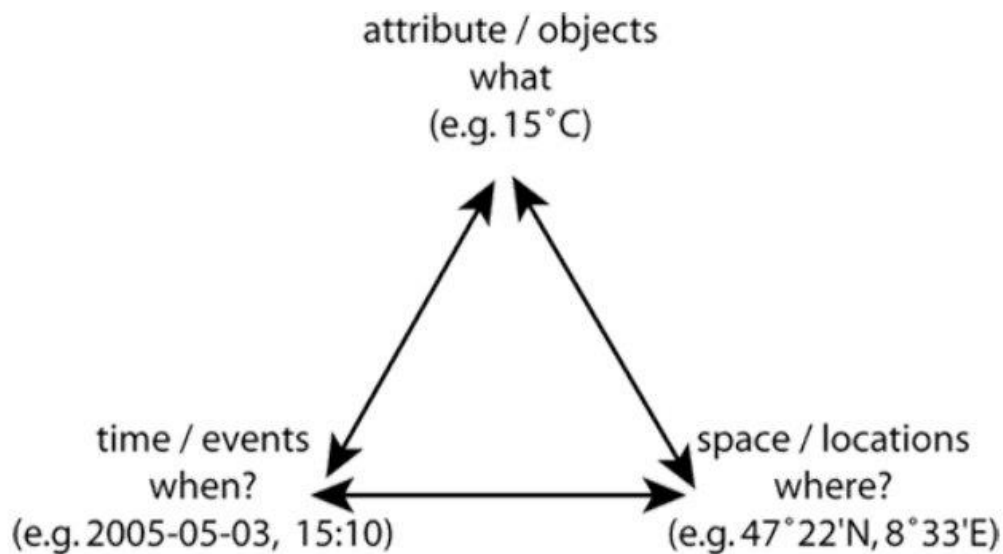


Figure 6: Important components of geo data: space, time and topic (Peuquet, 2002)

I assume that every map offers at least a basic sort of story and often triggers the development of stories, and therefore the presented visualization methods below can be used as story map. Story maps often defy easy categorization and the examples below summarize the most common map types. However, storytelling maps can also be more complex and combines elements of two or more types of maps (Esri, 2012). All these story maps are developed by Esri.

1. Locating something

This is the simplest form of storytelling. This form is mainly used to locate or orient the user in a single map. In figure 7 and 8, points are used to show where a certain facility is located. With pop ups a location or region can be described to give the user a sense of its character. Points, lines and polygons are usable in this form of visualisation.

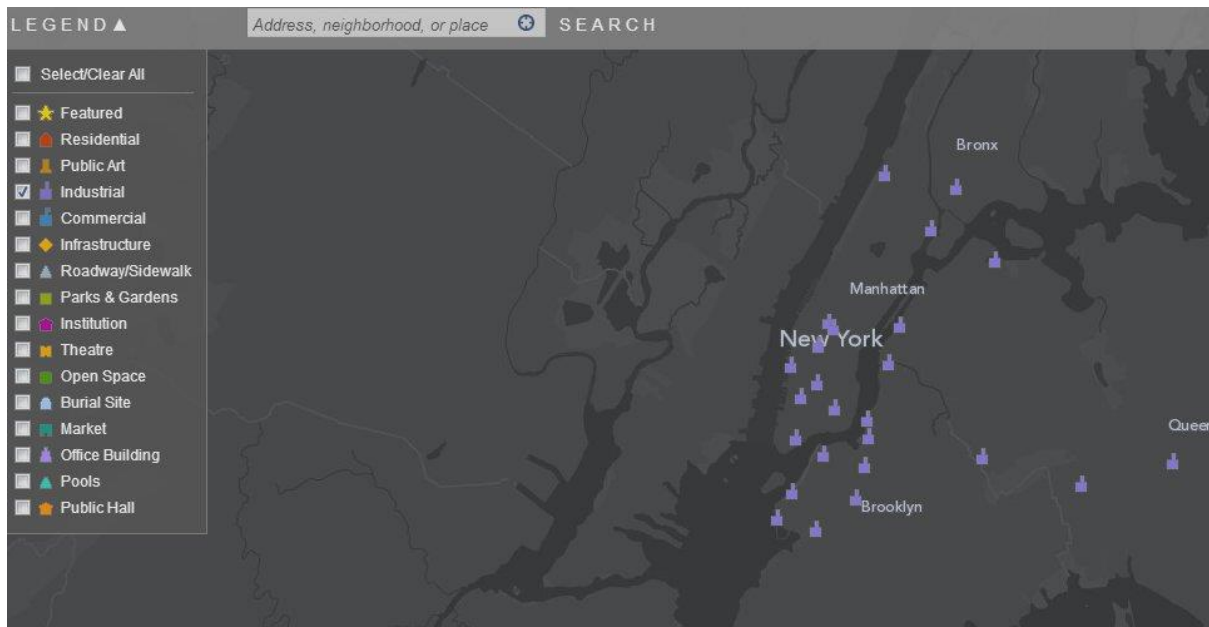


Figure 7: Locating something (Esri, n.d.)

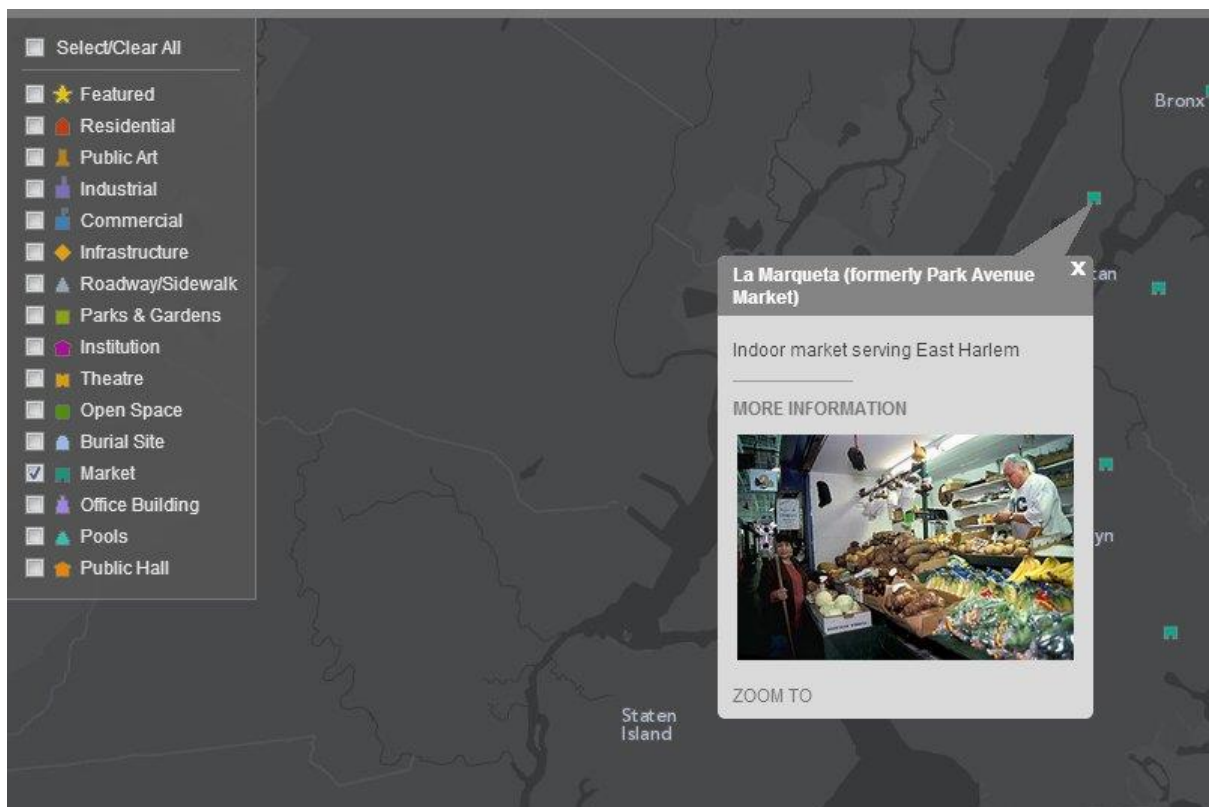


Figure 8: Describing a place (Esri, n.d)

II. From A to B

This form of visualisation is often used to show routes in a certain area. These routes are visualized by lines and points. The most important message is how to go from point A to point B. Figure 9 shows an example of a route from Haarlem to Amsterdam by car.



Figure 9: Providing Directions (Google maps, 2013)

III. Explaining a geography-related topic

Maps are often created to explain something. These maps depict the result of a research project or spatial analysis. These story maps involve most of the time thematic maps. In figure 10 an example is given of the theme renewable energy consumption. In this example the results are shown of a research about renewable energy consumption. For this visualisation method a mix of points, lines and polygons can be used.

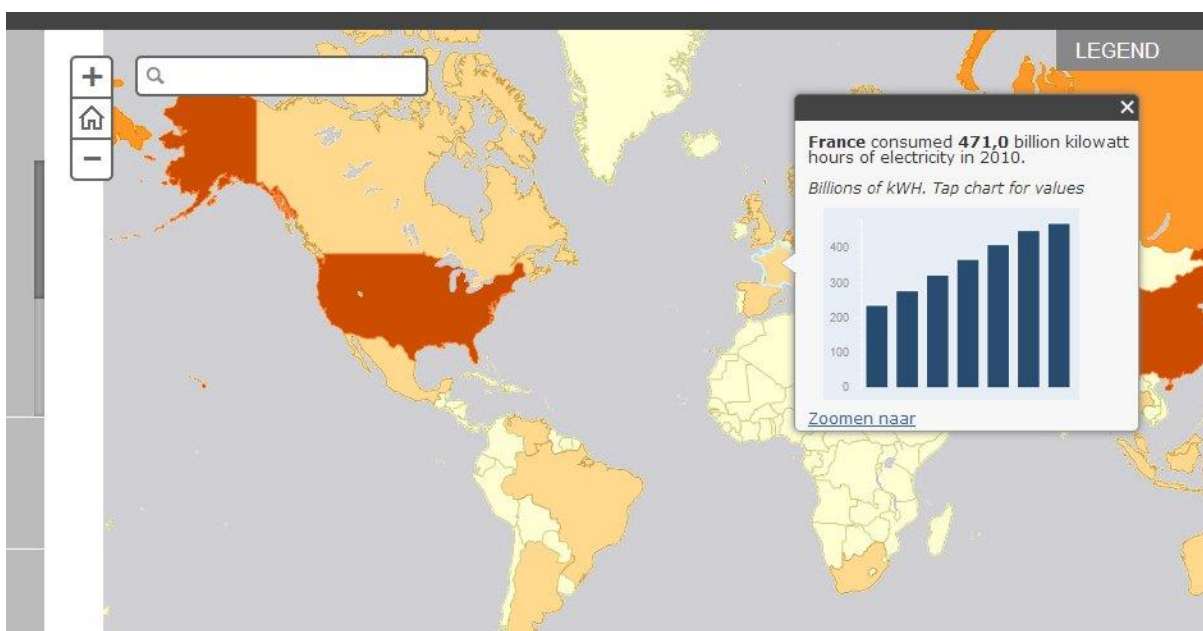


Figure 10: Explaining a geography-related topic (Esri, n.d.)

IV. Comparing

Story maps often compare two or more phenomena or themes in one region or one theme in more regions. Comparison maps can take many forms and serve many purposes. They frequently seek to explain a phenomenon or trend by comparing it to other themes or regions that may be causes or influences on the subject being explored. For this type of visualization the use of polygons and the use of multiple maps are common. Figure 11 compares unemployment rates and population change in a region. Figure 12 compares different locations and show how similar land uses have different patterns on different locations. Here, refugees camps all over the world are compared and shows number of refugees and their origin.

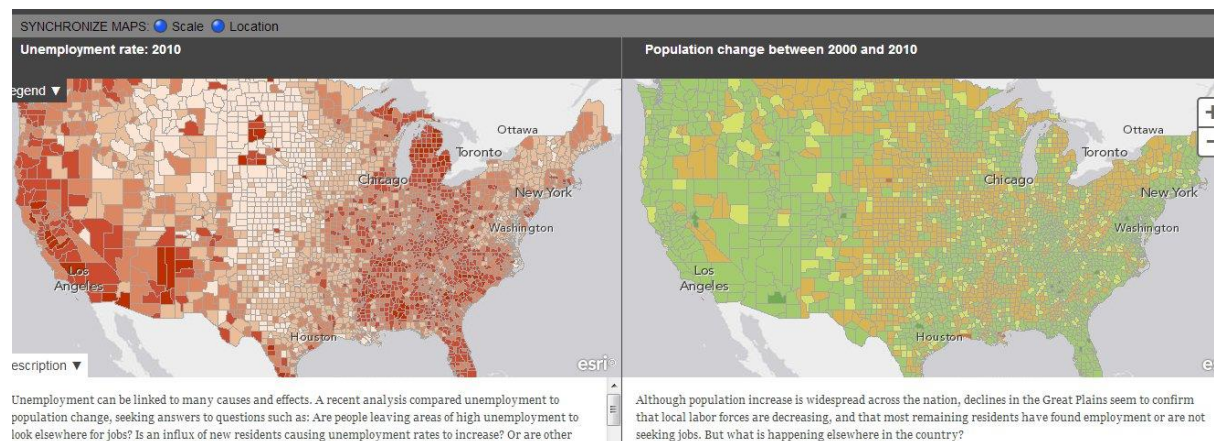


Figure 11: Comparing two or more themes (Esri, n.d.)

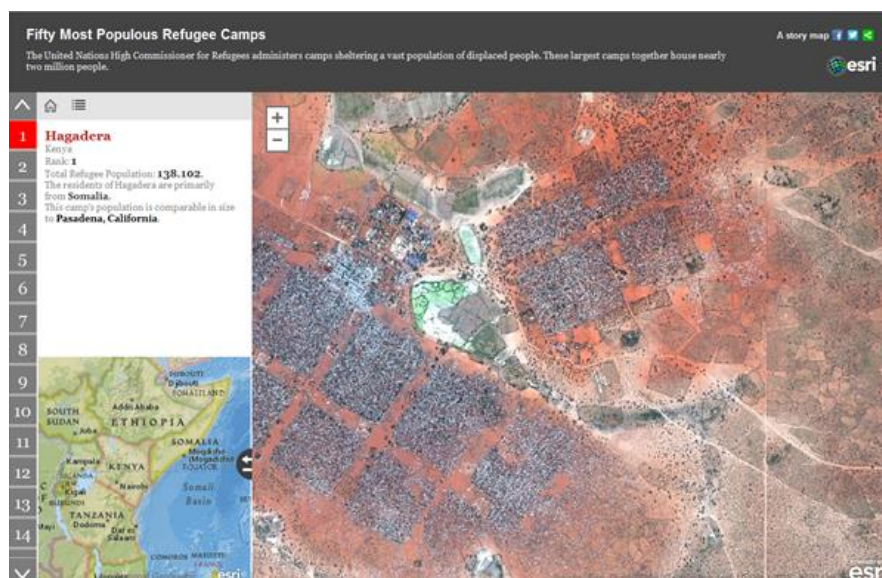


Figure 12: comparing two or more places on one topic (Esri, n.d.)

V. Forecasting and change over time

These types of maps have an emphasis on the history or the future. For these types of maps mostly polygons are used. In figure 13 prediction of heat waves in Europe are made. On the left side the model is explained. Figure 14 shows a creative example of how to visualize change over time. A spyglass is used to demonstrate the differences in world perspective in the past and present.

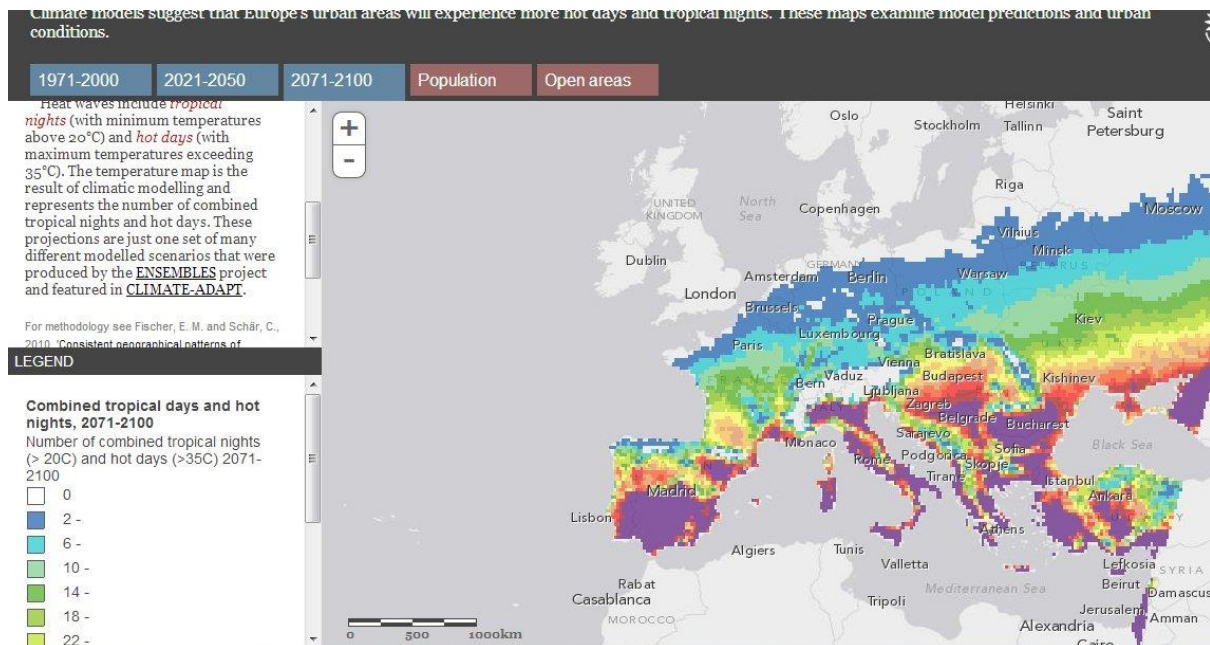


Figure 13: Forecasting the future (Esri, n.d.)

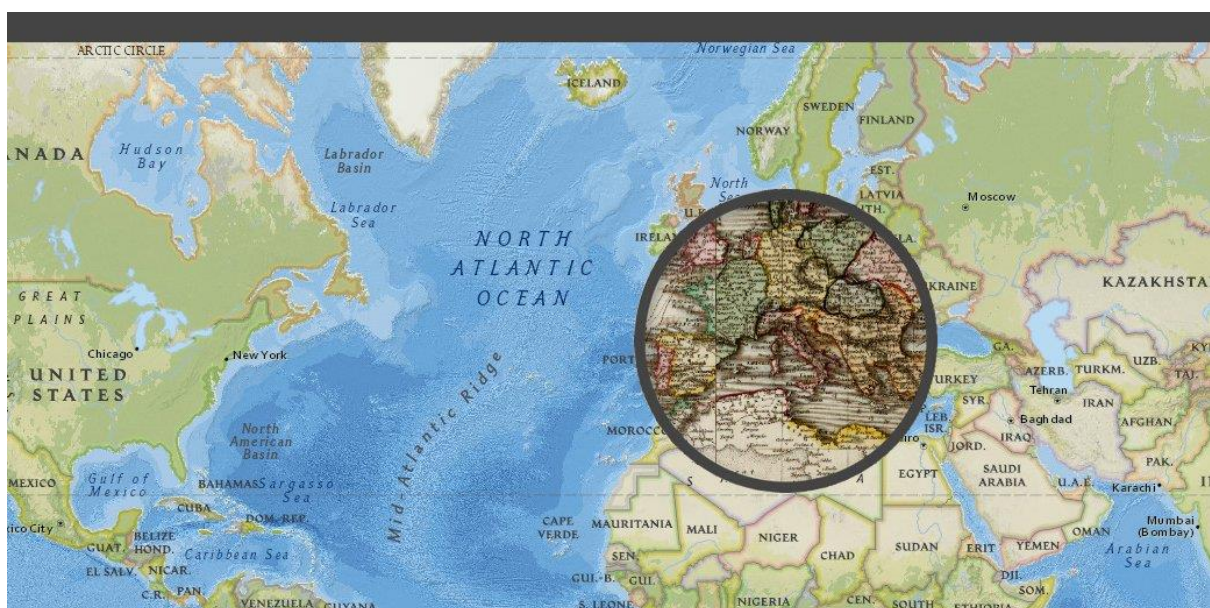


Figure 14: Showing change over time (Esri, n.d.)

2.2.4 Theoretical framework applicable to ‘Storytelling Maps’ of Esri?

An introduction to the Storytelling Maps of Esri was given. The elements of a storytelling map and visualisation methods were presented. It has to be clear that these methods are just examples of how to visualize a story by using maps: there are many more examples thinkable of how to visualize a story. I am aware of the fact that some of these visualization methods, especially visualization methods which express more complex stories, are not fully cartographic based. Esri makes use of several supporting elements such as popups, pictures and even animations and therefore you can doubt the cartographic addition to express the story. Nevertheless, these maps can be used in order to inspire and can be used as starting point to develop the cartographic addition more broad.

The question now is can the developed theoretical framework as presented in paragraph 2.1.4 be applied to the Storytelling Maps of Esri? Table 1 shows an overview of the application.

Visualization method	What? (story)	How? (telling)
Locating something	<p><u>Character</u>: a person for example who discovers a place.</p> <p><u>Event</u>: nice things to go to (e.g. market) through points on a map (coordinates) on a certain time (date).</p> <p><u>Setting</u>: different levels possible (world, continent, country, region, city) (coordinates).</p> <p>This type of map does not have a character development. There is no change over time visible and it is only a presentation of a static fact.</p>	<p><u>Form of visualization</u>: GIS plus Pop ups for pictures.</p> <p><u>Telling Technique</u>: no telling technique is used: it is a static view.</p>
From A to B	<p><u>Character</u>: a person for example who explores the shortest route.</p> <p><u>Event</u>: the easiest way to go from Haarlem to Amsterdam through points and lines on a map (coordinates) on a certain time (date).</p> <p><u>Setting</u>: different levels possible (world, continent,</p>	<p><u>Form of visualization</u>: Google Maps (GIS).</p> <p><u>Telling Technique</u>: no telling technique is used: it is a static view.</p>

	<p>country, region, city) (coordinates).</p> <p>Also for this type of map there is no character development visible. This map provides the shortest or fastest route between two cities and this is also a static fact.</p>	
Explaining a geography-related topic	<p><u>Character:</u> renewable energy consumption. <u>Event:</u> exploring countries with the highest of lowest renewable energy consumption through polygons on a map (coordinates) on a certain time (date). <u>Setting:</u> different levels possible (world, continent, country, region, city) (coordinates)</p> <p>These types of maps often show a change over time and a development of a certain topic. But again only a presentation of the facts is given and there is no value added to these numbers. In this way it is hard to distinguish the different stages.</p>	<p><u>Form of visualization:</u> GIS with supporting popups. <u>Telling Technique:</u> the telling technique moment was used. These maps often show a situation in several years.</p>
Comparing	<p><u>Character:</u> unemployment rates and population change. <u>Event:</u> comparing unemployment rates and population change in a region or besides regions through polygons on a map (coordinates) on a certain time (date). <u>Setting:</u> different levels possible (world, continent, country, region, city) (coordinates)</p> <p>Also with this type of map</p>	<p><u>Form of visualization:</u> GIS with supporting text and pictures. <u>Telling Technique:</u> no telling technique was used: it only shows the comparison on a certain time.</p>

	two concepts or areas are compared at the same time. In this way only based on the map a character development is not visible.	
Forecasting and change over time	<p><u>Character</u>: heat waves. <u>Event</u>: the occurrence of heat waves through polygons on a map (coordinates) on a certain time (date). <u>Setting</u>: different levels possible (world, continent, country, region, city) (coordinates)</p> <p>A character development is visible due to time differences. However it is often a presentation of figures and numbers and does not show a value judgement. As a consequence it is hard to recognize the different stages. The only stage which is clearly visible is the 'transformation' stage.</p>	<p><u>Form of visualization</u>: GIS with supporting text or pictures. <u>Telling Technique</u>: the telling technique moment was used. The map only shows the situation in several years.</p>

Table 1: Theoretical framework applied to Storytelling maps of Esri.

As a conclusion I could say that the developed theoretical framework does not become visible in the Storytelling Maps of Esri. According to the used literature in the first sub chapter, change over time and recognition of different stages are of importance for character development to structure a narrative. Also the telling techniques of Blok (2005) did not become clearly visible in the examples of Esri. This has also to do with the assumption that people have value judgements and want to stress a certain topic or time period. These value judgements does not become visible since the Storytelling Maps of Esri often show static facts.

Despite of the fact that the Storytelling Maps as developed by Esri does not make use of the theoretical framework, the maps are a good starting point for this research. They are used for inspiration and they show a good use of other media like pictures and animation.

In this chapter the relationship between the planning of energy transition, GIS and narratives was established. Theoretical concepts like narrative, narrative inquiry and character development were explored. Also a theoretical background was given

about the use of narratives in the planning of energy transition. After that the valuable use of GIS in the planning of energy transition was highlighted. From this literature a theoretical framework was developed which will be the leading thread in this research. At last some theory was explored about the use of narratives in a GIS environment and some examples were given. Also the developed theoretical framework is applied to these examples.

In the next chapters the above mentioned theoretical framework will be applied to the Veenkoloniën: a region in the Netherlands, which faces transition towards a renewable energy landscape. Chapter 3 describes the cases and in chapter 4 the methodology will be presented: a guidance of how to set up a Narrative GIS according to the developed theoretical framework.

CHAPTER 3: CASE DESCRIPTION

The previous chapter gave an overview of important concepts and provided a theoretical framework wherein the research takes place. In order to develop a Narrative GIS two cases will be used and both cases are entries to the competition held in 2011 to 2012 of the Eo Wijers Stichting. This competition challenges researchers and engineers to develop a renewable energy landscape for the Veenkoloniën in the provinces of Groningen and Drenthe. This plan development had to include (local) stories. In my study the case called 'Wat weet een boer van saffraan?' is used as a case study on the development of a narrative on energy transition. The second case called '7Sprong' will be used to verify the general applicability of the developed Narrative GIS set up.

The central theme of the Eo Wijers competition was 'Shrink'. Several parts of the Netherlands face a population decline, employment decline and as a reaction on this a decline of public and private facilities. Where the western part of the Netherlands is still growing and provides sufficient employment, the other regions in the Netherlands loses valuable people to keep their economical and social engine running. Because of this trend, big contrasts between the west and other parts of the Netherlands are already remarkable. But this trend is not only a negative one. It also enables these regions to invest in more sustainable options (social, economical and ecological) to create long term value to obtain more economical and social stability in these areas. The Eo Wijers competition uses terms like energy transition, bio-based economy, bottom-up planning and new combinations for land use in order to create spatial quality (Agenda voor de Veenkoloniën, 2013).

From all these regions, the Veenkoloniën in the provinces of Groningen and Drenthe was chosen. This region distinguishes itself because of its challenging attitude towards the competition and the failed top-down plans for the region. The Veenkoloniën needs a bottom-up approach where its inhabitants can create their own ideas and future perspective (Agenda voor de Veenkoloniën, 2013).

The Veenkoloniën are located in the provinces of Groningen and Drenthe in the Netherlands. The region lies between the municipalities of Veendam, Hoogezand-Sappemeer, Menterwolde, Pekela, Stadskanaal, Vlagtwede, Aa en Hunze, Borger-Odoorn and Emmen (Agenda voor de Veenkoloniën, 2013). In Figure 15 the region is visualized in the yellow color.

The Veenkoloniën has a long 'energy history'. From the 17th to the 20th century the Veenkoloniën were mainly used for peat extraction. This peat was the main source of fuel for the fast-growing parts in the Netherlands. The economy of the Veenkoloniën in this time was dominated by the peat extraction and nearly nobody lived in this area. Because of this peatery history the area obtained its famous characteristic landscape. Nowadays, the ground is used for agricultural purposes and is therefore the main economic activity in the area. Unfortunately the agricultural

system in this area can only exist due to governmental subsidies. The amount of subsidies will be reduced in the nearby future and this will have tremendous consequences for the area. The population in this area is 200.000 and is declining. The population can be characterized by its independency and there are many 'cultural differences' within the area itself. The area is suffering from dejunivation and therefore the future of the area as an growing and thriving agricultural area is uncertain (Agenda voor de Veenkoloniën, 2013).

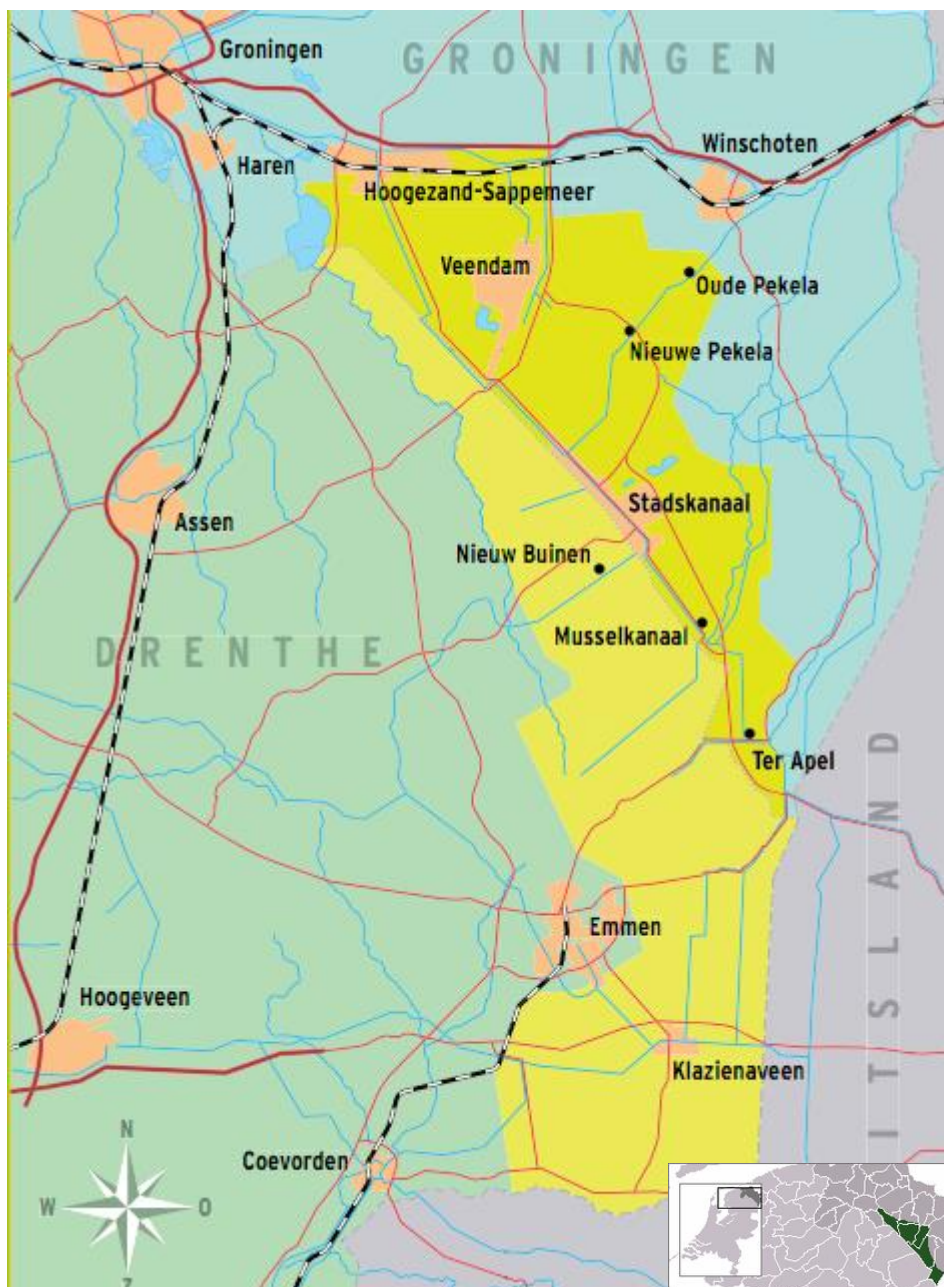


Figure 15: The Veenkoloniën (yellow) (Agenda voor de Veenkoloniën, 2013)

The Eo Wijers foundation supports planners who are concerned about the spatial quality on regional and local level. By setting up a competition, individuals get a change to present their plans for a certain region, in this case the Veenkoloniën. The main themes of this competition were: population decline, energy transition and

spatial quality. These are all issues in the area of the Veenkoloniën (Eo Wijersstichting, n.d.).

The two cases were chosen out of 36 submissions for the Eo Wijers competition. The reason why these two were chosen was because of the fact that they pay much attention to energy issues and energy transition in particular. This focus fits best in the scope of this research: the development of a Narrative GIS set up in order to visualize the narrative of energy transition and its contribution to the development of renewable energy landscapes.

In the next subchapters the two cases 'Wat weet een boer van saffraan?' and '7Sprong' will be described more in detail.

3.1 'Wat weet een boer van saffraan?'

The case 'Wat weet een boer van saffraan?' focusses on the barnyard as 'engine' for the 'comfort zone'. The comfort zone refers to comfortable living with less goods, less people, less government and less plans in order to improve the quality of living. 'Wat weet een boer van saffraan?' proposes an 'Energy Company'. This company focusses on a financing model for sustainable development and is responsible for the energy management in the Veenkoloniën.

A central element in this proposal is the development of an energy courtyard where renewable energy will be generated in combination with traditional farming. The energy courtyard, a product of the Energy Company, will act as a knowledge institute in order to convince farmers in the Veenkoloniën to apply renewable energy principles. The energy courtyards will show the many possibilities possible on these courtyards. In this way different 'themes' will exist. For example, an energy courtyard what focusses on social healthcare, recreation or small scale community farming.

Not only the generation of renewable energy is of importance in this proposal. The Energy Company will also aim for good cooperation between farmers and other inhabitants of the area and will act as a mediator in energy related conflicts.

An important element in this proposal is the extent to which the energy courtyard fits in the existing landscape. As noted before, the Veenkoloniën can be characterized by ribbon shaped development and it is of importance that the new developments fit in this pattern. Therefore the case proposes ribbon shaped farmhouses which are located on the energy courtyards. Also, the Veenkoloniën consist of four sub areas with their own characteristics. The farmhouses will be built in a way it fits in its sub area.

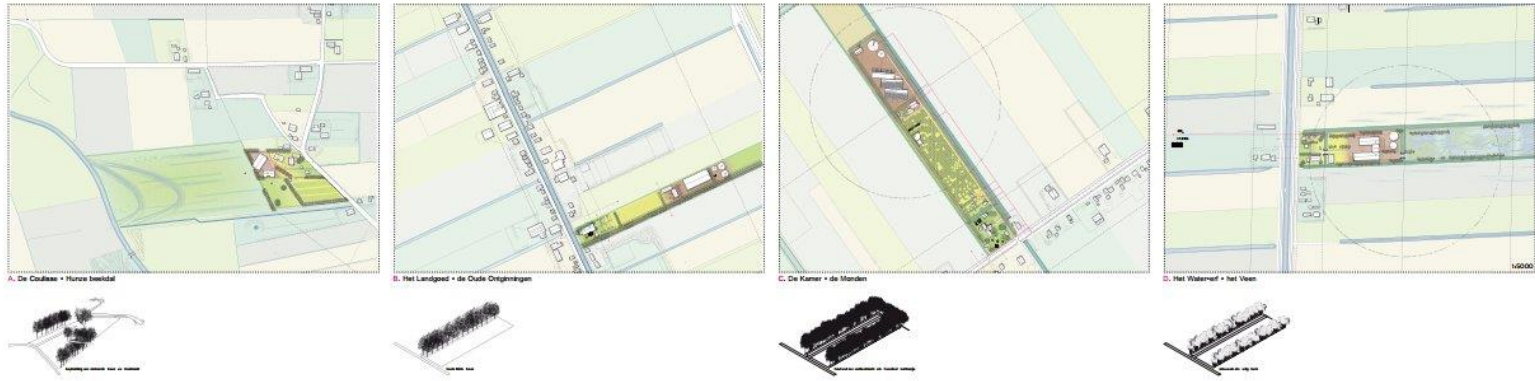


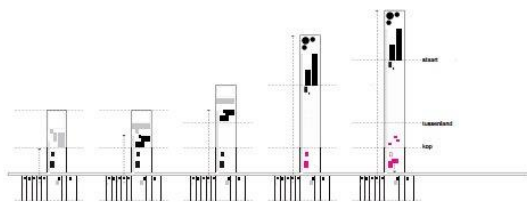
Figure 16: The four different sub areas with their own characteristics (Agenda voor de Veenkoloniën, 2012)

All together these energy courtyards and the Energy Company will create a more attractive area for living and recreation. The energy courtyard will provide new business opportunities for the farmers in this area and will also contribute to sustainable energy management. In this way the new landscape that will arise will serve as a strong foundation for the earlier mentioned comfort zone (Agenda voor de Veenkoloniën, 2012).

opstrek erf

Het nieuwe erf groeit met het recht van opstrek: lijnvormig naar achteren om uitzicht van huidige bewoners te beschermen en milieuhinder te minimaliseren. Opstrekking leidt tot driedeling erf: kop (comfort-zone aan lint), tussenland (faciliterend, semi-agrarisch), staart (nieuwe boeren erf).

Mate van opstrek is vrij, tot maximaal een derde afstand tot het volgende lint, ter vrijwaring van de karakteristieke landschappelijke openheid.



ontwikkeling erf

De opbouw is flexibel. Na opstrek volgt interne ontwikkeling: het bedrijf breidt uit, krijgt nevenfuncties, innoveert en haakt aan op lokale structuren.

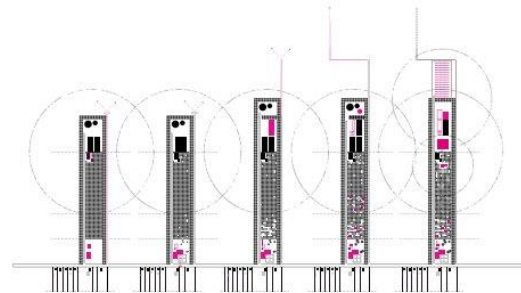


Figure 17: In the left picture the shape and the development of the county is presented. In the right picture the shape and development of activities on the county is presented (Agenda voor de Veenkoloniën, 2012)

The poster presentation of 'Wat weet een boer van saffraan?' is added in appendix A1.

3.2 '7Sprong'

The '7Sprong' proposes a development strategy based on the issues in the Veenkoloniën. In general the issues are all related to the need for a small scope and independent region where people can have a comfortable living with its own cultural

heritage where the Veenkoloniën is famous for and the shift towards a high scale, dependent and efficient market mechanism. The issues coming from this trend are coming from a shift over time where it started with a small scale agricultural society towards a post-industrial global agricultural society where efficiency, specialism and market mechanisms are of importance. Nowadays ICT makes it possible to connect 'the global with the local' and this trend can be favourable for the need for a comfortable living in a small scale society what benefits from the advantages of the international market.

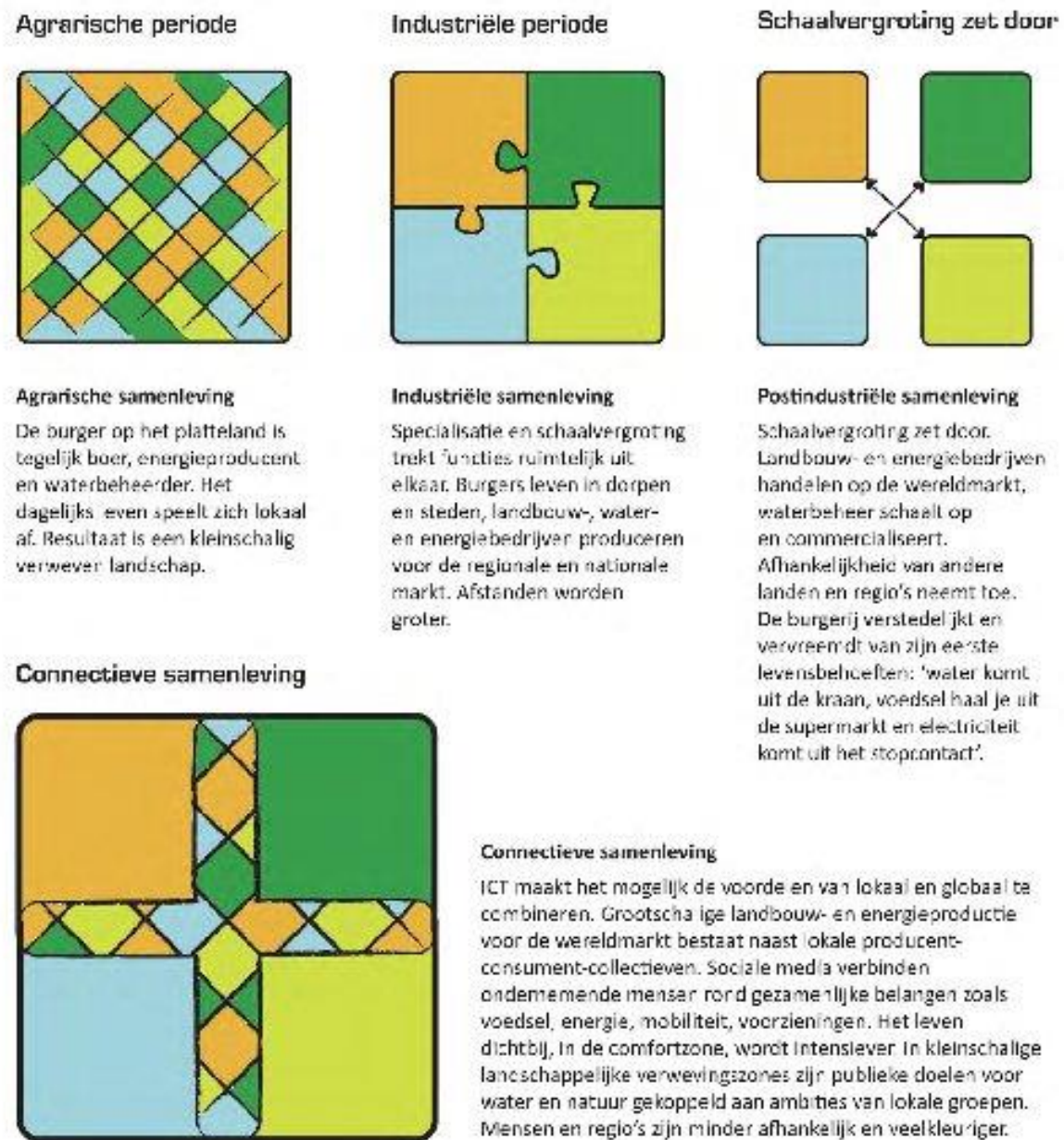


Figure 18: The development of the Veenkoloniën over time: Agricultural society, industrial society, post-industrial society and the communication society (left to right) (Agenda voor de Veenkoloniën, 2012)

Because of the international crisis the Veenkoloniën already reacted on the idea that the bigger is not always the best. There are already trends visible of recycling, intensive use of production goods and production by the consumer themselves.

The '7Sprong' goes further with these existing trends. The '7Sprong' proposes a 'harvest economy' where farmers work together to make intensive use of the goods which are present in the area: labour, space and agricultural knowledge. Continuity and quality are the leading principles and are needed for the development of the area. An example of a corporation of farmers and inhabitants is the 7%-rule, set up by the Dutch government. This rule will make sure that 7% of the courtyard is used for public purposes. By working together, these areas can be localised in an area where everybody can benefit without loss of valuable agricultural grounds. An example is a recreational area for the citizens. A 'Streekdeal' between farmers, inhabitants and landscape organisations (regional Public-Farmer-NGO Partnership) will facilitate this corporation in a way that all parties will win economically, ecologically or socially. There are already pilots started in this area which show that these corporations work.

The citizen of this area is especially triggered by the high energy costs and uncertainty about their property value. It is necessary that citizens can earn money by generating their own energy (e.g. solar panels). In this way the citizens have lower energy costs and increase their property value. A collective approach can generate scale based advantages and it will contribute to the social capital of the region. Also the combination of functions like living and healthcare or working and education centres can save costs because of a smart combination of space, production goods and facilities.

This collective approach (Streekdeal) has to start somewhere. The already existing 'Agenda voor de Veenkoloniën', an organisation which tries to develop the Veenkoloniën in order to create an innovative agricultural area what focusses on water and energy issues (Agenda voor de Veenkoloniën, 2013), will act as a facilitator which start the first phase of the project; will plan meetings in the neighbourhood and is responsible for publicity (Agenda voor de Veenkoloniën, 2012).

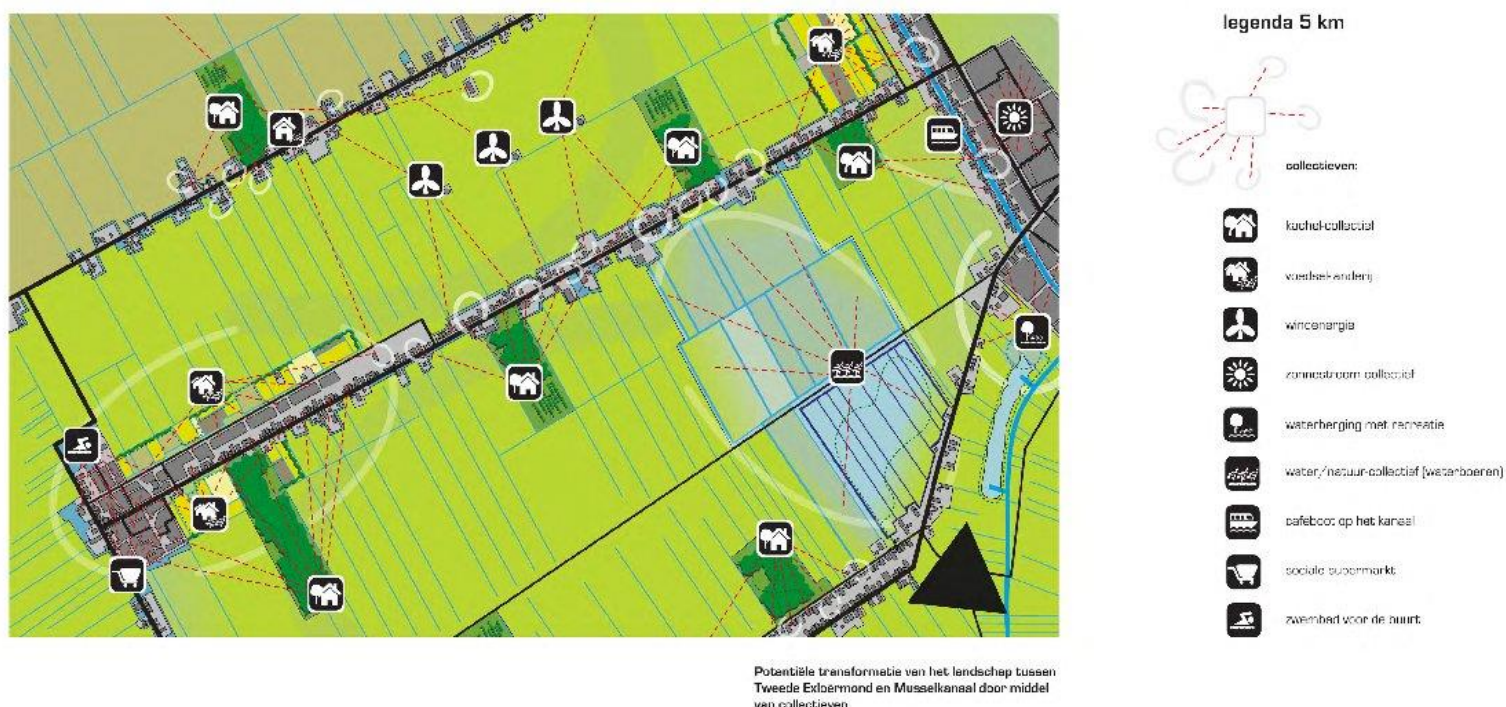


Figure 19: All the pictograms refers to the collective approach: farmers, inhabitants, organisations, etc. work together in order to achieve several goals (Agenda voor de Veenkoloniën, 2012)

In short the '7Sprong' aims for the following transitions (Agenda voor de Veenkoloniën, 2012):

From.....	To....
As much as possible generating new products	Make use of what is already there in the region (re-creation and combination of functions)
Speed and big volumes	Small amounts over a longer time period
Lots of raw materials and money needed	Less raw materials and money needed
Shifting environmental issues	Environment is an integral part and source of production
Short term profit, time is money	Long term profit (continuity), time gives meaning
No adaptability	Adaptability is leading principle
Counting with certainties	Counting in uncertainties
Ignoring social capital	Build up social capital
Solitary solutions	Solidary solutions

Table 2: '7Sprong' transitions (Agenda voor de Veenkoloniën, 2012)

The poster presentation of '7Sprong' is added in appendix A2.

3.3 Narrowing down the research

Chapter 2 and 3 showed the boundaries of the research. The theoretical framework was introduced and the cases used in this multiple case study were explored. To narrow down the research, choices for continuation need to be set. Chapter 4 follows the developed theoretical framework and here the second 'loop' will start. Objective

3 focusses on both the *what*-question and the *how*-question. Themes which play a role in the narrative of energy transition will be extracted and the six stages of character development will be applied to the themes. The six stages will be explored and analysis of properties of geo data leads to a data ordering scheme. After that translation to a GIS environment is needed to visualize this data ordering scheme. This translation will be done by applying the telling techniques of Blok (2005). In the fourth objective the *what*- and *how*-question are combined to explore the concept of external validity.

In chapter 5 the Narrative GIS 'setup' as developed in chapter 4, will be applied on the cases 'Wat weet een boer van saffraan?' and '7Sprong'. For this, the case descriptions in chapter 3 will be used for filling in the developed Narrative GIS setup. Not everything what is mentioned in chapter 3 will be presented in the Narrative GIS due to time limitations. Only some important concepts as noted in the case descriptions will be presented. The data ordering scheme will show that also not everything in the case descriptions can be used because of the bad resolution and accuracy of some data (this will be explained in chapter 4).

CHAPTER 4: METHODOLOGY

In this chapter the methodology used for this research will be presented. The second 'loop' will be central what consist of the analysis of different parts of a Narrative GIS set up by following the earlier presented theoretical framework and synthesize these parts to a workable Narrative GIS set up which is in chapter 5 applied to the two selected cases. Sub chapter 3.3 showed what will be used from chapter 2 and chapter 3 to set up the methodology. In the first part the type of research, research design and the way of data collection will be explained. In the second part the methods for analysis will be presented for every objective as noted in the introduction chapter.

4.1 Type of research and research design

The type of research defines the structure of the research. This structure is of importance by choosing the right analysis methods and data collection methods (Bryman, 2008).

Two types of research can be distinguished: quantitative research and qualitative research. Quantitative research focusses on testing the existing theoretical model. By doing this, quantitative research has a deductive nature. The aim of this type of research is to discover causality and to generalize these causalities. Because generalization is hard to achieve, large data sampling are needed and therefore this is a common way of data collection when doing quantitative research. Important to know is that interpretation of the generated data will be a posteriori (Bryman, 2008).

Qualitative research on the other hand is based on ideas and develops new hypotheses. Backgrounds and motives of people are of importance with this type of research. The research focusses more on why something happens and the result rather than the process of the research. Therefore qualitative research has an inductive nature where one single event leads to a general theoretical model. However, for both qualitative and quantitative research, collection of data, analysis of the collected data and interpretation of data are central elements. Also data reduction and discovery of typical data patterns are of importance for both research types (Bryman, 2008).

The research type used in this thesis is a combination of quantitative and qualitative research. With the development of a Narrative GIS set up a general theory or framework will be formed out of one case and this is characteristic for qualitative research where one single event leads to a general theoretical model. But because of the focus on the use of this Narrative GIS more in general, also the process is of importance. How to come to this narrative framework and how can you reproduce this framework in other cases. This last thing is characteristic for quantitative research and therefore a combination of quantitative and qualitative research will be used.

A research design is used to frame the way of data collection and way of data analysis. The design choice depends on your aims for the research process. For this research a multiple case study is chosen. By using a case study as research design a case will be intensely explored and analysed. Either cases with unique characteristics as cases with representative characteristics can be used, depending on the research purposes. As shown in the previous chapter, two cases were chosen for this research. These cases are two approaches for the same region in the Netherlands: the 'Veenkoloniën'. These two cases were chosen out of 36 submissions because of their special attention to energy landscapes and the complex social strategies behind the planning of energy transition. This is also the reason why these cases are representative for other regions in at least the Netherlands or Western Europe where social structures, governmental systems and economical systems are equivalent. By choosing for a multiple case study where one case will be used for verification, the external validity will be enlarged (Bryman, 2008).

4.2 Data collection

As noted before, a research design is needed to shape the research. An important part of this research is the way of data collection. Because of the wide variety of data collection it is needed to elaborate on this subject.

Also for data collection a distinction can be made between quantitative ways of data collection and qualitative ways of data collection. This means that the chosen way of data collection will contribute to either quantitative research or qualitative research (Bryman, 2008). Because of the chosen combination of quantitative research and qualitative research, a combination of data collection will be used.

Objective 1 and 2 (chapter 2) are based on a literature study. Existing literature about narratives, energy transition and GIS were used. From this a theoretical framework was formed. This is a qualitative way of data collection.

Objective 3 focusses on the development of a Narrative GIS. For doing this the data of the submitted essays will be used. Also previous work done by Karmijn van den Berg and Renée de Waal (2013) will be used to determine themes within the narrative of energy transition for operationalization. They developed a coding framework to extract themes from the selected cases. I will use their work as a starting point since the extraction of themes from a case is time-consuming and this is not the central focus of this research. I am aware of the fact that their work is not totally finished and the found themes used for this research are provisionally. Because the developed theoretical framework will be applied to develop a Narrative GIS set up, existing literature, extracted from online databases and libraries will be used. For this objective, a combination of qualitative and quantitative methods is used because of the development of a new 'theory' (qualitative) and the development of a clear process for general application (quantitative).

The last objective, objective 4, will use the designed Narrative GIS and existing literature as source. The existing literature will be used to define important concepts like 'external validity'. The designed Narrative GIS will be used to test its general application. In order to test its general application the case '7Sprong' will be used to verify the designed Narrative GIS. Also for this objective a combination of a quantitative (testing the Narrative GIS for its external validity) and qualitative approach (using literature to define and interpret important concepts) will be used.

4.3 Analysis methods

In the previous sub chapters the research type, research design and way of data collection were presented. In this sub chapter the analysis methods will be discussed. An analysis method is a method to analyse the gathered data in a structured way in order to generate conclusions and causalities. The analysis method is, like the way of data collection, dependent on the type of research: quantitative research or qualitative research (Bryman, 2008). In the next paragraphs the analysis methods will be presented divided by objective.

4.3.1 Objective 3: Set up a Narrative GIS for the case 'Wat weet een boer van saffraan?' by using the theoretical framework.

In the developed theoretical framework, the concepts 'narratives' and 'narrative inquiry' were explored. These concepts are an integral part of the research since the use of narratives in combination with GIS applications is the main focus of this research. Also, to introduce the coding framework set up by Karmijn van den Berg and Renée de Waal, knowledge of narratives and narrative inquiry is needed. In this paragraph a roadmap will be provided of how to develop a Narrative GIS set up. The theoretical framework will be applied in 6 steps which will be explained below. Steps 1 to 5 focus on the *what*-question while step 6 focusses on the *how*-question. Chapter 5 provides an example of a Narrative GIS according to the developed Narrative GIS set up.

Step 1 (*What?*) Determine themes within the narrative of energy transition

To start, the narrative of energy transition needs to be explored. The scheme of Potteiger and Purinton (1998) can also be applied to the narrative of energy transition (Figure 20). This scheme will be filled in in chapter 5.

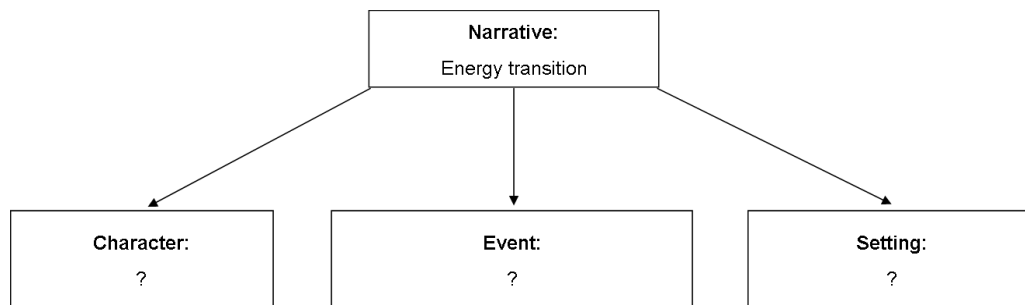


Figure 20: Scheme of Potteiger and Purinton (1998) applied to the narrative of energy transition

As noted before, the selected case ‘Wat weet een boer van Saffraan’, can be seen as a realistic planning practice since the submissions of the Eo Wijers competition are real plans for the planning of energy transition in the area of the Veenkoloniën. Because the narrative of energy transition is very broad, different themes which play a major role in the narrative of energy transition will be explored in order to make the narrative of energy transition more transparent and concrete.

To explore these themes, the coding framework set up by Karmijn van den Berg (master student) and Renée de Waal (Phd student) will be used. This coding framework is developed by analysing the submissions of the Eo Wijers competition. Renée de Waal set up an analytical framework (figure 21). This analytical framework is based on the assumption that the already mentioned elements character, event and setting, determine what stories express. People analyse existing stories and design new stories based on these elements (van den Berg, 2013).

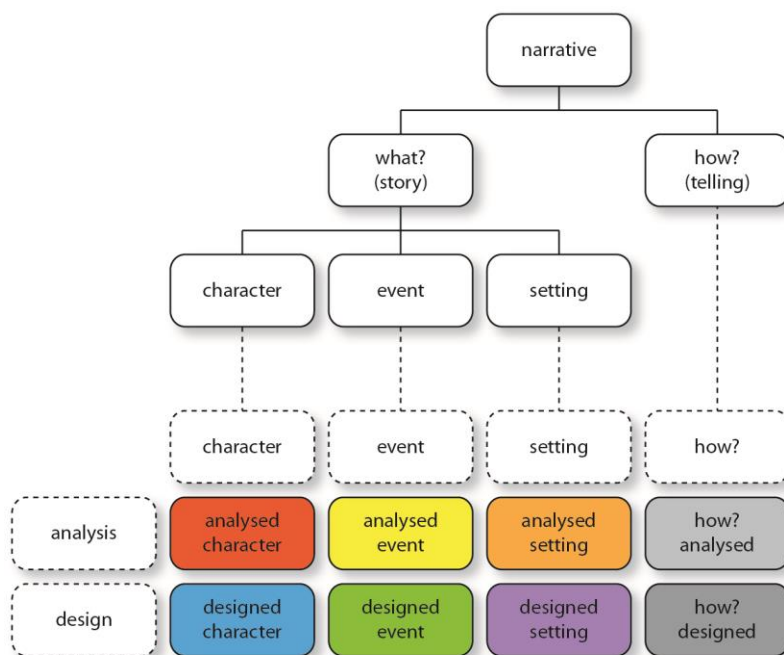


Figure 21: Analytical framework (de Waal, n.d.)

The posters and essay of ‘Wat weet een boer van saffraan?’ were used as primary data source. As analytical technique a coding scheme was used. Coding can give a systematic overview of the interpretation of the research by organising the segments before the researcher attaches meaning to the segments (Creswell, 2009). Based on the presented analytical framework the following questions have been taken into account during the coding process (van den Berg, 2013):

1. What analysed events are present?
2. What analysed settings are present?
3. What analysed characters are present?
4. How did the designer analyse the story?
5. What designed events are present?
6. What designed settings are present?
7. What designed characters are present?
8. How did the designer express the story?

The coding process consists of five steps for both essay and poster. In these five steps, different themes will be extracted by analyzing character, events and setting of the narrative of energy transition. The five steps are (van den Berg, 2013):

I Coding narrative elements, getting an overview

- 1 “Een andere taak van de Energie Compagnie is bemiddeling. Voordat er een schop
- 2 de grond in gaat moet eerst een meningsverschil tussen boeren en de bewoners
- 3 worden opgelost. Het plaatsen van windturbines in de achtertuinen van de
- 4 bewoners in de linten is onaannemelijk. Er komt geen medewerking voor
- 5 agrarische ontwikkeling wanneer de molens in de weg blijven staan. Een lint van
- 6 windmolens langs de Provincialeweg N366 en het kanaal lijkt een betere keuze
- 7 dan een windpark in de Monden. Hier staan de molens zo veel mogelijk buiten het
- 8 gezichtveld van de dorpslinten en maken ze onderdeel uit van een grootschalige,
- 9 bovenregionale structuur.”

Analysed narrative elements

Designed narrative elements

II Coding ‘events’, ‘characters’, ‘settings’ and ‘how’

- 1 “Een andere taak van de Energie Compagnie is bemiddeling. Voordat er een schop
- 2 de grond in gaat moet eerst een meningsverschil tussen boeren en de bewoners
- 3 worden opgelost. Het plaatsen van windturbines in de achtertuinen van de
- 4 bewoners in de linten is onaannemelijk. Er komt geen medewerking voor
- 5 agrarische ontwikkeling wanneer de molens in de weg blijven staan. Een lint van
- 6 windmolens langs de Provincialeweg N366 en het kanaal lijkt een betere keuze
- 7 dan een windpark in de Monden. Hier staan de molens zo veel mogelijk buiten het
- 8 gezichtveld van de dorpslinten en maken ze onderdeel uit van een grootschalige,
- 9 bovenregionale structuur.”

Analysed character

Analysed event

Analysed setting

Analysed how

Designed character

Designed event

Designed setting

Designed how

III Noting the coded data

De Energie Compagnie bemiddelt. (1)

Boeren en burgers verschillen van mening over het plaatsen van windturbines in de achtertuinen van burgers in de linten. (1-4)

Geen medewerking van burgers voor agrarische ontwikkeling door meningsverschil. (3)

De windturbines worden geplaatst langs de Provinciale weg N366 en het kanaal. (6)

De windturbines worden zo veel mogelijk buiten het gezichtsveld van de burgers in de linten geplaatst. (7-8)

De windturbines zijn onderdeel van een grootschalige bovenregionale structuur. (8-9)

IV Clustering of narrative elements

Windturbine conflict

Het plaatsen van windturbines creëert een meningsverschil tussen boeren en bewoners van linten, waardoor de bewoners van linten geen medewerking geven aan agrarische ontwikkeling.

Oplossen van windturbine conflict

Door het bemiddelen van de Energie Compagnie staan de windturbines zoveel mogelijk buiten het gezichtsveld van de bewoners van linten, als onderdeel van een grootschalige regionale structuur.

V Writing a resume for every theme

Energie:

Windturbines worden geplaatst

Economisch:

Bemiddeling maakt agrarische ontwikkeling mogelijk

Communicatie:

Boeren en burgers werken samen.

The total analysis can be found in appendix B1. In the document the essay of the submission is analysed and this data will be used for further proceedings.

After analysis, the narrative of energy transition can be clustered in five general themes. These themes and their interactions are presented in the results in chapter 5.

It must be said that these themes can only be found by interpreting the findings of other people. Because of this personal interpretation of data, first by Renée de Waal and Karmijn van den Berg and later by myself, I have to be aware that there are consequences for the reliability for the research. Also the reproducibility can be doubted. Because of this personal interpretation, the research may have other outcomes when someone else interprets the same data because of differences in thoughts and cultures (Bryman, 2008).

Step 2 (What?) Character development per theme

As stated in chapter 2.1.1 every narrative follows a certain structure. The three elements of a story, 'character', 'event' and 'setting', develop together a time-bounded and spatial plot or character development. This character development was explained by the Freytag's Pyramid. Not every story is the same and therefore different forms of this pyramid are thinkable. But in general this pyramid can be used as starting point for this first step to create a character development for all themes. The different themes as found in objective 1 will be explored according to their character development or plot.

I will distinguish the six stages of character development per theme according to the explanation of every stage given in chapter 2.1.1. I am aware of the fact that I will interpret the different stages of the themes by myself and this has consequences for the reliability and reproducibility of this research. However, this research is meant to show the possibilities of the use of narratives within GIS and a perfect division, if that is possible because of all the interrelations between stages, of the six stages is of minor importance. Figure 22 will present step 2. Theme X is used as example. This figure can be repeated for all themes which can be found in the results. The outcome of this step will be written text for every step in the character development.

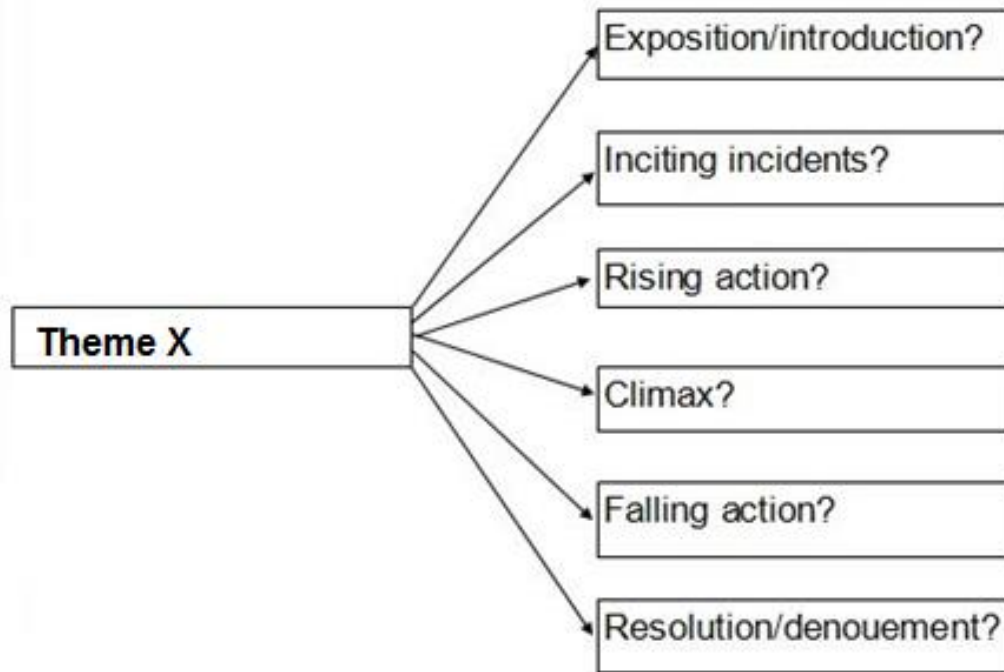


Figure 22: Exploring the different steps of character development for all themes

Step 3 (What?) Geo data used in character development

In this step the outcome of step 2 will be used (written text for every step in the character development for every theme) to explore the geo data that can be used in GIS. In order to decide when data can be classified as geo data I will look at the following indications: place names, landmarks on pictures/in text, longitudinal/latitude coordinates, addresses, landownership, economical activities, demographic characteristics, infrastructural structure (water, electricity, roads, etc.), administrative units (municipality borders etc.), cultural units, land use, etc. These indications can often be used as geo data. In order to structure the geo data, geo data can be defined according to the following five properties: location, direction, shape, size and topology. Where location refers to a specific place on earth; direction says something about the orientation of an area/object (e.g. northeast); shape is about the shape of an area/object (line-shaped/ square-shaped); size says something about the scale of an area/object; and topology refers to the spatial interrelations between areas or objects (Chang, 2006). To make this classification more complete, I also take the extent, resolution and accuracy into account. At last, I will look whether the data can be used as thematic data. Figure 23 and 24 show the roadmap for step 3. I will use MS Excel to order the data.

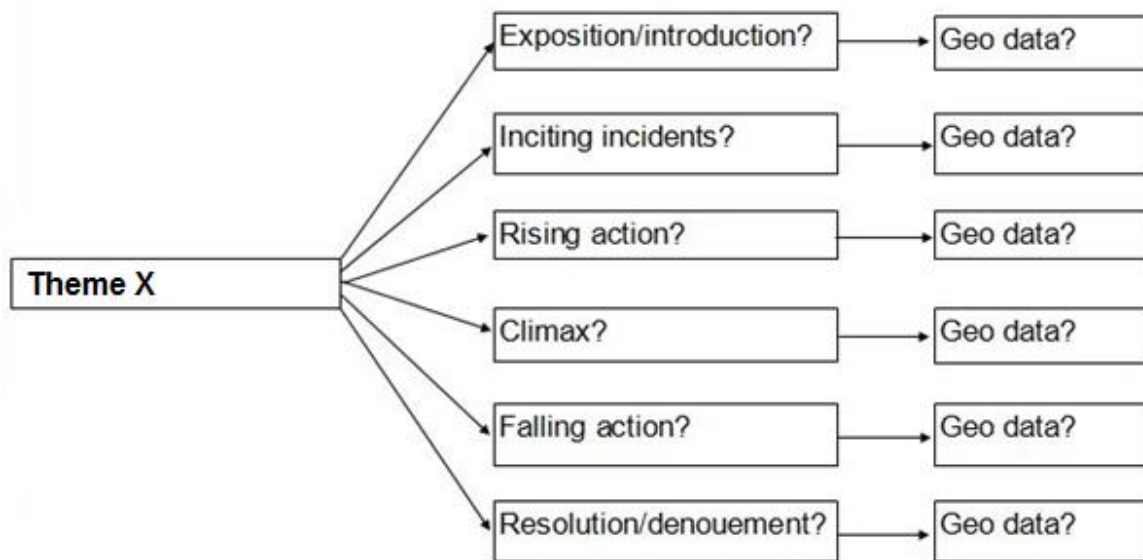


Figure 23: Data of the different steps of character developments consist of geo data that can be used in GIS

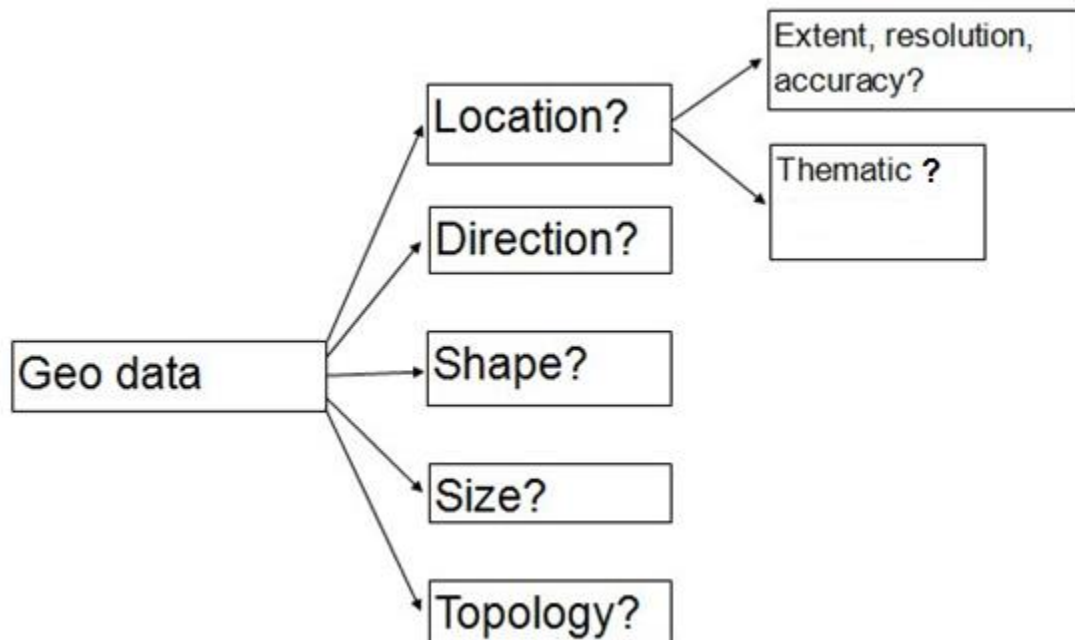


Figure 24: Geo data can be classified in five different properties. All these properties can be characterized by its extent, resolution, accuracy and whether the data is used as reference or as theme

Step 4 (*What?*) Ordering of used geo data in MS Excel

Now the geo data which can be used in a GIS environment are explored, a clear ordering of this data is needed for further process. For the data ordering MS Excel is used. How this is done will be explained below. Figure 25 shows the MS Excel sheet which will be filed in in chapter 5.

The story is divided in the five themes which play a role in the narrative of energy transition: economical theme (blue), landscape theme (green), energy theme (yellow), communication theme (orange) and social theme (red). In this way there are five different blocks with different colours (in figure 25 the energy theme is used as example). Within these blocks, the six stages of character development are distinguished. For every stage written text from the essays is used and a summary of every stage of every theme is written down. Out of these summaries, geo data will be extracted. This will enfold according to the five stages of geo data: location, direction, size, shape and topology. Also the extent, resolution and accuracy of the geo data are written down. The extent is in these cases always 'the Veenkoloniën'. The resolution and accuracy are expressed by -, +/- and +. Where '-' means bad resolution/accuracy, '+/-' means moderate resolution/accuracy, and '+' means good resolution/accuracy. At last, the thematic properties of the summaries are presented.

In the next steps, this model will be translated in a GIS environment.

Energy Narrative							
Exposure/introduction			Location	Direction	Size	Shape	Topology
Summary of introduction	Toponym		Concept 'location'	Concept 'direction'	Concept 'size'	Concept 'shape'	Concept 'topology'
Thema?	Extent		Region	Region	Region	Region	Region
Theme keywords	Resolution		+ or +/- or -	+ or +/- or -	+ or +/- or -	+ or +/- or -	+ or +/- or -
	Accuracy		+ or +/- or -	+ or +/- or -	+ or +/- or -	+ or +/- or -	+ or +/- or -
Inciting incidents			Location	Direction	Size	Shape	Topology
Summary of inciting incidents	Toponym		Concept 'location'	'Concept 'direction'	Concept 'size'	Concept 'shape'	Concept 'topology'
Thema?	Extent		Region	Region	Region	Region	Region
Theme keywords	Resolution		+ or +/- or -	+ or +/- or -	+ or +/- or -	+ or +/- or -	+ or +/- or -
	Accuracy		+ or +/- or -	+ or +/- or -	+ or +/- or -	+ or +/- or -	+ or +/- or -
Rising action			Location	Direction	Size	Shape	Topology
Summary of rising action	Toponym		Concept 'location'	'Concept 'direction'	Concept 'size'	Concept 'shape'	Concept 'topology'
Thema?	Extent		Region	Region	Region	Region	Region
Theme keywords	Resolution		+ or +/- or -	+ or +/- or -	+ or +/- or -	+ or +/- or -	+ or +/- or -
	Accuracy		+ or +/- or -	+ or +/- or -	+ or +/- or -	+ or +/- or -	+ or +/- or -
Climax			Location	Direction	Size	Shape	Topology
Summary of climax	Toponym		Concept 'location'	'Concept 'direction'	Concept 'size'	Concept 'shape'	Concept 'topology'
Thema?	Extent		Region	Region	Region	Region	Region
Theme keywords	Resolution		+ or +/- or -	+ or +/- or -	+ or +/- or -	+ or +/- or -	+ or +/- or -
	Accuracy		+ or +/- or -	+ or +/- or -	+ or +/- or -	+ or +/- or -	+ or +/- or -
Falling action			Location	Direction	Size	Shape	Topology
Summary of falling action	Toponym		Concept 'location'	'Concept 'direction'	Concept 'size'	Concept 'shape'	Concept 'topology'
Thema?	Extent		Region	Region	Region	Region	Region
Theme keywords	Resolution		+ or +/- or -	+ or +/- or -	+ or +/- or -	+ or +/- or -	+ or +/- or -
	Accuracy		+ or +/- or -	+ or +/- or -	+ or +/- or -	+ or +/- or -	+ or +/- or -
Resolution/denouement			Location	Direction	Size	Shape	Topology
Summary of resolution	Toponym		Concept 'location'	'Concept 'direction'	Concept 'size'	Concept 'shape'	Concept 'topology'
Thema?	Extent		Region	Region	Region	Region	Region
Theme keywords	Resolution		+ or +/- or -	+ or +/- or -	+ or +/- or -	+ or +/- or -	+ or +/- or -
	Accuracy		+ or +/- or -	+ or +/- or -	+ or +/- or -	+ or +/- or -	+ or +/- or -

Figure 25: Example model of ordering geo data in MS Excel

Step 5 (*What?*) Selecting datasets for use in a GIS application

In the previous step the model for ordering of geo data is presented. In this step the geo data the model provides, will be 'translated' to a GIS environment. The 'themes', as selected in the ordering model play a major role in the process of searching datasets in online databases.

For this step I will use the database of the 'Publieke Dienstverlening op de Kaart' (PDOK). The 'PDOK' is an online database with all open geo-information about the Netherlands. These datasets can be downloaded for use in your own GIS application. The 'PDOK' also delivers data to the 'Nationaal Georegister' which also stores data of the Netherlands for the European 'INSPIRE' network (Geonovum, n.d.).

The 'PDOK' is an easy-to-use geo database and stores all the available open geo-information. Because of these characteristics, this geo database is used in this research. The Narrative GIS is meant for GIS specialists and planners and therefore an easy accessible database is required.

In figure 26 a webpage of the 'PDOK' is presented. In this example, the front page of all datasets started with the letter 'A' is showed. When selecting one of the datasets, you can download the data or copy the URL for use in a GIS application. The datasets will be selected related to the thematically aspects of the summaries of the themes.

In step 6, the use of datasets in ArcGIS will be explained and will focus on the *how*-question.

PDOK Services

> Services op alfabet

- > Uitleg over services
- > Uitleg over metadata

> PDOK Downloads

> PDOK Viewer

> PDOK Kaart

> PDOK Software

> Nationaal Georegister

Home > Producten > PDOK Services > PDOK services

PDOK services

Onderstaand een alfabetisch overzicht van PDOK webservices. Deze webservices kunnen bijvoorbeeld gebruikt worden in een GIS pakket.

A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | V | W | X | Y | Z

[AAN \(WMS | Open\)](#)

<http://geodata.nationaalgeoregister.nl/aan/wms?request=GetCapabilities>

[AAN \(WMTS | Open\)](#)

<http://geodata.nationaalgeoregister.nl/tiles/service/wmts/aan?VERSION=1.0.0&request=GetCapabilities>

[AAN \(TMS | Open\)](#)

<http://geodata.nationaalgeoregister.nl/tms/1.0.0/aan@EPSG:28992@png8>

[AAN \(WFS | Open\)](#)

<http://geodata.nationaalgeoregister.nl/aan/wfs?version=1.0.0&request=GetCapabilities>

[Adressen \(WMS | Open\)](#)

<http://geodata.nationaalgeoregister.nl/inspireadressen/wms?SERVICE=WMS&request=GetCapabilities>

[Adressen \(WFS | Open\)](#)

<http://geodata.nationaalgeoregister.nl/inspireadressen/wfs?version=1.0.0&request=GetCapabilities>

[Ahn25m \(WMS | Open\)](#)

<http://geodata.nationaalgeoregister.nl/ahn25m/wms?service=wms&request=getcapabilities>

[Ahn25m \(WFS | Open\)](#)

<http://geodata.nationaalgeoregister.nl/ahn25m/wfs?version=1.0.0&request=GetCapabilities>

[Ahn25m \(WCS | Open\)](#)

<http://geodata.nationaalgeoregister.nl/ahn25m/wcs?request=getcapabilities>

[Asbest scholenkaart \(WMS | PDOK Basis\)](#)

<http://geodata.nationaalgeoregister.nl/asbestscholenkaart/wms?SERVICE=WMS&request=GetCapabilities>

[Asbest scholenkaart \(WFS | PDOK Basis\)](#)

<http://geodata.nationaalgeoregister.nl/asbestscholenkaart/wfs?version=1.0.0&request=GetCapabilities>



Figure 26: Webpage of the 'PDOK' (PDOK, n.d.)

Step 6 (*How?*) Design map in ArcMap and apply telling techniques

In the previous step the datasets, which can be related with the thematic data as shown in the MS Excel ordering document, are selected. In this step ArcGIS 10.2 for Desktop will be used to visualize the datasets in order to develop a Narrative GIS. The following things need to be done:

- I. The first thing what need to be done is the creation of a file geodatabase in Arc Catalog (figure 27). In this file geodatabase all datasets can be stored. Important to know is that the datasets selected in 'PDOK' cannot be translated immediately into ArcGIS 10.2 for Desktop. In order to get the dataset and the visualization of the dataset you need to choose the WFS dataset option. In ArcGIS you can use the tool 'WFS to Feature Class' to translate the dataset to ArcGIS (figure 28).

Figure 27: Creating file geodatabase (ArcMap, 2014)

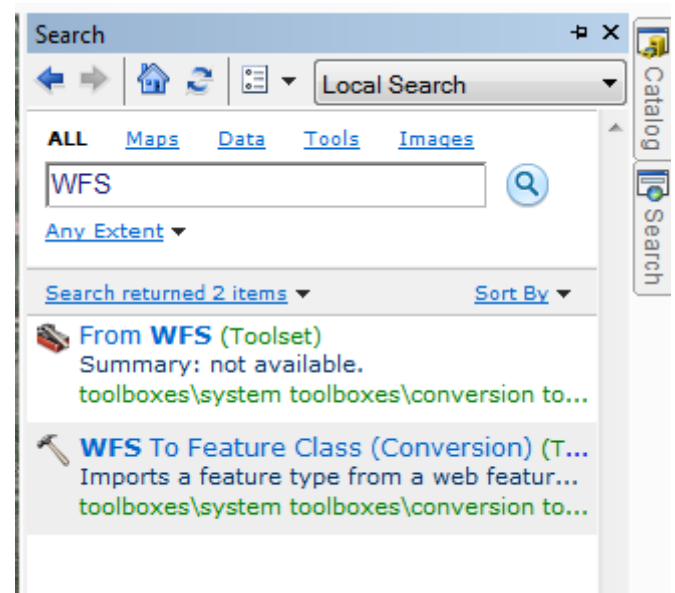
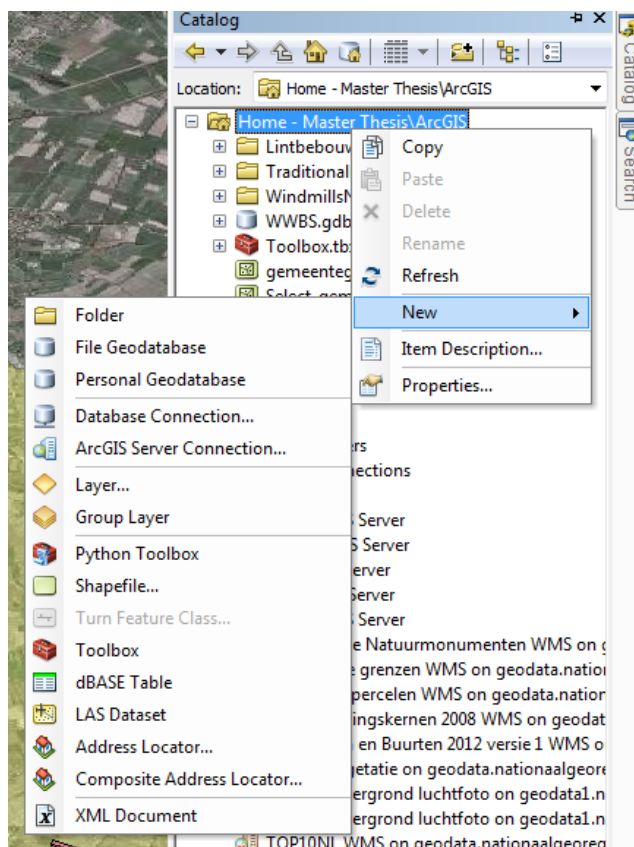


Figure 28: WFS to Feature Class tool (ArcMap, 2014)

- II. Now the datasets are translated in ArcGIS, different group layers need to be created in the 'Table of Contents'. Six different group layers will be created according to the themes which play a role in energy transition: economical theme, landscape theme, energy theme, communication theme and social theme. A sixth group layer will be made for all the general datasets which are useful for all themes. We call this group layer: general. Within the first five group layers, six other group layers will be created for every phase of storytelling: introduction, inciting incidents, rising action, climax, falling action and resolution (figure 29).

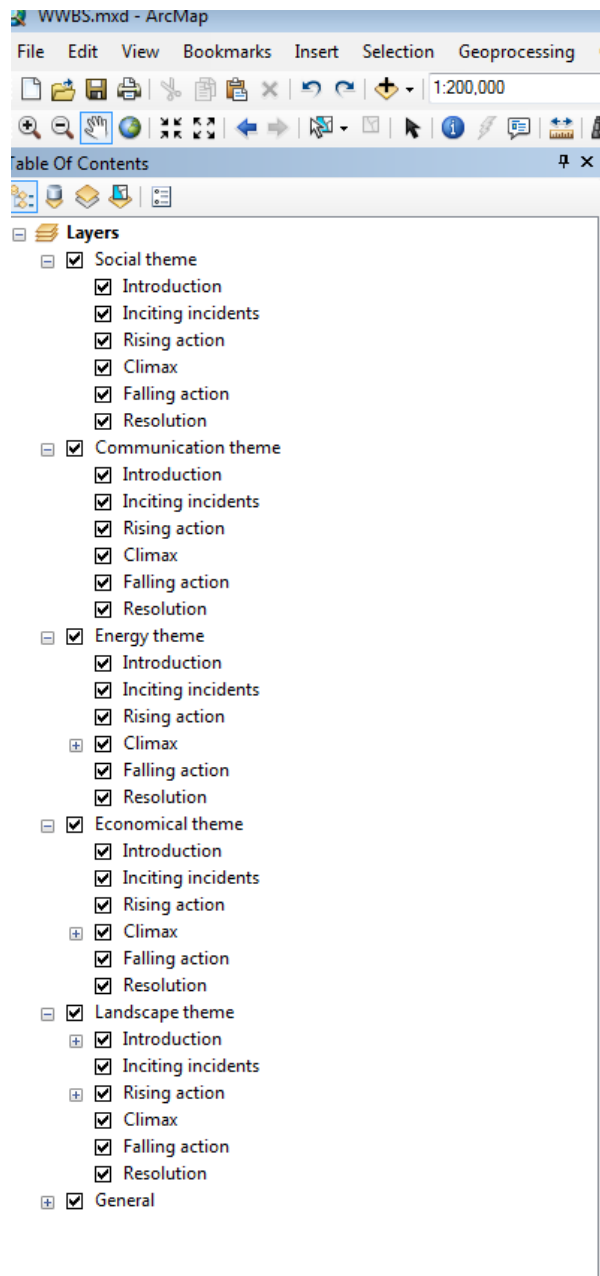


Figure 29: Ordering Table of Contents (ArcMap, 2014)

- III. After ordering the Table of Contents, the translated 'PDOK' datasets need to focus on data only for the Veenkoloniën. For this the 'Select' tool and 'Clip' tool will be used in the 'Modelbuilder' (figure 30, 31 and 32). Also this Model will be stored in the earlier created file geodatabase.

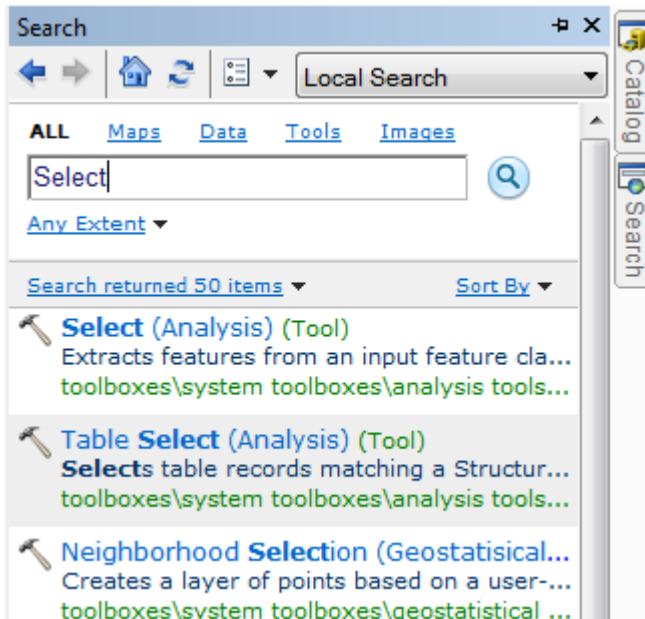


Figure 30: Select tool (ArcMap, 2014)

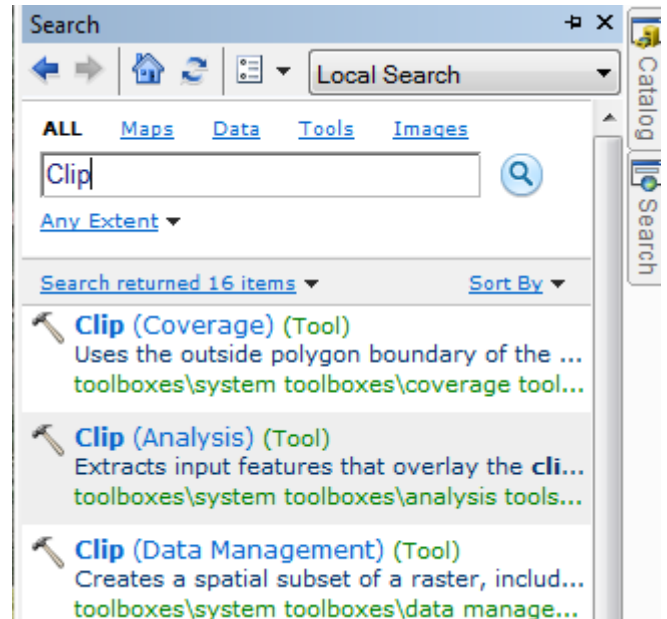


Figure 31: Clip tool (ArcMap, 2014)

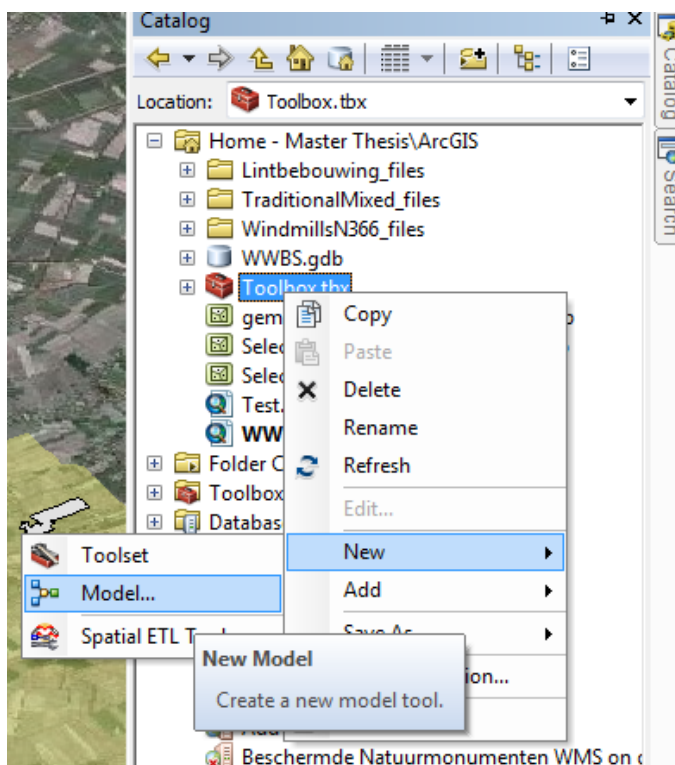


Figure 32: Creating new model (ArcMap, 2014)

- IV. The clipped datasets need to be stored in the group layer according to its significance. Datasets which can be useful for all group layers will be stored in the group layer 'general'.
- V. The fifth step is to create a new 'Feature Class' for every phase of storytelling where geo data is found. In these new feature class the 'Point Feature Class' will be used most often but also other types of feature classes (polygon, line) can be used. The aim is to choose the best type to visualize geo data what says something about the five properties of geo data: location, direction, shape, size and topology (figure 33). By creating feature classes, the importance of data and level of detail of data need to be taken into account. Sometimes it is necessary to create more feature classes to explain a short part in time or create one feature class to explain a large part in time (Blok, 2005).

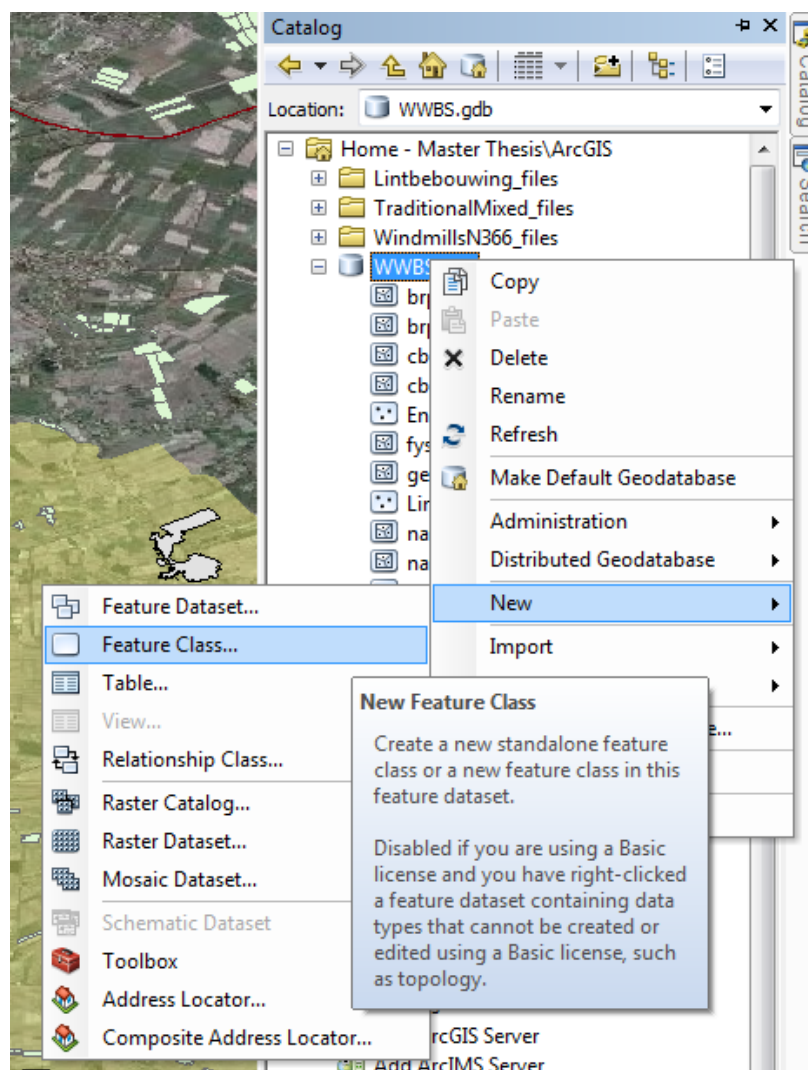


Figure 33: Creating new Feature Class (ArcMap, 2014)

- VI. After the creation of the feature classes, HTML popups can be created in ArcGIS. These popups are a combination of images and text which will clarify the geo data and will play a major role in telling the story. Figure 34 shows how to create a HTML popup. Figure 35 shows an example how a HTML popup looks like in ArcGIS 10.2 for Desktop.

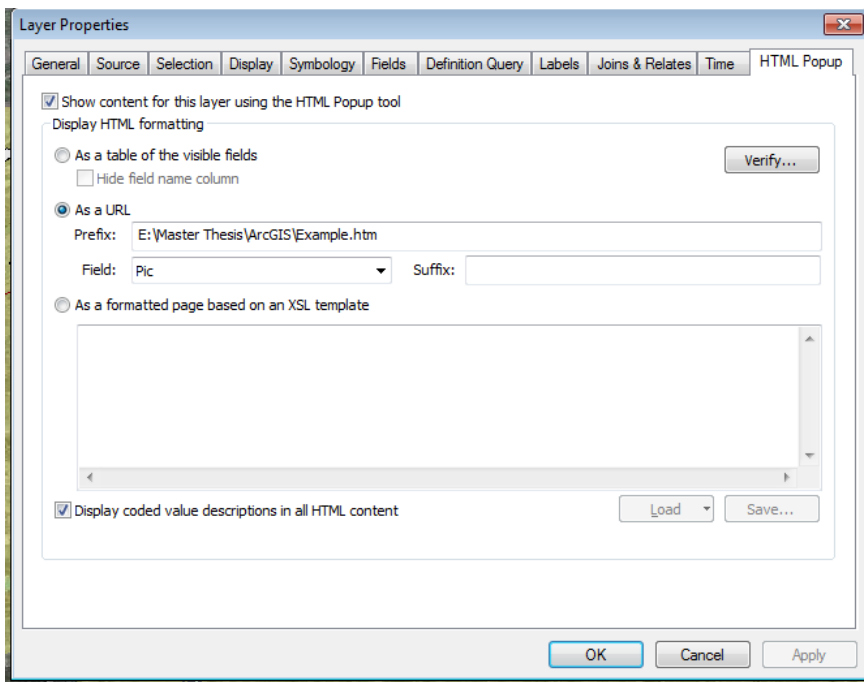


Figure 34: Creating a HTML Popup (ArcMap, 2014)



Figure 35: Example of HTML Popup (ArcMap, 2014)

After following these six steps, the Narrative GIS 'setup' is developed. Sub chapter 5.1 will follow these steps to fill in this 'setup' for the case 'Wat weet een boer van saffraan?' in order to create a Narrative GIS.

4.3.2 Establish a relationship between the developed Narrative GIS (according to the theoretical framework) and the planning of energy transition in general by evaluating the developed narrative GIS setup. This will be done by using the 'control case' '7Sprong'.

In the previous paragraph a roadmap towards a Narrative GIS was given. In this paragraph I will present methods to raise the external validity of the developed Narrative GIS set up. The methods consist of two parts: a theoretical part where concepts like 'external validity' will be discussed, and a more practical part where the developed Narrative GIS and the case '7Sprong' will be used.

Part 1 Theory of external validity

Because of the aim to use the geo-data based narrative framework more in general, I need to generalize from the used case study 'Wat weet een boer van saffraan?'. The problem of generalization is discussed under the concept of external validity. The question is always: would the same result be found under a different set of circumstances? Will we find in this case characteristics or relationships that have value for other cases or samples? And are therefore general applicable? (Bryman, 2008). In part 1 I will discover through literature research what characteristics of the developed Narrative GIS setup are widely recognized or easy accessible for planners and GIS specialists in general.

In order to reach more external validity I will elaborate on different characteristics which are typical for the developed Narrative GIS. This theoretical part will first elaborate on the concept 'external validity' and after that on the following characteristics of the developed narrative GIS: the used themes which play a role in energy transition; the six stages of the character development; the chosen properties of geo data; the use of a national georegister to gain datasets; and design techniques for the visualisation process in ArcGIS. The analysis can be characterized by literature research. I will look at literature that is written about these characteristics. If literature shows that the characteristics of the narrative GIS are widely recognized in other cases or easy accessible for planners or GIS specialists, we can assume that the Narrative GIS is applicable to a variety of cases and that the external validity of the developed narrative GIS rises. In this way we look for typical material that can be seen as typical for a broader population (Mayring, 2003).

Part 2 practical evidence of external validity

The second part focusses more on the practical evidence of the external validity of the developed Narrative GIS. The roadmap towards a Narrative GIS as presented in 4.3.1 will be applied on another case for the 'Veenkoloniën', the case '7Sprong'. If

the results show that the Narrative GIS is also applicable on this case, the external validity of the Narrative GIS will increase.

Also for this part there are some issues which I have to take into consideration. The case '7Sprong' is like the other case, 'Wat weet een boer van saffraan?', set up for the 'Veenkoloniën'. The same level of themes is used in this case. The used themes in the case studies act on a certain level. Themes like 'energy' and 'communication' are very broad and it is thinkable that smaller projects in other regions have more specific or broader themes. By only focussing on these two cases for the same region, the Narrative GIS does not prove its application at different levels of themes.

The next chapter presents the results of the research.

CHAPTER 5: RESULTS

In the previous chapters the theoretical framework, case descriptions and methodology were presented. This chapter will present the results of this research. Per objective, as presented in the first chapter, the results will be discussed. Some of the research questions were already answered in chapter 2 in order to support the research and shape the research in a theoretical way. The rest of the research questions will be answered in this chapter. This chapter is part of the earlier mentioned second 'loop'. In this chapter the several parts are synthesized together and applied to the two selected cases. Another part of this judgement on the external validity.

5.1 Roadmap towards a Narrative GIS (Objective 3)

As presented in paragraph 4.3.1 this paragraph will make use of the six presented steps towards a Narrative GIS set up. By applying these steps on a case, the Narrative GIS set up will become a filled in Narrative GIS.

Step 1 (What?)

The narrative of energy transition can be described by the elements character, event and setting (what-question) (Potteiger and Purinton, 1998). In this narrative the character is 'renewable energy transition', the events are the submissions of the EoWijers competition (in this case the events presented in the case 'Wat weet een boer van saffraan'), and the setting is the region of the Veenkoloniën (Figure 36).

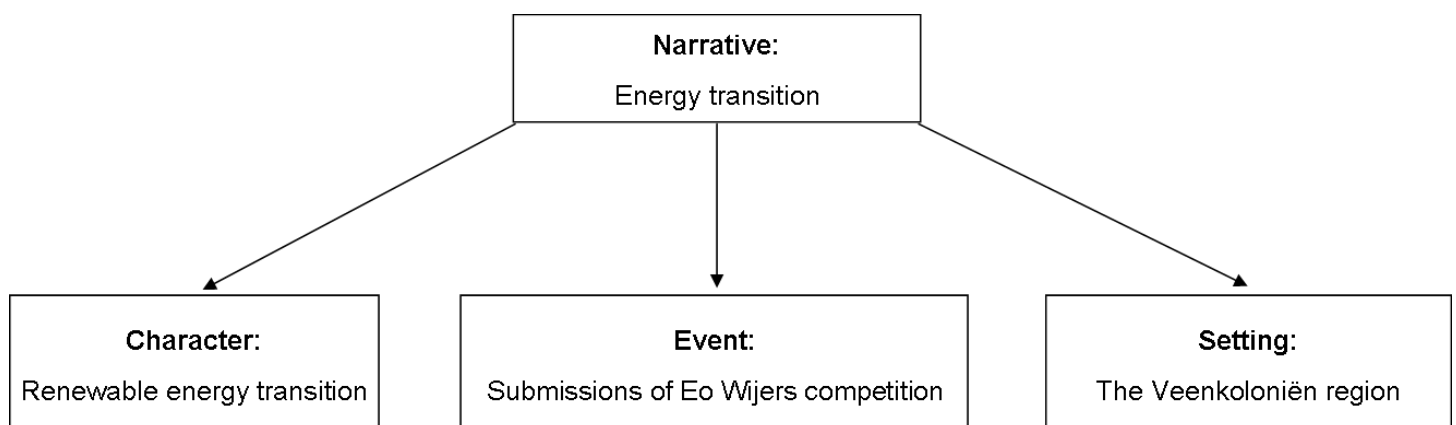


Figure 36: Elements of the narrative of energy transition (Bol, 2014)

Because of the fact that the narrative of energy transition is very broad and vague, different themes which play a role in the narrative of energy transition are discovered in order to make the narrative of energy transition transparent and concrete what will be very helpful when developing a Narrative GIS.

By using the coding framework, five themes can be distinguished within the narrative of energy transition: economical theme, landscape theme, energy theme,

communication theme and social theme. Figure 37 shows the summaries of these themes for the case ‘Wat weet een boer van saffraan?’.

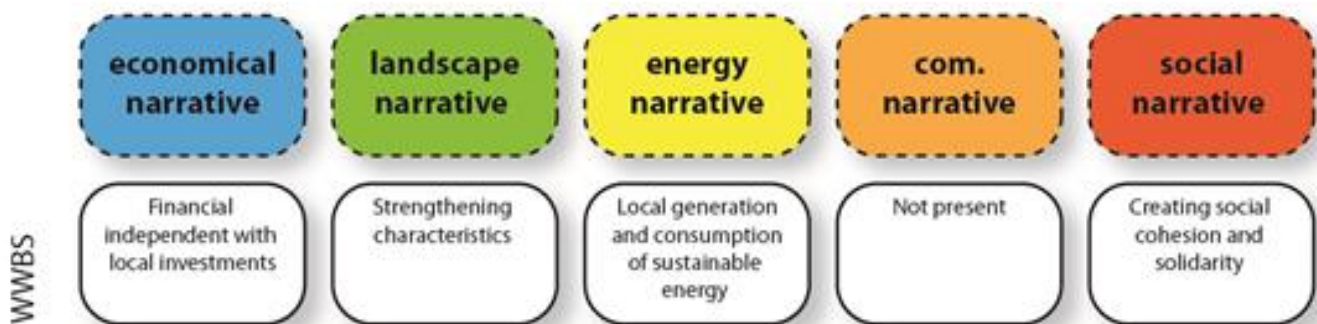


Figure 37: Filled in narrative framework for the case study: ‘Wat weet een boer van saffraan?’ (WWBS) (van den Berg, 2013)

As shown in figure 37, the communication theme in the case ‘Wat weet een boer van saffraan?’ is not present. Every submission has a focus on certain themes. The cases which highlight the process have much more attention for the communication theme. The downside is that there is less focus on other themes. The cases which focusses more on results will show more attention to the landscape theme for example and less to the communication theme. As a consequence, the case ‘Wat weet een boer van saffraan?’ focusses more on energy issues and the aesthetic experience of the area. The process how to come to the result is not clearly defined. In the other case, ‘7Sprong’, which will be presented in sub chapter 5.2, all the themes are present (van den Berg, 2013).

Another result of their research is the hypothesis of a strong interaction among the themes. Figure 38 shows these strong interactions. This means that for example the energy theme can contain or cause economical activities and social dynamics. These narratives are highly intertwined and I have to be aware that these themes cannot occur in its ‘pure form’ without any intervention of other themes.

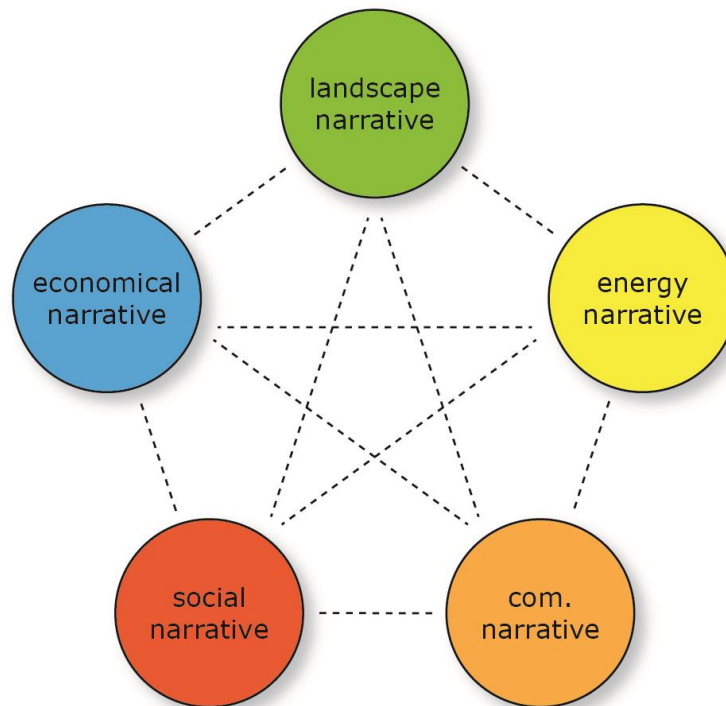


Figure 38: Five themes in the analysed case. These themes have a strong interaction (van den Berg, 2013)

In short the results of objective 3 are summarized in figure 39. The narrative of energy transition consist of the character 'renewable energy transition', the events as mentioned in the case, and the setting is the region of the Veenkoloniën. The events can be related to five different themes: Economical theme, landscape theme, energy theme, communication theme and social theme. These themes can be seen as sub narratives which all consist of the three elements of a narrative: character, events and setting. The character and the setting is the same for all themes. The events depends on the nature of the themes. These events have a strong interaction and are highly interrelated.

In the next step all the data as presented in appendix B1 will be used for the analysis. The presented themes in figure 37 are used to divide the data in different storylines which I want to present in the Narrative GIS.

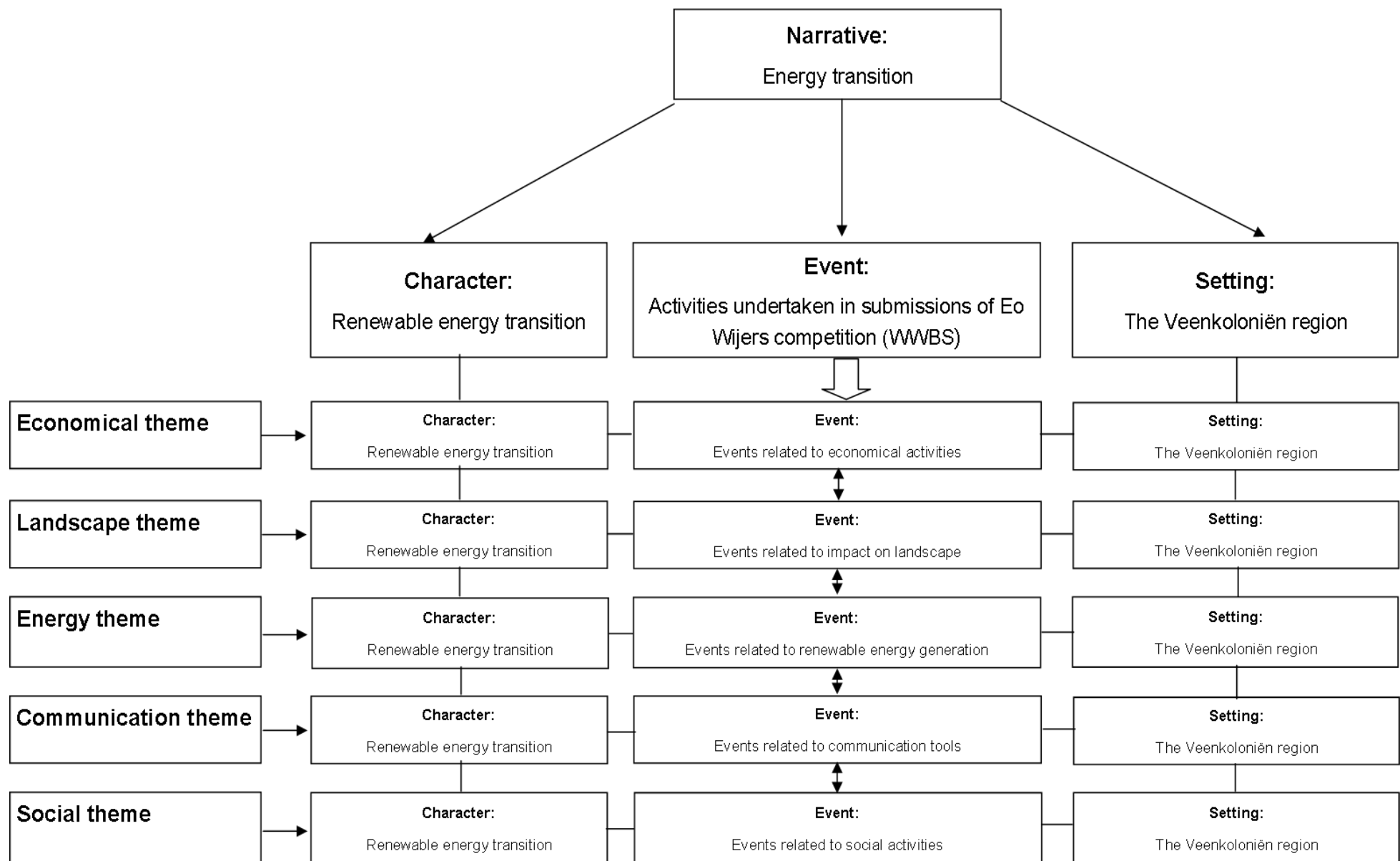


Figure 39: Summary of results objective 1

Step 2, 3, 4 (What?)

In these three steps the MS excel model for ordering geo data of the case 'Wat weet een boer van saffraan?' will be set up. The end result of the MS excel model is presented in appendix C1. In these steps the summary of every stage for every theme is given. When these summaries were written down, I looked at the data in these summaries which can be used as geo data in a GIS environment. This data is ordered according to the five properties of geo data: location, direction, size, shape and topology. For all geo data the extent, resolution and accuracy were given. Also thematically aspects within these summaries were presented. These themes were useful in the fourth step for the selection of data sets.

In appendix C1 all the results are presented and this developed MS Excel sheet seems to be very helpful in giving an overview of which stages of a narrative make use of geo data and which stages do not make use of geo data often. This information can be extracted by counting geo data per stage. Figure 40 shows the amount of geo data used per stage in the story ('Wat weet een boer van saffraan?'). This case shows that especially in the introduction phase and climax phase, the use of geo data is common. In my view this is because of the description of the setting in the introduction phase where locations are explored. Also in the climax phase, geo data is often used. In this stage the 'concrete' plan is presented and is realistic and 'tangible'. Geo data refers to locations somewhere on the earth and plans make often use of this geo data to make their plan more concrete. The high score in the rising action phase in the story 'Wat weet een boer van saffraan?' is because of the 'concrete and geo referenced' steps taken to achieve the final plan.

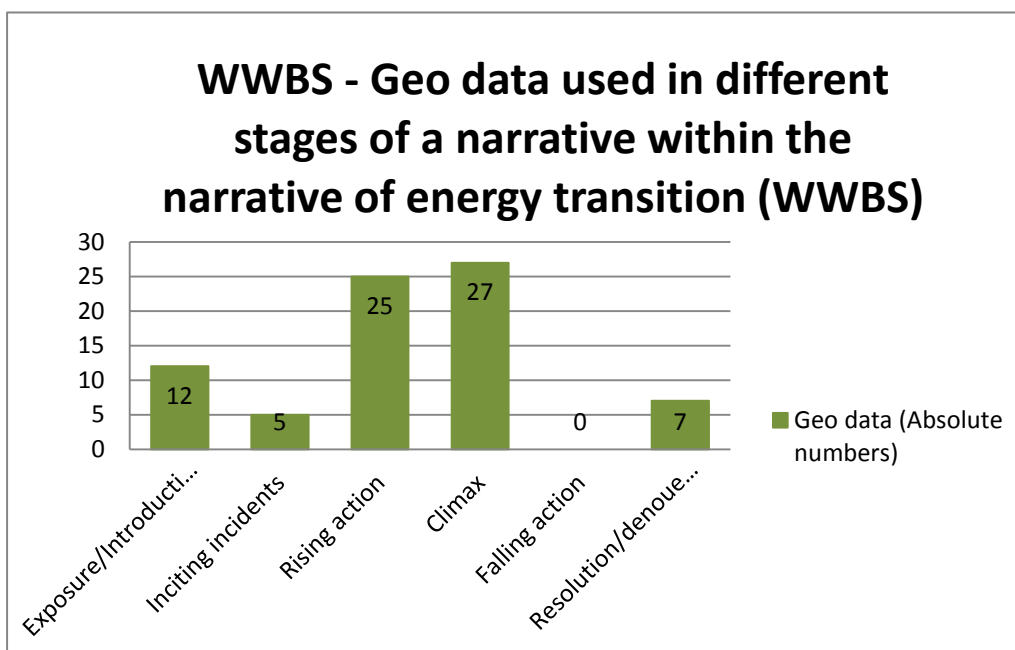


Figure 40: Geo data used per stage WWBS

The same can be said about the different themes. As noted before, some themes are more focused on the results rather than the procedure and the other way around. Some themes make less use of geo data than others. Examples are the communication theme and social theme, which makes less use of geo data and the landscape theme, energy theme and economical theme, which pay relatively more attention to geo data. Figure 41 shows these differences between themes.

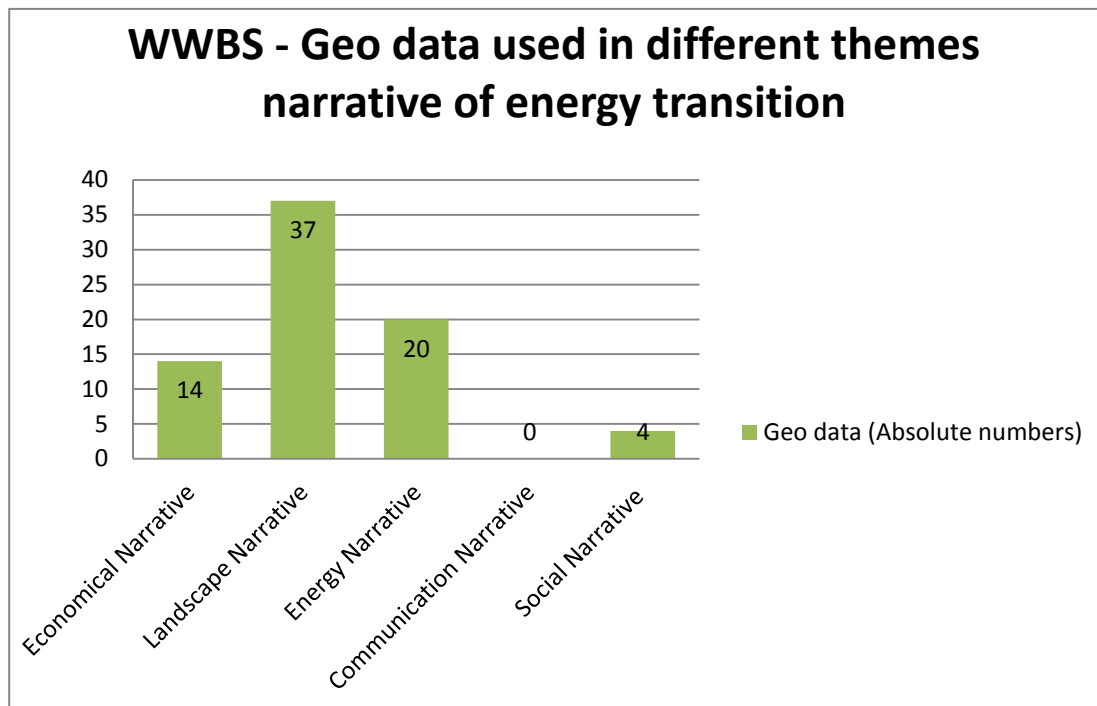


Figure 41: Geo data used per theme WWBS

A graph can also be made for the properties of geo data in terms of usage within the narrative of energy transition. Figure 42 shows that most of the geo data used in the case 'Wat weet een boer van saffraan?' can be classified to 'description of a location'. This suggest that a lot of geo data is used to describe a location. This is not surprising since a location always refers to a location somewhere on the earth. Also a lot of geo data is used to explain a certain shape. In the case, shape is often used to describe the shape of an object in space, for example the ribbon shaped villages.

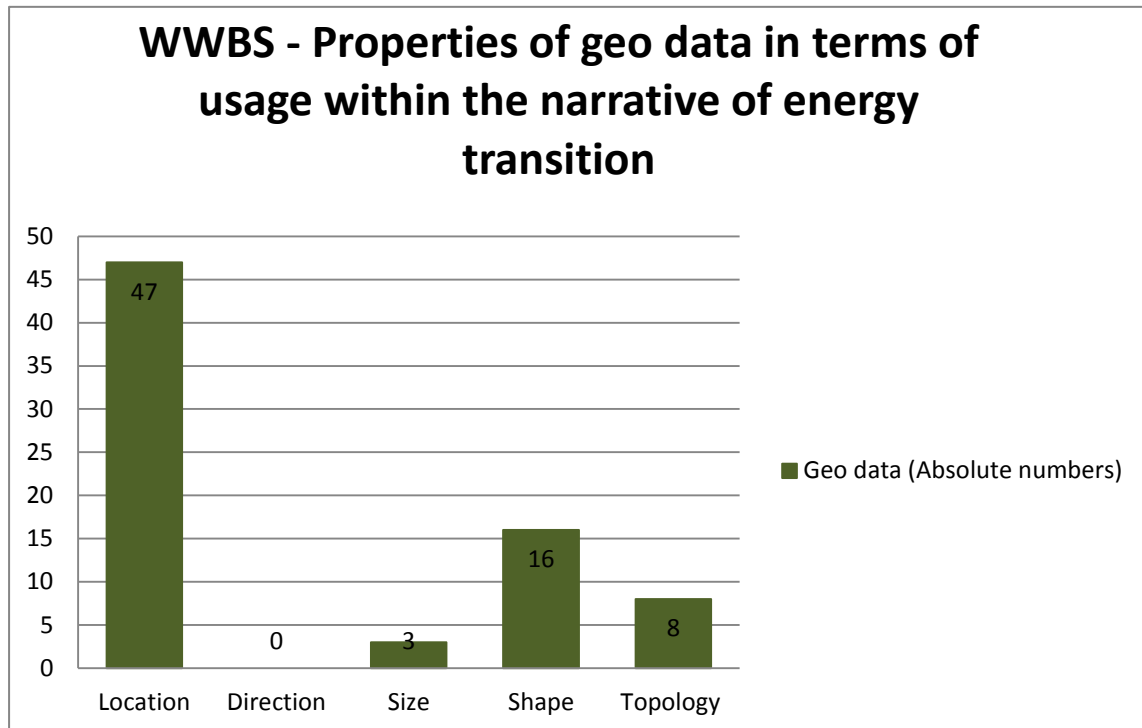


Figure 42: Properties of geo data in terms of usage within the narrative of energy transition WWBS

It can be very useful to know in which themes and phases GIS can play a role for the decision making process. By introducing GIS in these phases of storytelling, the story can be more convincing.

Step 5 (What?)

As noted before, the presented thematically aspects were used to select datasets from the database of the 'PDOK'. As noted in chapter 2 all maps and linked datasets can be seen as a form of storytelling. All datasets tell a kind of story and can be combined to visualize a typical story. As a result, the following datasets were selected from the database to visualize the story/narrative of energy transition:

- Luchtfoto (PDOK-achtergrond): used as background layer.
- Bestuurlijke grenzen: used for the selection of the area the Veenkoloniën.
- CBS Bevolkingskernen: used for the visualization of built areas and the shape of built areas.
- BRP Gewaspercelen: used to visualize the different agricultural land uses.
- Weggeg: used to visualize the major roads.
- Natura 2000: used to visualize the protected nature areas.

Note that to import these datasets into ArcGIS 10.2 for Desktop, the WFS option is needed. This option contains the data within the layer and not only the visualization as addressed in the WMS option. The WFS option can be obtained by using the tool 'WFS to Feature Class'. This will be explained in step 6.

Step 6 (How?)

In the previous step the useful datasets are chosen for use in ArcGIS 10.2. In this step the presented roadmap in sub chapter 4.3.1 will be followed to create a Narrative GIS for the case 'Wat weet een boer van saffraan?'.

- I. The first step was the creation of a file geodatabase. I named this file geodatabase 'WWBS' and I can store all the datasets in this geodatabase. Now the selected datasets as mentioned in step 5 will be translated to ArcGIS by using the tool 'WFS to Feature Class'. Figure 43 shows the 'WFS to Feature Class' window of the dataset of 'Natura 2000'.

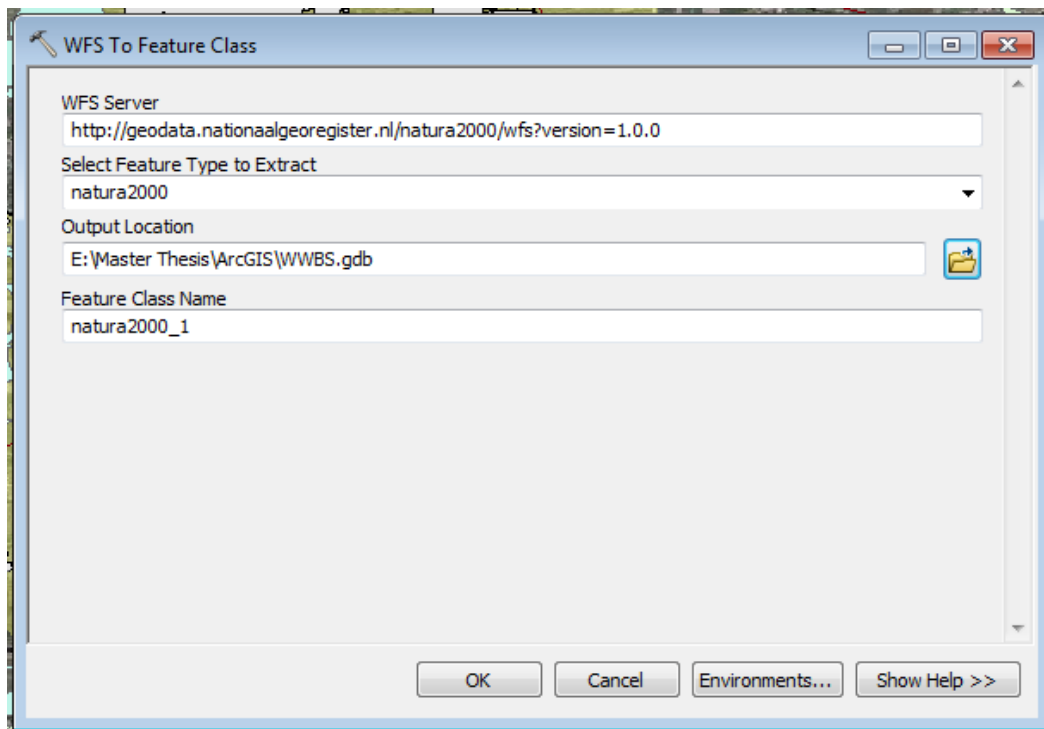


Figure 43: 'WFS to Feature Class' window with the example of 'Natura 2000' (ArcMap, 2014)

- II. As noted in sub chapter 4.3.1 the ordering of the Table of Contents will be done by creating five group layers for every theme plus one group layer for all the general datasets. Within the five group layers for the themes, six other group layers are created for every phase of storytelling one. Figure 29 shows the result.
- III. Now the Table of Contents is ordered, the translated 'PDOK' datasets need to focus on data only for the Veenkoloniën. By doing this the extent of the geo data will be visible. For this the 'Select' tool and 'Clip' tool is used in the 'Modelbuilder'. In this model I first select the municipalities which form the Veenkoloniën: Veendam, Vlagtwedde, Borger Odoorn, Hogeveen, Sappemeer, Aa en Hunze, Pekela, Stadskanaal, Emmen and Menterwolde. After that I clipped these municipalities and the boundaries of the

Veenkoloniën are formed. After this clip, all the other datasets can be clipped according to this selection with as a result that only the data of the Veenkoloniën is presented. Figure 44 shows the model. Also, this model is stored in the earlier created file geodatabase.

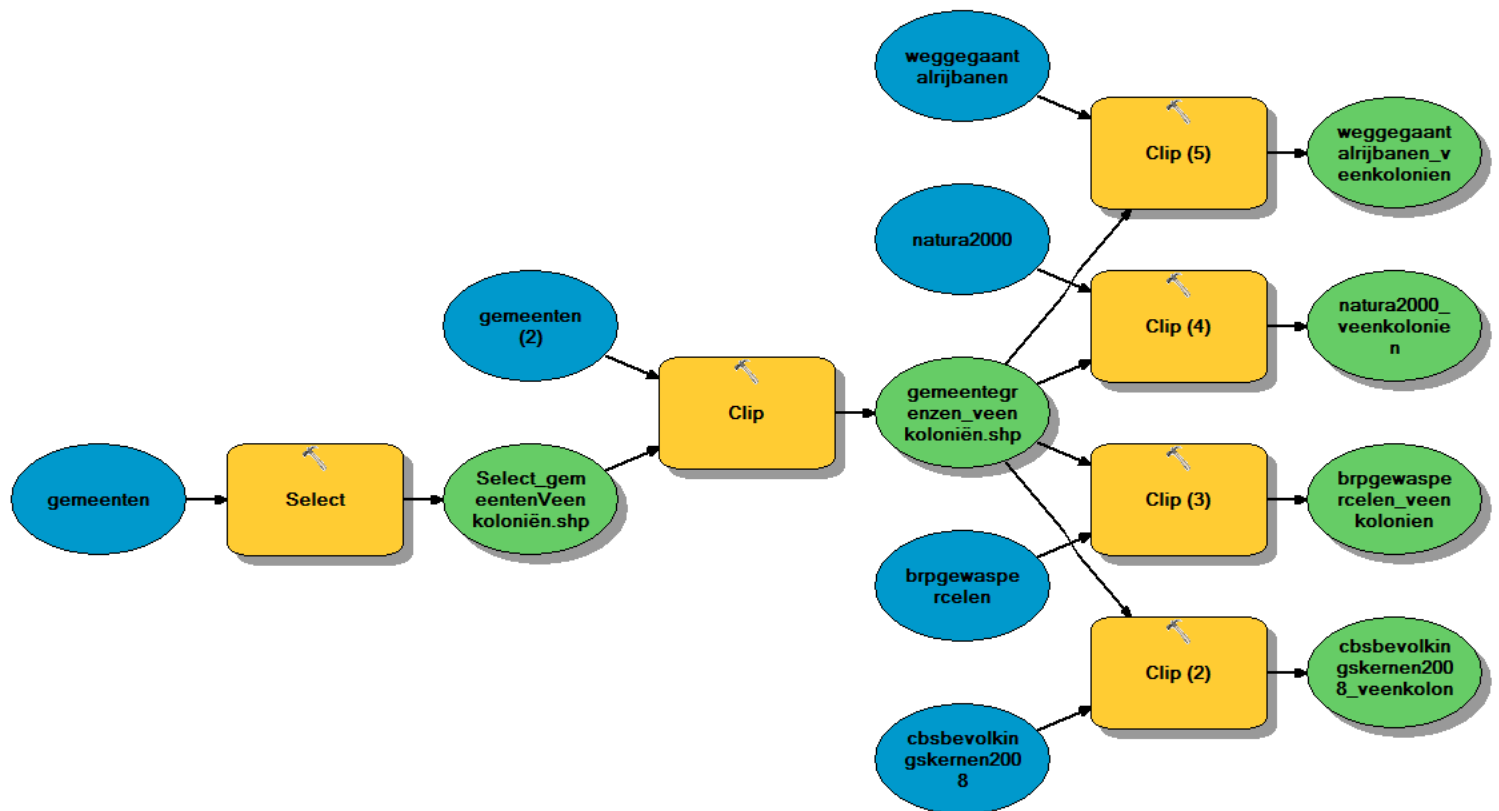


Figure 44: Model for clipping data for the Veenkoloniën (ArcMap, 2014)

- IV. The clipped datasets are stored in the group layer according to their significance. Some of the datasets are gathered under the 'general group layer'. These datasets are of importance for all themes. Other datasets like the 'BRP Gewaspercelen' are only of importance for the economical theme. The same can be said about the 'Weggeg' dataset and the 'Natura 2000' dataset for the landscape theme. Figure 45 shows the map layer of stored data for the Veenkoloniën. The yellow part is the extent: the Veenkoloniën region; the green parts are Natura 2000 areas; the red lines are the major roads in the area; the grey parts are built areas; and the pink spots are some of the agriculture courtyards.

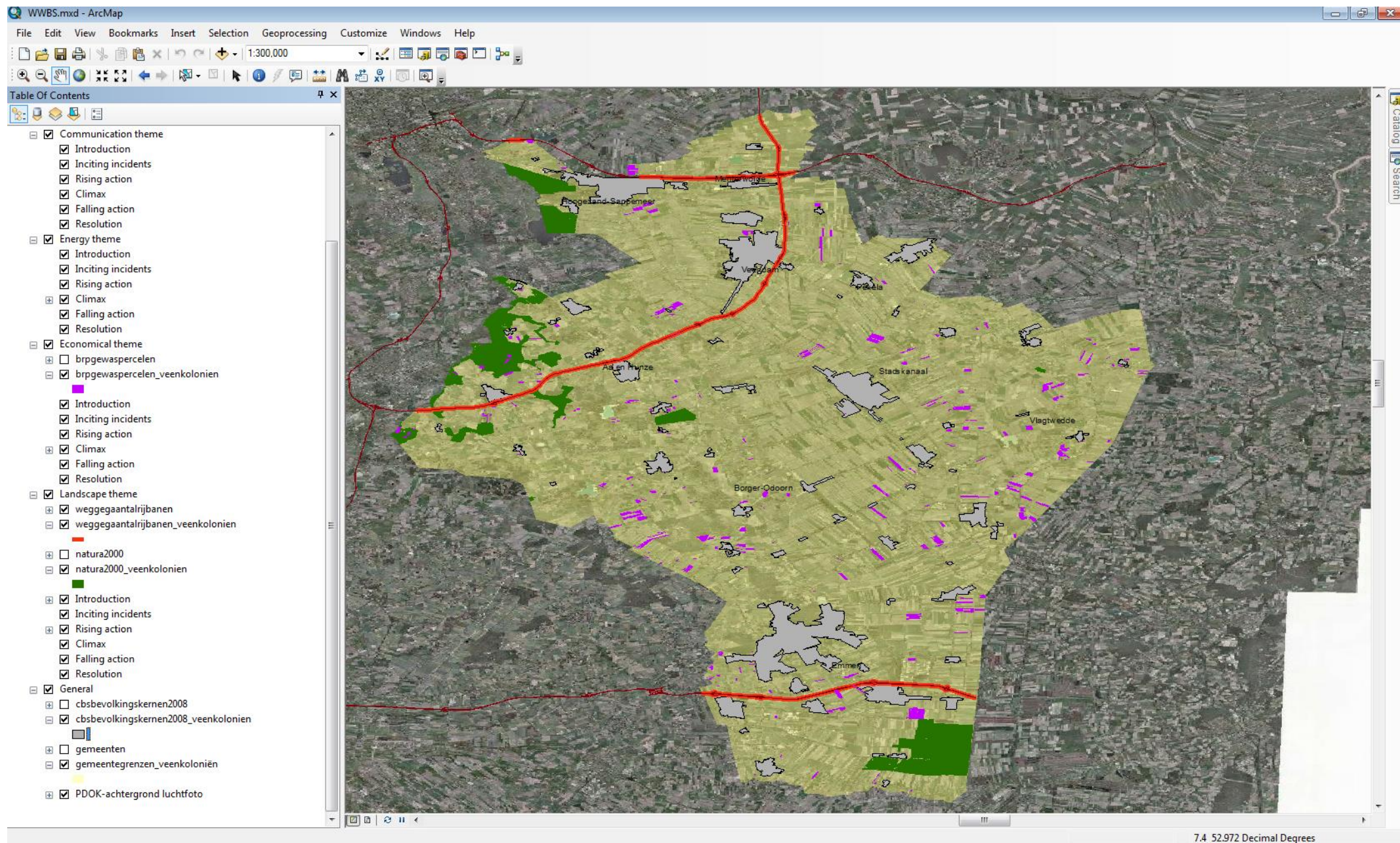


Figure 45: Map layer with selected datasets for the Veenkoloniën (ArcMap, 2014)

- V. In this step new feature classes are created for every phase of storytelling where geo data is found in the MS Excel document. As mentioned before the five properties of geo data: location, direction, shape, size and topology can be visualized by creating a feature class. Not every property is represent in the case 'Wat weet een boer van saffraan?' and therefore it is not necessary to visualize these properties (direction). Some other properties do exist in the case but the resolution and accuracy of this data is limited and therefore it is hard to visualize this data in a clear way (size). The other properties (location, shape, topology) can be visualized and these are the only properties which play a role in this case. To visualize these three properties, new feature classes are developed. I chose the 'Point Feature Class' because it will be the easiest way to visualize these properties. When the Point Feature Class is created, points can be located in the map. Figure 46 shows a yellow point. This point shows an energy courtyard which is one of the main outcomes of the case 'Wat weet een boer van saffraan?'. This energy courtyard is best described in the climax phase of the energy theme. To refer to Blok (2005), it is also possible to use two or more feature classes for one phase or not to use any feature class for a phase. This depends on the importance of the phase or how long it takes to tell the story.

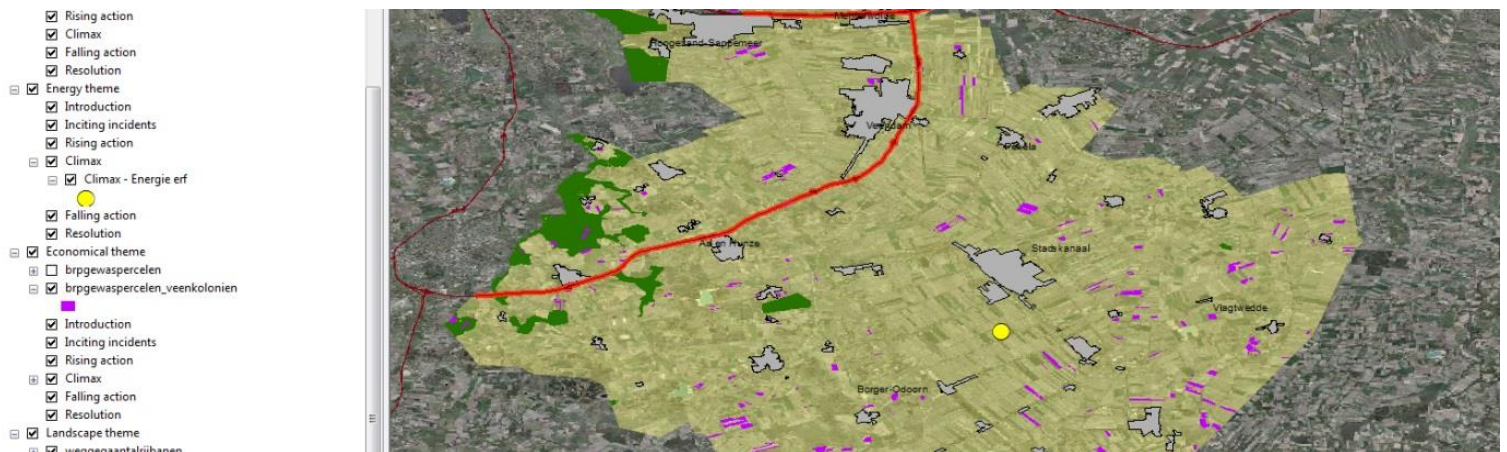


Figure 46: Energy courtyard (yellow dot) in the climax phase of the energy theme (ArcMap, 2014)

- VI. In order to make the Narrative GIS more attractive and to tell the story more easy. HTML popups are used. Figure 47 shows the example of the previous step where the energy courtyard is explained (location). In figure 48 the climax of the economical theme is told (location). Figure 49 shows the rising action of the landscape theme (location and topology). Figure 50 shows the introduction of the landscape theme where the shape is of importance. In this way all storytelling phases of all themes can be told.

Because the communication theme was not present in the case 'Wat weet een boer van saffraan?', there is also no geo data that can be visualized.

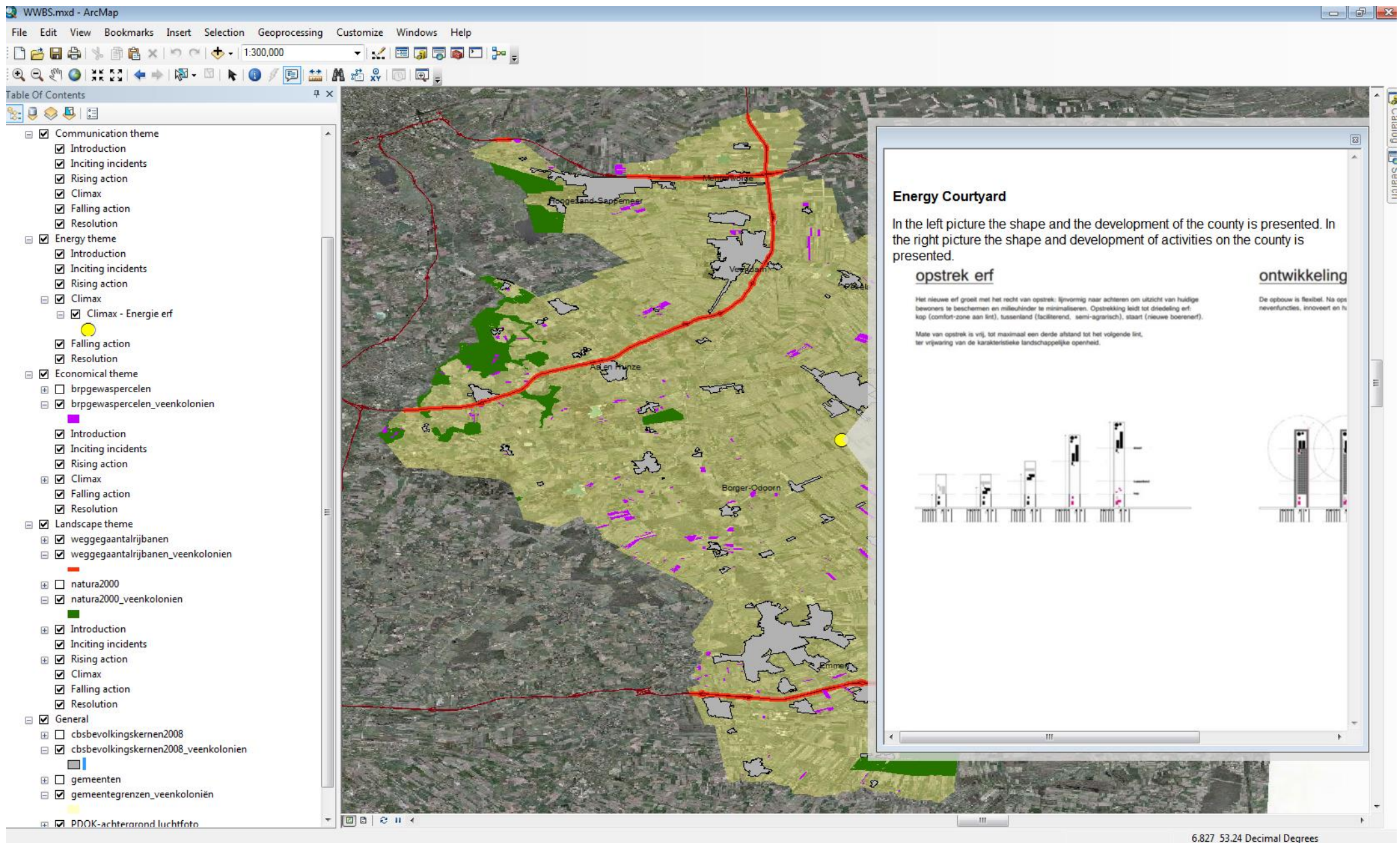


Figure 47: HTML Popup of the Energy courtyard in the climax phase of the energy theme (ArcMap, 2014)

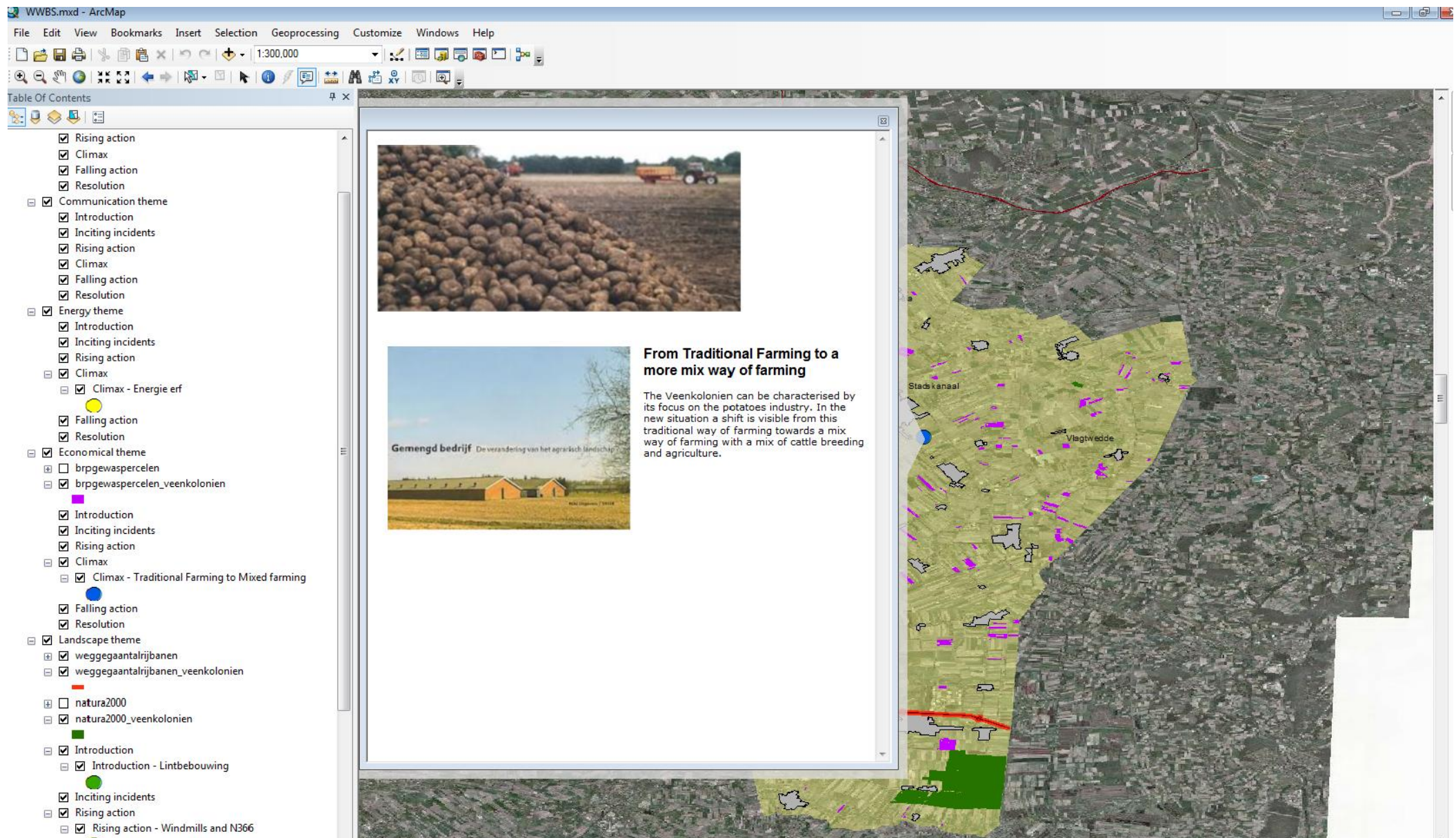


Figure 48: HTML Popup of the movement from traditional farming to a more mix way of farming in the climax phase of the economical theme (ArcMap, 2014)

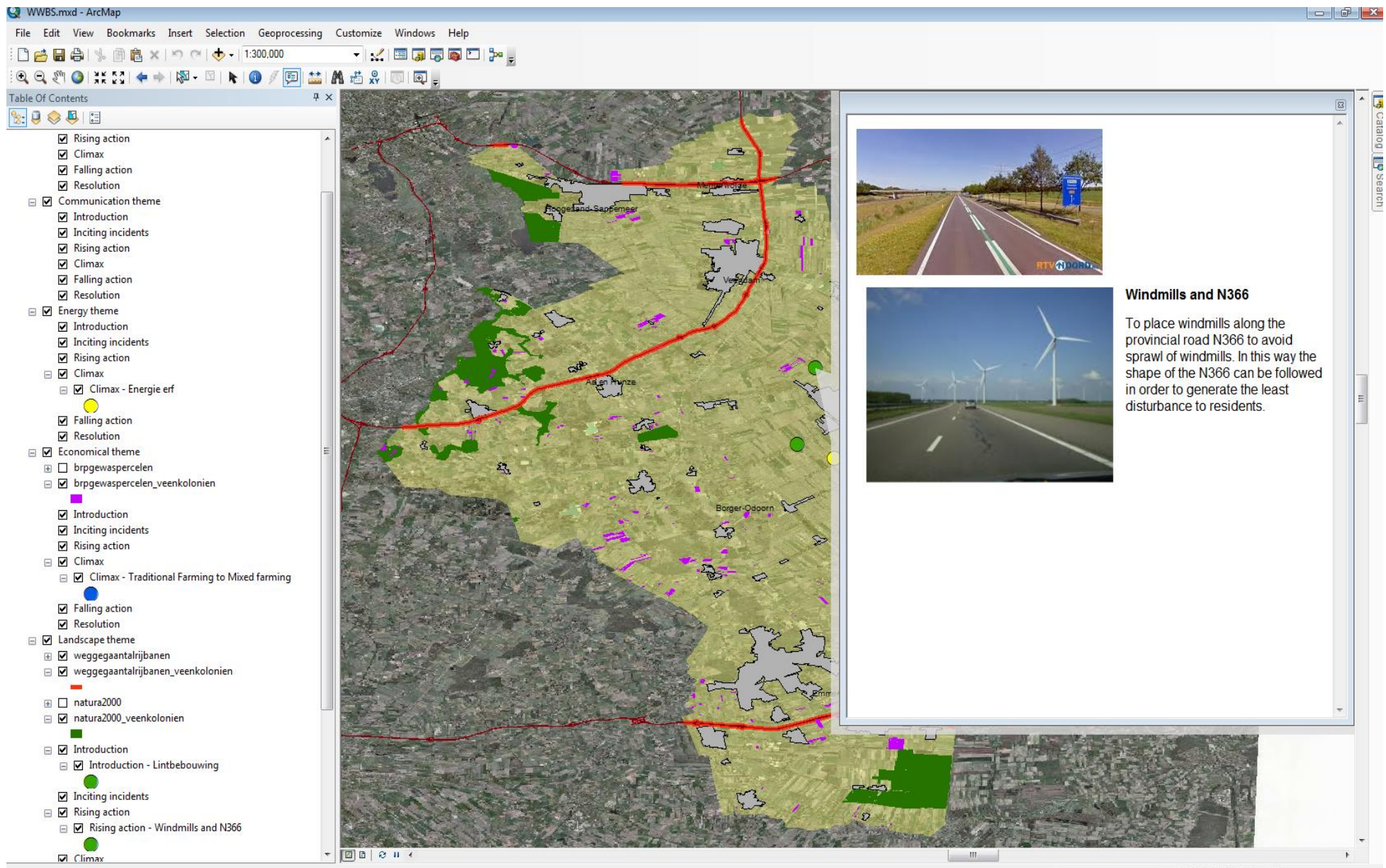


Figure 49: HTML Popup of the rising action phase of the landscape theme (ArcMap, 2014)

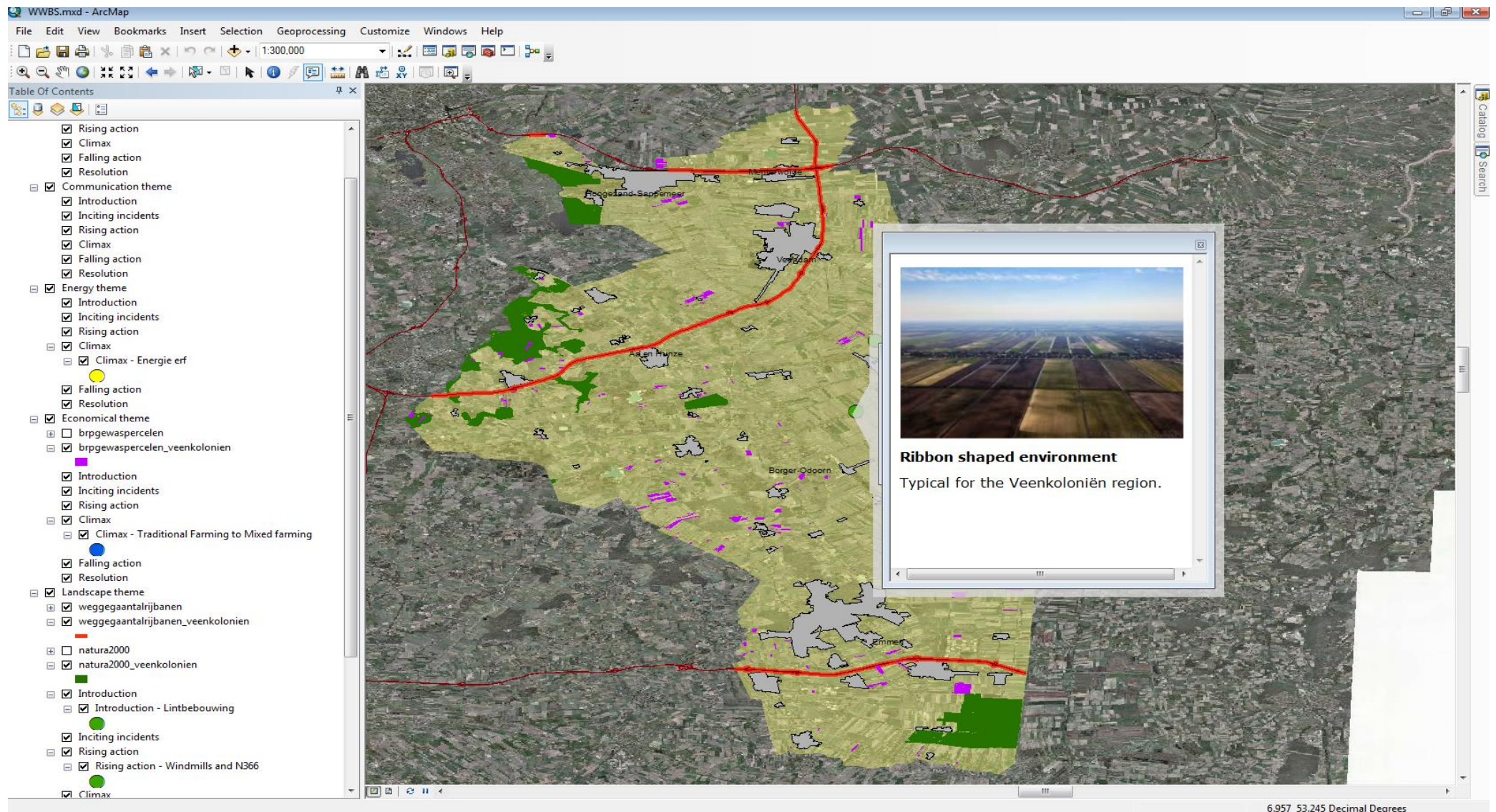


Figure 50: HTML Popup of the ribbon shaped environment in the introduction phase of the landscape theme (ArcMap, 2014)

5.2 Relationship between a Narrative GIS and the planning of energy transition in general (Objective 4).

As noted in paragraph 4.3.2, the results of objective 4 will consist of two parts: a theoretical part and a more practical part. The theoretical part will elaborate on the concept of 'external validity' and make use of existing literature. The more practical part will focus on the earlier presented roadmap and its application on another case for the same region: '7Sprong'.

Part 1 Theory of external validity

External validity is always questionable when doing qualitative research. "The intent of almost all experiments is to generalize their findings to some group of subjects and set of conditions that are not included in the experiment. To the extent and manner in which the results of an experiment can be generalized to different subjects, settings, experimenters, and, possibly, tests, the experiment possesses *external validity*. However, one can identify a number of threats to external validity which cause the effects of a treatment to be specific to some limited population of people or set of condition. These threats to external validity appear to fall into two broad classes: (1) those dealing with generalizations to populations of persons (what population of subjects can be expected to behave in the same way as did the sample experimental subjects?) and (2) those dealing with the 'environment' of the experiment (under what conditions, i.e., settings, treatments, experimenters, dependent variable, etc., can the same result be expected?) the two broad classes correspond to two types of external validity: *population validity* and *ecological validity*" (Bracht and Glass, 1968). In this research I will elaborate on the second type of external validity: *ecological validity*. This is because of the focus on generalization of the experiment itself (the use of the developed Narrative GIS in other cases about energy transition) rather than generalization of the specific outcomes for the case 'Wat weet een boer van saffraan?'. This case is only be used to demonstrate the value of the roadmap towards a Narrative GIS.

Because of the qualitative nature of the narrative GIS set up (from one case to a general applicable Narrative GIS set up), I will look at the characteristics of this Narrative GIS more deeply. I will elaborate on the following characteristics: the used themes which play a role in energy transition; the six stages of the character development; the chosen properties of geo data; the use of a national georegister to gain datasets; and telling techniques for the visualisation process in ArcGIS. At first I will look at the different themes which play a role in energy transition. According to the case 'Wat weet een boer van Saffraan?' five different themes can be distinguished: economical theme, landscape theme, energy theme, communication theme and social theme. Giorel Curran (2011) state in his article 'Contested energy futures: shaping renewable energy narrative in Australia' that "the level of narratives reveal energy and climate politics. The paper examines some of the main narratives through which the conversation about renewable energy in Australia takes place. It

contends that these narratives help shape the profile of renewable energy in Australia in important ways, ultimately impacting the renewable energy sector's standing, status and future. It is thus important to identify and interrogate these narratives in order to more adequately consider the contribution that renewable energy could make to addressing the climate problem. We label these narratives *feasibility* ('Pie in the sky'); *security* ('Keeping the lights on'); *cost* ('Costing the earth'); and *employment* ('Jobs carnage'). Some of the most effective narratives are those that build on important elements of the issue at hand and that intersect the legitimate concerns, and fears, that surround the issue" (Curran, 2011).

These four main narratives, as described by Curran, are more 'general' than the five narratives or themes described in this research. These five themes are set up for the submissions of the Eo Wijers competition for the Veenkoloniën region and are specific for these cases. Nevertheless, these five themes comes, just like the four main narratives of Curran, from the assumption that advanced industrial societies, like capitalist democracies like Australia and the Netherlands, are diverse, complex and multi-layered and can be characterized and shaped by two key interrelated elements: economic growth – the motor of a market economy; and state legitimacy – state and government capacity for maintaining the legal, structural and institutional infrastructure on which market operations, and associated socio- economic relations, depend. Since these factors constitute the central 'imperatives, or functions that governments of most contemporary national states must fulfil' most political issues, and the discourses and narratives that frame them, are thus negotiated through the prism of these core elements (Curran, 2011). This implies that the chosen five narratives can be more widely applicable in the Netherlands and also other capitalist democracies where the two key elements play a major role.

Another characteristics of the narrative GIS is the choice of six stages of character development mentioned in sub chapter 2.1.1. Not every story is the same, but the general structure of introduction, middle part and resolution is in every story recognizable. The Freytag's pyramid explains a 'general' structure of storytelling where these three stages are expanded into six widely used stages: introduction, inciting incidents, rising action, climax, falling action and resolution. Because of the general nature of the Freytag's pyramid and its application in the Narrative GIS set up, it can be said that the choice for these six stages of character development can be used more in general.

As third characteristic of the Narrative GIS, the choice of the five geo data properties. The used geo data properties: location, direction, shape, size and topology are mentioned in literature about geometry and GIS. These properties are widely applied and recognized and therefore they are also used in this research. Because of the widely usage and recognition it can be said that the use of these properties can be justified in this research and in other cases (Chang 2006; Heywood *et al*, 2011; Longley, 2011).

The fourth characteristic of the narrative GIS: the use of a national georegister, can also be applied more in general. The used 'PDOK' is the Dutch central database for open geo data. These datasets are open to everyone and can be downloaded for use. The 'PDOK' also provides datasets to the 'Nationaal Georegister' which is responsible for all geo datasets (open and closed datasets) of the Netherlands. The 'Nationaal Georegister' also delivers Dutch datasets to the European project 'INSPIRE' which coordinates all European datasets (Geonovum, n.d.). Not only the Netherlands can be characterized by an open database of geo data, also other countries provide an open web service like the 'PDOK', 'Nationaal Georegister' or 'INSPIRE'. Because of the fact that the used datasets in the Narrative GIS are open for everyone and applicable in every GIS environment, we can say that this characteristic can be more applied in general.

The fifth and last characteristic is the telling technique of the Narrative GIS. In order to tell a story through for example a book, film, etc. several telling techniques are used to stress a certain part or to skip some parts of minor importance. Flashbacks and flash forwards are widely used telling techniques for example. But also the division of time along the topic differs. In some cases the beginning is less important than the middle part or the other way around. Because these techniques are commonly used in the film industry of among authors it can be seen that the examples of Blok (2005) give a good overview of telling techniques which can be used in a GIS environment.

To conclude, I can say that the developed Narrative GIS set up can conceptually be applied more in general due to the above explained general applicable and widely recognized characteristics of the developed Narrative GIS set up. By applying these characteristics, the Narrative GIS set up can be understood by and used by people from different regions or countries with different cultural backgrounds. The next section will show the practical evidence of its general application. The case '7Sprong' will be used to validate the developed narrative GIS.

Part 2 practical evidence of external validity

As noted in paragraph 4.3.2, this second part will focus more on the practical evidence of the external validity of the developed Narrative GIS. By doing this, the roadmap as presented in 4.3.1 will be applied on another case for the Veenkoloniën: the case '7Sprong'.

Step 1 (What?)

In subchapter 4.3.1 the analysis of the different themes within the narrative of energy transition was explained. The case '7Sprong' was just like the case 'Wat weet een boer van saffraan?' also part of the analysis of Karmijn van den Berg and Renée de Waal (2013). As a result, the discovered themes which play a role in the narrative of energy transition can also be applied on the case '7Sprong'. Figure 51 shows the filled in narrative framework.

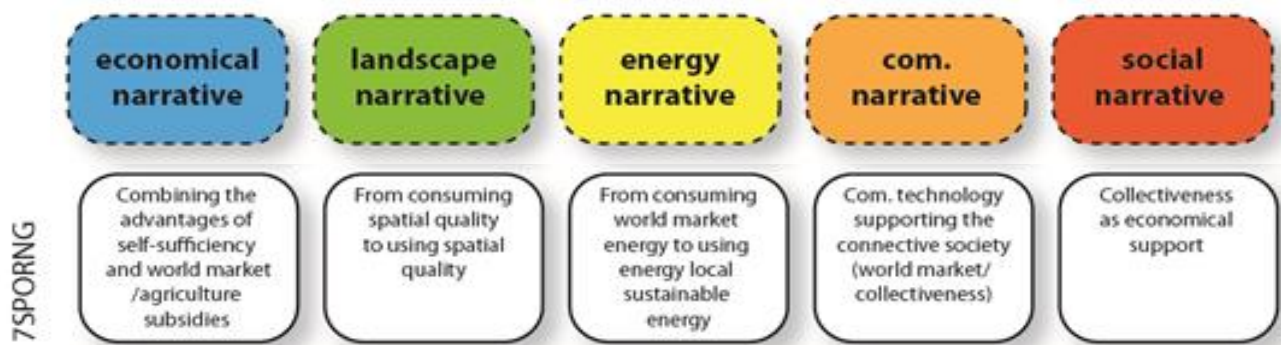


Figure 51: Filled in narrative framework for the case study: '7Sprong' (van den Berg, 2013)

Different than in the case 'Wat weet een boer van saffraan?' all the themes are present in the case '7Sprong'. This case focusses on both the process of the plan and the results of the plan.

In the next steps the roadmap towards a narrative GIS for the case '7Sprong' will be discovered.

Step 2, 3, 4 (What?)

Also for this case, the MS Excel model for ordering of geo data can be used. The end result of this model for the case '7Sprong' can be found in appendix C2. The procedure of how to come to this model was the same as for the case 'Wat weet een boer van saffraan?'. The summary of every stage of every theme is given and within these summaries the geo data were extracted according to the five properties of geo data.

Also for this case some graphs were made in MS Excel out of the data found in appendix C2. The graphs are comparable with the graphs made for the case 'Wat weet een boer van saffraan?' but there are some small differences which make every case unique.

Figure 52 shows the geo data used per stage. This graph shows again that the introduction phase, rising action phase and climax phase make the most use of geo data. Notable is that this case scores higher on the introduction phase and less high on the rising action phase and climax phase. The inciting incidents phase also show a high score. This could be explained by the fact that this case pays more attention to the procedure.

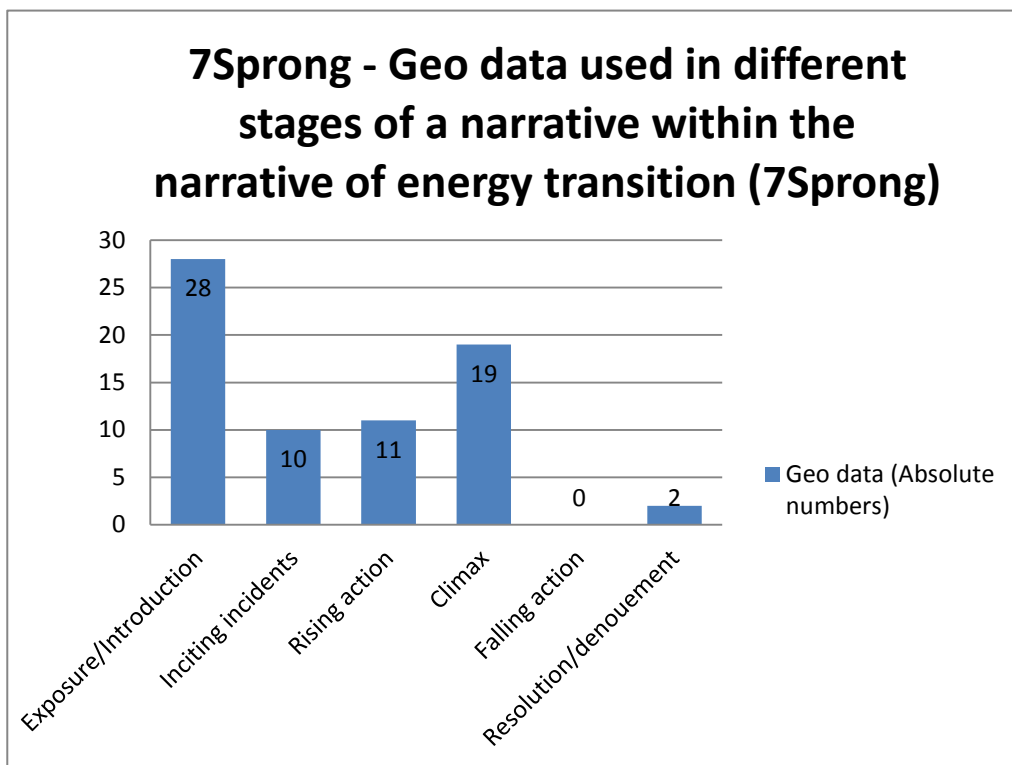


Figure 52: Geo data used per stage 7Sprong

Also for the geo data used in the different themes are some differences between the cases (figure 53). The economical theme and landscape theme have a high score in both cases. The energy theme scored high in the case 'Wat weet een boer van saffraan?' but didn't have a high score in the case '7Sprong'. This is because this case doesn't pay that much attention to 'concrete plans' of energy issues, but highlight more the process of implementing sustainable energy. That this case spent more attention to the process in general is also remarkable on the high score of the social theme.

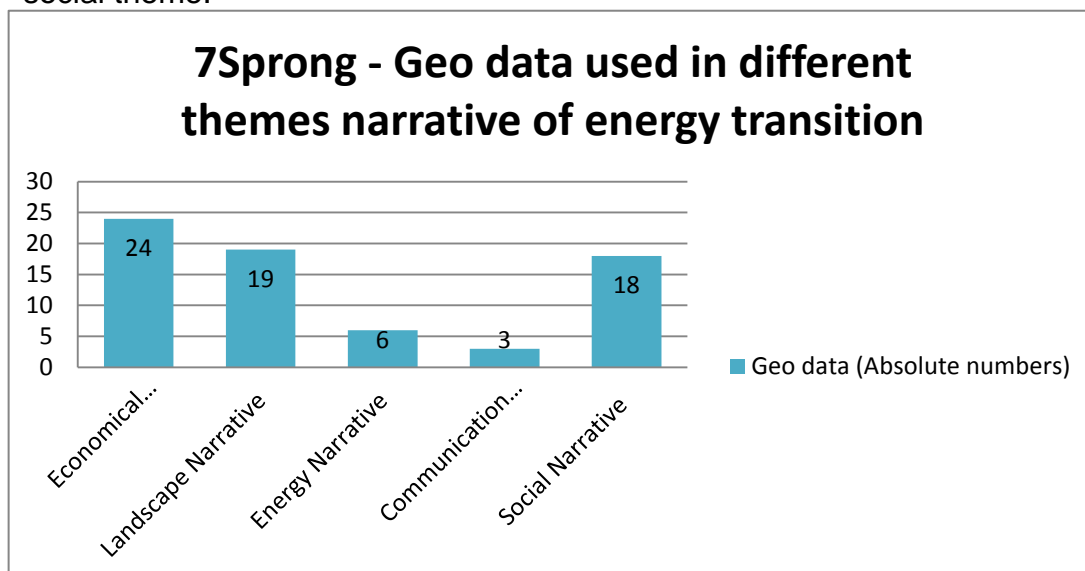


Figure 53: Geo data used per theme 7Sprong

Figure 54 shows the properties of geo data in terms of usage within the narrative of energy transition. Also for this case the property 'location' is the most used property of geo data.

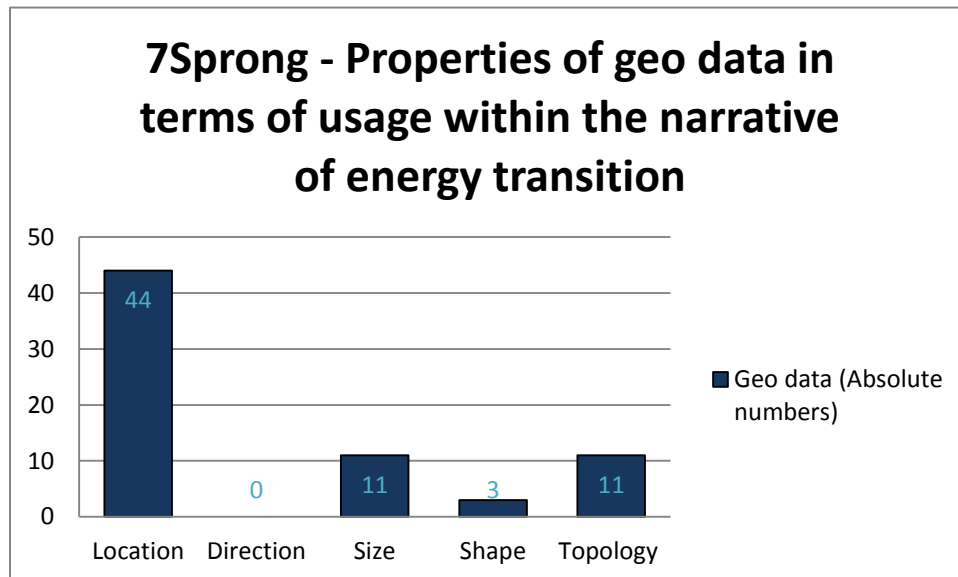


Figure 54: Properties of geo data in terms of usage within the narrative of energy transition 7Sprong

Overall, it can be said that the two cases show comparable results on the presence of geo data. There are some minor changes due to different emphases within the cases.

Step 5 (What?)

Also for this case the database of the 'PDOK' was used. The used datasets for this case will be the same as for the case 'Wat weet een boer van Saffraan?'. Because of the limited availability of useful datasets, there are no other datasets used for this case. If there were more datasets available, there can be differences in datasets in the two cases because of the earlier mentioned focus on themes where some themes and topics are more important in one case than another or the case highlights some other topics which are not highlighted in other cases. The selected PDOK datasets are:

- Luchtfoto (PDOK-achtergrond): used as background layer.
- Bestuurlijke grenzen: used for the selection of the area the Veenkoloniën.
- CBS Bevolkingskernen: used for the visualization of built areas and the shape of built areas.
- BRP Gewaspercelen: used to visualize the different agricultural land uses.
- Weggeg: used to visualize the major roads.
- Natura 2000: used to visualize the protected nature areas.

Step 6 (How?)

In this step the design of the Narrative GIS will be central. The same as step 5, this step will for the major part be the same as presented for the case 'Wat weet een boer van saffraan?'. Step I to X of step 5 can also be repeated for this case. Instead of the file geodatabase 'WWBS', the file geo database '7Sprong' need to be created to make clear that all the datasets belong to the case '7Sprong'. If other datasets were selected from 'PDOK' the same translation method (WFS to Feature Class) can be used. Also the used model can be adapted to it. The ordering system in the Table of Contents and the way to create a feature class will also be the same for the '7Sprong'. Step VI will be different for this case since the Narrative GIS make use of polygon feature classes and multimedia (these are examples and can also be applied in the case 'Wat weet een boer van saffraan?'). Below the figures will be presented and discussed.

The following figures show the Narrative GIS of the case '7Sprong'. Besides the used points feature classes as used in the case 'Wat weet een boer van saffraan?', polygon feature classes are also used in the case '7Sprong'. Figure 55 and 56 show examples of these polygon feature classes. In these examples the polygon represents the area what is presented in the picture in the HTML Popup. These figures show the spatial development of the Veenkoloniën. These polygon feature classes and connected HTML Popups are also applied in the climax phases of the economic theme, energy theme and landscape theme. This is because of the fact that the pictures show aspects which are related to all these themes. These are one of the most important pictures in the case '7Sprong' since they say something about the final situation and combine almost all themes. To refer to Blok (2005) these pictures are repeated to show their importance and complexity. Figure 57 show an example of the earlier mentioned point feature class and figure 58 shows a point feature class with a HTML popup of a 'Youtube video' which explains how solar panels work (installing small scale solar panels on roofs is one of the major topics in the climax phase of the energy theme).

These figures of the narrative GIS of the '7Sprong' show the applicability of the roadmap for a Narrative GIS set up in other cases. These results increased the external validity and reproducibility of the Narrative GIS set up.

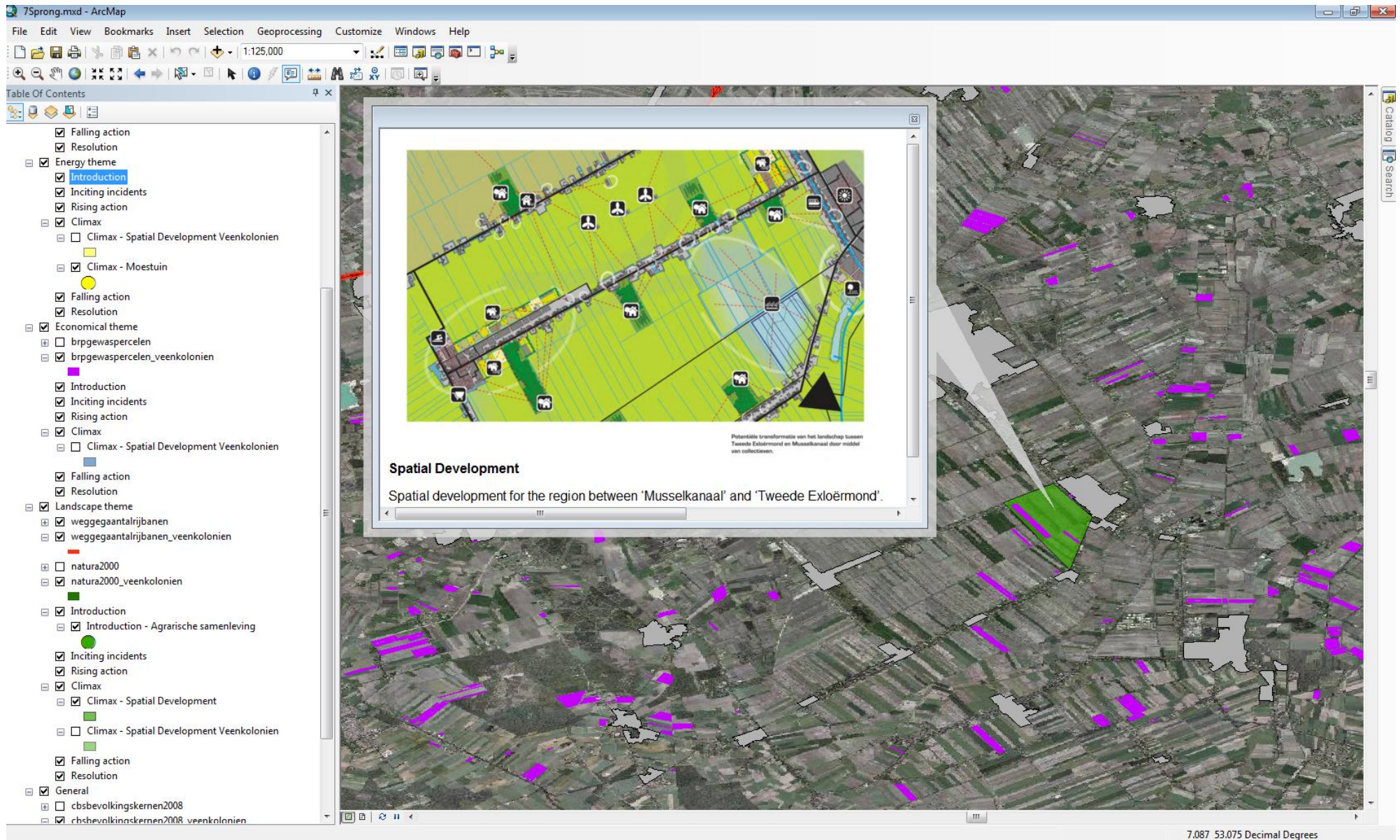


Figure 56: HTML Popup of the spatial development (polygon) of the Veenkoloniën (small scale) in the climax phase of the landscape theme. The picture represents the polygon area (ArcMap, 2014)

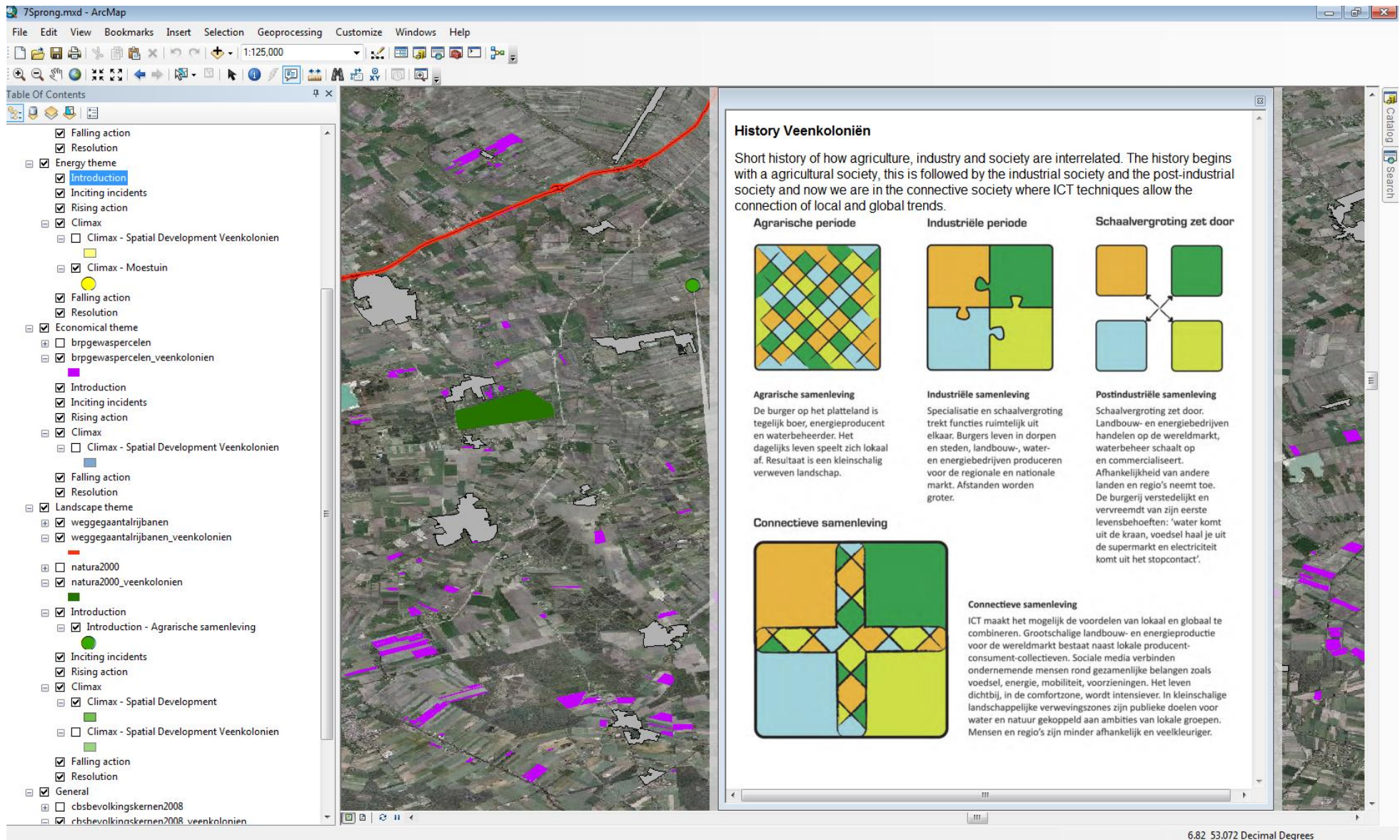


Figure 57: HTML Popup of the history of Veenkoloniën in terms of the interrelations of agriculture, industry and society in the introduction phase of the landscape theme (ArcMap, 2014)

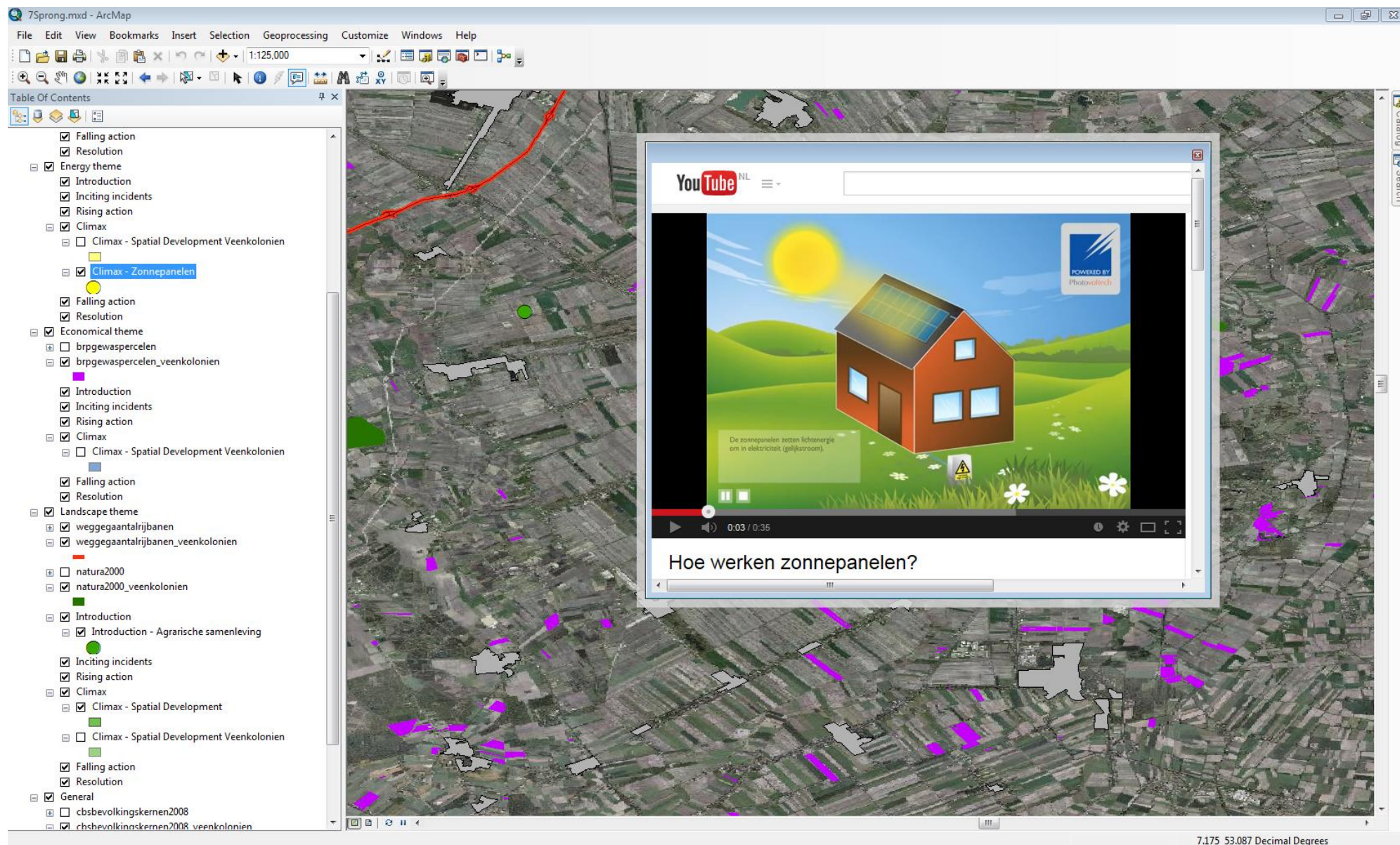


Figure 58: HTML Popup with video. This HTML Popup shows a video of how solar panels work. This is part of the climax phase of the energy theme (ArcMap, 2014)

CHAPTER 6: CONCLUSION, DISCUSSION AND RECOMMENDATIONS

Previous chapters showed the framework wherein the research took place. Also the used methodologies and results of the research were discussed. This chapter will give the overall conclusion, raises some points for discussion and will come up with some recommendations for further research. The chapter will start with a summary of the research and a presentation of the overall conclusions. After that the findings of the research will be discussed. Here some points of criticism on the used methods and the findings of this research will be raised. This subchapter will be divided into three subchapters which will discuss the selected cases, reproducibility and used telling techniques. At last, in subchapter 6.3 some recommendations for further research will be given.

6.1 Conclusion

In general I would say that the research was useful and above all out of the ordinary. The thesis started with an introduction on the topic and a presentation of the research objectives and important concepts. The second chapter represents the first 'loop'. This chapter framed the research by presenting a theoretical framework wherein the research took place. Important concepts were elaborated and discussed and the research field was explored. After that, the developed theoretical framework was applied to the examples of Esri's 'Storytelling Maps'. Chapter 3 focussed on the two cases which were central in this research: 'Wat weet een boer van saffraan?' and '7Sprong'. Chapter 4 and chapter 5 embodied the second 'loop'. Chapter 4 discussed the methodology used in order to set up a Narrative GIS. Chapter 5 dealt with the application of the developed Narrative GIS set up to the two selected cases. The last chapter, conclusion, discussion and recommendations, put the research in a new light and discuss points of improvements and recommendations for further research.

6.1.1 Stories that shape our world....

'The way we see the world is based on stories. Stories enable us to explore the world, set boundaries of what is knowable and explain causes. In other words: stories are used to shape our world. But not only the content of the story is of interest, also the way these stories are communicated is of importance' (Potteiger and Purinton, 1998).

This was the opening statement of Potteiger and Purinton (1998) in the introduction chapter of this research. Telling stories, or narratives, is as old as mankind itself. Different ways to communicate these stories were discovered and cannot be ignored. Over time significant changes in telling stories have taken place and the future will bring us many more ways to express our stories in a way that fits in our modern society. Two things are fixed: stories will always remain and we always need a way to express these stories to understand and shape the world.

Nowadays developments in society and the natural world around us, like climate change, ask for new ways of dealing with these issues. Energy transition is one of the major changes we will face these days and will have tremendous impact on the environment. It requires new ways of thinking and new ways of land use. In fact the story of energy transition can be told in many already known ways. But especially planning activities which induce high impacts on the environment and society, may be profiting of a more participative and flexible way of storytelling. GIS always played a role in planning activities, but the role of GIS to communicate stories and the use of GIS in a more flexible and creative way was never explored. This research took some steps in the new direction of the combination of storytelling and GIS.

6.1.2 A Narrative GIS to express stories that shape our world....

As noted before the main objectives and research questions were used to shape the research. In this sub chapter I will reflect on the outcomes of these questions.

The main objective of this research is: *‘to set up a Narrative GIS by the use of ‘PDOK data’ within the context of energy transition’.*

The supporting research questions to achieve the sub objectives were the following:

To explore theoretical concepts within the field of narratives, GIS and planning of energy transition in order to develop a theoretical framework to set up a Narrative GIS.

1. What are the characteristics of a narrative?
2. How are narratives used in the planning of energy transition?
3. What role plays GIS in the planning of energy transition?

To explore to what extent the theoretical framework is applied to the existing ‘Storytelling Maps’ of Esri.

4. What are Storytelling Maps?
5. To what extent is the theoretical framework applied to the existing ‘Storytelling Maps’ of Esri?

To set up a Narrative GIS for the case ‘Wat weet een boer van saffraan?’ by using the theoretical framework.

6. What themes play a role in the narrative of energy transition by using the case ‘Wat weet een boer van saffraan?’
7. What data can be used as geo data in a GIS environment?
8. How can you analyse this geo data?
9. How to visualize the geo data in a GIS environment in order to become a narrative?

To establish a relationship between the developed Narrative GIS (according to the theoretical framework) and the planning of energy transition in general by evaluating the developed narrative GIS setup. This will be done by using the ‘control case’ ‘7Sprong’.

10. What characteristics of the developed Narrative GIS can be used more general?

In this research the concept of storytelling or narrative, and more specific the narrative of energy transition, is widely explored. The first objective of the research discovered the theoretical concepts within the field of narratives, GIS and planning of energy transition. The outcome of this literature study was that a narrative consists of two parts: a *what*- and *how*-question. This distinction forms the basis of the developed theoretical framework. This framework is completed with theory found on the structure of a narrative (character development), distraction of themes and forms of telling and telling techniques. Also the use of narratives and GIS in the planning of energy transition was explored. The main conclusion is that there are already researchers who highlight the importance of the use of narratives but how to apply this has never been explored. Starting from the beginning - what are the characteristics of a narrative – was needed for the development of a theoretical framework in order to apply this framework on two practical cases. The main outcome of this first objective was a theoretical framework what is based on existing literature which can be applied to develop a Narrative GIS set up.

For the second objective the Storytelling Maps examples of Esri were explored. Esri is the only organization so far which paid attention to establishing a relationship between GIS and storytelling. The main conclusion of this objective was that the developed theoretical framework can poorly be applied to these examples. Most of all, static numbers were used to communicate a story. Change over time and value judgements, which are often responsible for the structure of a story, were left out in these examples. Nevertheless the examples are a good starting point and they can be used for inspiration. Also the examples show that a map can often be used as a 'trigger' for storytelling.

In chapter 4 the theoretical framework was applied to form a methodology for the development of a Narrative GIS set up. In chapter 5 this Narrative GIS set up was applied to the case 'Wat weet een boer van saffraan?'. This was also the focus of objective 3 where different themes were discovered which play a role in the planning of energy transition; what the characteristics of geo data are; and how this geo data can be visualized in a GIS environment. The developed theoretical framework seemed to be very helpful for setting up such a set up in a structured way. Not only the structure was of importance also the fact that the characteristics of the Narrative GIS set up can be applied in an easy and more general way was of importance. Specialists from different sectors have to work with it and therefore accessibility is a key word. At the end, this third objective delivered a Narrative GIS set up which can be applied to a case what focusses on energy transition.

Objective 4 focussed on the general applicability of the developed narrative GIS. Because specialists from different sectors have to work with it, it is of importance that the characteristics are widely recognized and easy to use. Therefore all the characteristics were evaluated on their general applicability. Also a second case was used to test the

general applicability on a different case in order to test the Narrative GIS set up. The main conclusion was that the characteristics were general applicable and that the developed Narrative GIS set up seemed to be workable in a different case. There are also some critical points; these will be discussed in the discussion chapter.

Important to highlight is that all the individual steps taken in this research are all useful in the understanding of narratives, specifically the narrative of energy transition, and stimulates creative usage of GIS. Even if the Narrative GIS is not the main outcome, the research made some interesting topics more clear which can be used in other researches.

Overall can be said that the sub objectives helped to achieve the main objective. Nevertheless, the main objective is partly achieved due to fact that the developed Narrative GIS is a concept version and many improvements have to be taken. Due to time limitless and the fact that there was simply no knowledge beforehand, the developed Narrative GIS as a concept version can act as a stepping stone for further improvements.

To conclude, the research achieved more than only the developed Narrative GIS. The research shows also the importance of the use of narratives in planning practices and shows a creative way of using GIS applications. These findings are not only useful in the planning field, but also for the geo-information science by showing the versatility and creative applicability of GIS.

6.2 Discussion

In the previous paragraph the main conclusions were presented. In this paragraph the findings will be discussed. I will raise some points of criticism on the used methods and the findings of this research. This chapter is divided into three parts which will discuss the selected cases, reproducibility and used design techniques.

6.2.1 Selected cases

I will start to discuss the framework wherein the research takes place. In this research two cases were central: 'Wat weet een boer van saffraan?' and '7Sprong' to validate the used methods. One point of criticism is the choice of two cases which are plans for the same region: the Veenkoloniën in the Netherlands. The two plans are both submissions for the Eo Wijers competition and they are subject to the same set of requirements to participate in the competition. Therefore you can say that the two selective cases are representative for only the Veenkoloniën region and not for other regions in the Netherlands or other European countries. A better option would be to incorporate another case about energy transition which focusses on another region in the world. When doing this the external validity will increase because of the evidence that the developed Narrative GIS can be applied in a variety of cases in different regions. The reason why this was not done in this research is because of the already existing analysis of themes done by Renée de Waal and Karmijn van den Berg (2013). Time limitations did not allow me to find another comparable case about energy transition in another country and to analyse the themes which play a role in

that other case. If other themes can be found in other cases, the Narrative GIS should be tested again for its application.

6.2.2 Reproducibility and reliability

In the previous chapter the external validity was discussed. Subchapter 5.3 showed the generalization of the characteristics of the Narrative GIS. Despite of the fact that the characteristics or methods are clear and reproducible, you still have to deal with literature and plans (the two cases) which are subject to personal interpretation. In this research I chose to use the character development as visualized by the Freytag's pyramid and the telling techniques of Blok as leading thread in the research. It could be possible that there are also other methods to show character development or other telling techniques which will lead to other outcomes. In other words, there are more storytelling theory alternatives which will probably lead to another theoretical framework and results.

Also, it is possible that the meaning of the plans (two cases) differs from how I interpreted the plan. It is thinkable that someone else interpret the case in another way which will lead to different outcomes. This strikes with the reproducibility and reliability of the research. Also, as mentioned in subchapter 4.3.1, the found themes are also found by interpreting the data. The themes are generable (see subchapter 5.3), but the choice of these themes in this research can be slightly different if someone else applies the same methodology to find the themes in the two cases (Bryman, 2008). To overcome the problem of interpretation it would be a good idea to organize a 'neighbourhood meeting' where the 'tellers' of the story live and can help to interpret the data since it's their story. In this way the interpretation of the plan is widely supported.

The same can be said about the extraction of the six phases of character development from the text. The research does not show a reliable method to extract phases from a text. I developed my own strategy and I interpret and categorized the data by myself. What I think is part of the introduction, someone else can think the text belongs to another phase of character development. It is hard to define what text belongs to which stage of character development and therefore there are consequences for the reproducibility of the research since someone else can come up with another categorization.

The last 'interpretation problem' has to do with the presented geo data classification. The research came up with generic classification methods and use generable properties of geo data. Also here, the chosen properties are correct but what data belongs to which property is discussable. It must be clear that the research does not cover these kinds of interpretation problems. This is one of the major criticism against the analysis of qualitative data like texts written by other people. And the reliability and reproducibility will always be doubted. Despite of that, the research tried to come up with general applicable characteristics which are widely recognized and accessible for everyone. And it is undisputable that first steps are taken to use qualitative data in a quantitative oriented GIS environment.

6.2.3 Selected datasets, used software and telling techniques

Another point of discussion has to do with choices concerning used techniques and datasets. I already justified the use of a general online geo database like 'PDOK' because of its easy usage. Nevertheless, the amount of datasets available is very low and therefore important data is not available in online datasets and cannot be shown in a GIS environment in an easy and quick way. Because of this the Narrative GIS misses a lot of useful and important data and this has consequences of the reliability of the Narrative GIS. There is a change that a lot of the required data is available, but these datasets are closed and often owned by, for example the state or a company, and are hard to obtain. This is also the reason why so much HTML popups and multimedia is used to 'tell the story' in the Narrative GIS. Subchapter 2.4.1 mentioned that good cartography is needed to tell the story and that cartography should tell the most of the story instead of HTML popups and text. Popups and text is only allowed if it makes the story more clear and is used to *support* the told story and not to *tell* the story. Because of the limited accessibility of datasets, popups are often used to tell the story in the developed Narrative GIS. Maybe, the amount of open datasets will increase in the future and can be used to tell a story in a GIS environment. Also the telling techniques of Blok (2005) couldn't be applied easily. The developed Narrative GIS tried to include these telling techniques but in reality it seemed very hard to express the story well according to these telling techniques.

Another question that can be raised is: why is ArcGIS 10.2 for Desktop used and not another GIS environment which is easier accessible? Arc GIS 10.2 for Desktop is used because of its availability on the WUR computers. Also, the program has a lot of options and is special designed for GIS related analyses and visualizations. But because of the aim of easy accessibility the use of Google Earth or ArcGIS Online would have been a better option for this research. The same can be said about the visualization and telling techniques. Subchapter 2.2 mentioned the lack of research that was done of the use of narrative within a GIS environment. Because Esri has a first with its story maps, I only focus on the visualization options developed by Esri. For the developed Narrative GIS a lot of Esri's visualization techniques were used notwithstanding the developed theoretical framework could not be applied easily to the Esri examples. Maybe other visualization techniques fits better in the theoretical framework and have to be developed.

6.3 Recommendations

Now a clear overview is given of the findings, main conclusions and points of criticism. Out of this, recommendations for further research can be given.

6.3.1 A future Narrative GIS: recommendations

The aim of this research was not only to develop a Narrative GIS but also to explore the topic of the combination of narratives and GIS in the context of renewable energy transition. During the research process a lot of issues or shortcomings came clear and these were discussed in sub chapter 6.2. One of the conclusions of the research is that application of GIS in storytelling is of interest for the planning of energy landscapes and the geo-

information science. Therefore it could be interesting to investigate how the developed Narrative GIS set up Narrative GIS set up can be improved. The following recommendations are set up for further research:

Assessment of Narrative GIS by testing

Due to time limitations it was not possible to test the Narrative GIS set up for another region in the Netherlands or a region in another country. Also organising a 'neighbourhood meeting' would be a possibility to test the developed Narrative GIS and telling techniques among professionals and civilians and to overcome an interpretation problem.

Construction of Narrative GIS by different tools

Because the research presented one way to come to a Narrative GIS set up, it would be a possibility to explore theory alternatives about narratives. By using other literature, the Narrative GIS set up will have another appearance and might generate other outcomes.

Repeatability of the Narrative GIS framework

Due to the fact that data is interpreted by myself and its consequences to the repeatability, it is needed to refine the characteristics of the Narrative GIS set up and develop a clear roadmap of how to interpret the used concepts and data. By doing this, the repeatability will increase since other people can follow your thoughts and argumentation.

Enhance the framework by storytelling techniques

Because the storytelling techniques of Blok (2005) were poorly discussed in the narrative GIS I would suggest to pay more attention to these techniques. Also other telling techniques are possible in storytelling.

Find proper methods to analyse stories and synthesize stories.

In this research the focus was on ArcGIS for Desktop. Maybe there are other GIS applications which are more suitable for storytelling.

These recommendations will contribute to the improvement of the Narrative GIS. This research acts as a stepping stone for further research in order to express future stories using GIS. However, it seemed hard to visualize a story in a GIS environment since a lot of people are captivated by interaction with the audience and by sharing emotions and value judgements. These typical human characteristics are hard to translate to a computer application (Brooks, n.d.). The future is open to new techniques which will provide a good method for storytelling through computer applications and GIS applications in particular.

REFERENCES

- Agenda voor de Veenkoloniën, 2012. *Essay: 7Sprong*. [online]
<http://www.veenkolonien.nl/upload/100-7sprong_essay.pdf> [Accessed on 12 October 2013]
- Agenda voor de Veenkoloniën, 2012. *Essay: Wat weet een boer van saffraan?* [online]
<http://www.veenkolonien.nl/upload/89WWBS_Wat_weet_een_boer_van_saffraan_essay_1493w.pdf> [Accessed on 9 October 2013]
- Agenda voor de Veenkoloniën, 2013. *Eo Wijers prijsvraag*. [online]
<<http://www.veenkolonien.nl/83-eo-wijers.html>> [Accessed on 8 October 2013]
- ArcGIS Explorer Online, 2013. *Presenting a Briefing*. [online]
<<http://www.arcgis.com/explorer/>> [Accessed on 25 November 2013]
- ArcMap, 2014. Existing Map WWBS. Version: ArcGIS 10.2 for Desktop.
- Baban, S.M.J., Parry, T., 2000. *Developing and applying a GIS-assisted approach to locating wind farms in the UK*. In *Renewable Energy 2001*, Vol. 24, Issue 1, p. 59-71.
- van den Berg, K., 2013. *Conclusions of the analytical framework of narratives*. [conversation] (personal communication, 9 September 2013).
- Blok, C.A., 2005. *Dynamic visualization variables in animation to support monitoring of spatial phenomena*. Doctor. Utrecht University.
- Bracht, G.H., Glass, G.V., 1968. *The External Validity of Experiments*. In *American Educational Research Journal* 1968, Vol. 5, p. 437-474.
- Brooks, K., n.d., *Storytelling and Computational Narratives: Reaching for the High Bar*. Motorola Human Interface Labs.
- Bryman, A., 2008. *Social Research Methods*. 3rd ed. Oxford: University Press.
- Chang, K. 2006. *Introduction to Geographic Information Systems*. 6th ed. McGraw-Hill.
- Creswell, J.W., 2009. *Mapping the field of mixed methods research*. *Journal of Mixed Methods Research*, 3(2), 95-108.
- Curran, G., 2011. *Contested energy futures: Shaping renewable energy narrative in Australia*. *Global Environmental Change* 2012, No. 22, p. 236-244.
- Eckstein, B., 2003. *Making Space: Stories in the Practice of Planning*. In Throgmorton, J. A., Eckstein, B., 2003. *Story and Sustainability: Planning, Practice, and Possibility for American Cities*. Cambridge, Massachusetts: The MIT Press, p. 13-38.
- EO Wijers-stichting, n.d. *Eo Wijers-prijsvraag 2011-2012, Nieuwe energie voor de Veenkoloniën op zoek naar regionale comfortzones: Brochure voor de idee fase over krimp*,

- energietransitie en ruimtelijke kwaliteit*. Den Haag: Eo Wijers-stichting. [online]
<http://www.eowijers.nl/?page_id=1149> [Accessed on 8 October 2013]
- Esri, n.d. *Storymaps: Colorado Flooding Impact*. [online]
<<http://tmappsevents.esri.com/website/colorado-flooding-impact-map/>> [Accessed on 25 November 2013]
- Esri, n.d. *Storymaps: Jobs & Population*. [online]
<<http://storymaps.esri.com//UnemploymentPopulation/>> [Accessed on 25 November 2013]
- Esri, n.d. *Storymaps: New York Place Matters*. [online]
<<http://placematters.net/ESRImap/index.html>> [Accessed on 25 November 2013]
- Esri, n.d. *Storymaps: Refugee camps*. [online]
<<http://storymaps.esri.com/stories/2013/refugee-camps/>> [Accessed on 30 January 2014]
- Esri, n.d. *Storymaps: Renewable Energy*. [online]
<<http://storymaps.esri.com/stories/2013/energy/>> [Accessed on 25 November 2013]
- Esri, n.d. *Storymaps: The World in 1812 and 2013*. [online]
<<http://story.maps.arcgis.com/apps/StorytellingSwipe/index.html?appid=b8ece5952db443858442f122984602ba&webmap=8ea34ba9a4f843e08a468595d8d91188#>> [Accessed on 25 November 2013]
- Esri, n.d. *Storymaps: Warming Cities in Europe*. [online]
<<http://storymaps.esri.com/stories/2012/warming-cities/>> [Accessed on 25 November 2013]
- Esri, n.d. *GIS Dictionary*. [online]
<<http://support.esri.com/en/knowledgebase/GISDictionary/term/GIS>> [Accessed on 23 September 2013]
- Esri, 2012. *Telling Stories with Maps: A White paper*. Draft version February 2012. [online]
<<http://storymaps.esri.com/downloads/Telling%20Stories%20with%20Maps.pdf>> [Accessed on 2 November 2013]
- Freytag, G., 1900. *Technique of the drama: An exposition of dramatic composition and art*. E. J. MacEwan, Trans., 3rd ed. Chicago: Scott, Foresman.
- Geonovum, n.d. *PDOK*. [online] <<http://www.geonovum.nl/onderwerpen/pdok-nationaal-georegister/nationaal-georegister>> [Accessed on 7 January 2014]
- Geostories, 2013. *America's 10 Most Endangered Rivers of 2013*. [online]
<<http://www.geostories.org/portal/player/americas-10-most-endangered-rivers-of-2013/gesF144C2B12671D96C1>> [Accessed on 25 November 2013]
- Google Maps, 2013. *Routebeschrijving van Haarlem naar Amsterdam*. [online]
<<https://maps.google.nl/>> [Accessed on 30 January 2014]

Heywood, I., Cornelius, S., Carver, S., 2011. *An Introduction to Geographical Information Systems*. 4th ed. Pearson Education Ltd.

IBM, n.d. *Many Eyes: Listing Visualisations*. [online]
<<http://www958.ibm.com/software/analytics/manyeyes/visualizations>> [Accessed on 5 November 2013]

Longley, P.A., Goodchild, M.F., Maguire, D.J., Rhind, D.W., 2011. *Geographic Information Systems & Science*. 3rd ed. Wiley.

Mahdavinejad, M. and Amini, M., 2011. *Public Participation for Sustainable Urban Planning in Case of Iran*. *Procidia Engineering* 2011, Vol. 21, p. 405-413.

Mayring, P., 2003. *Einführung in die qualitative Sozialforschung (Introduction to qualitative social research)*. 5th edition. Weinheim: Beltz-UTB.

Neumann, A., Freimark, H., 2010. *Introduction to Geodata-Management*. [online]
<<https://geodata.ethz.ch/geovite/tutorials/L1IntroToGeodata/en/text/L1IntroToGeodata.pdf>> [Accessed on 22 November 2013]

PDOK, n.d. *PDOK services: letter 'A'*. [online] <<https://www.pdok.nl/nl/producten/pdok-services/overzicht-urls/a>> [Accessed on 12 January 2014]

Ohler, J., 2008. *Digital storytelling in the classroom: New media pathways to literacy, learning, and creativity*. Thousand Oaks, CA: Corwin Press.

Peuquet, D., 2002. *Representations of Space and Time*. New York/London: The Guilford Press.

Potteiger, M., Purinton J., 1998. *Landscape Narratives: Design Practices for Telling Stories*. New York, John Wiley & Sons.

Ramachandra, T.V., Shruthi, B.V., 2005. *Spatial mapping of renewable energy potential*. *Renewable Energy reviews* 2007, Vol. 11, p. 1460-1480.

Roberts, B., 2002. *Biographical research*. Buckingham: Open University Press.

Rotmans, J., Kemp, R., van Asselt, M.B.A., Geels, F., Verbong, G., Molendijk, K., 2000. *Transities & Transitie management: de casus van een emissiearme energievoorziening*. Maastricht: ICIS-boek.

Sandercock, L., 2003. *Cosmopolis II: Mongrel Cities in the 21st Century*. London: Continuum.

Selman, P.H., 2010. *Learning to Love the Landscape of Carbon-Neutrality*. *Landscape Research*, Vol. 35, No. 2, p. 157-171.

- Sheppard, E., 2001. *Quantitative Geography: Representations, Practices, and Possibilities*. Environment and Planning D: Society and Space, 19, p. 535-554.
- Stremke, S., van den Dobbelsteen, A., 2012. Sustainable Energy Landscapes. Design, Planning, and Development. Boca Raton: Taylor & Francis Group.
- Throgmorton, J.A., 2003. *Planning as Persuasive Storytelling in the Context of 'The Network Society'*. In *The Network Society: A New Context for Planning?* London: Routledge. Pp. 125-145.
- Trung, N. H., Tri, L. Q., van Mensvoort, M. E. F., Bregt, A. K., 2007. Application of GIS in land/use planning: a case study in the Coastal Mekong Delta of Vietnam. *International Journal of Geoinformation* 3 (2007)4, p. 1-8.
- University of Wisconsin, n.d. *Dramatic Arc Stages*. [online]
<<http://narrativestructures.wisc.edu/home/aristotle/stages>> [Accessed on 15 October 2013]
- University of Wisconsin, n.d. *Freytag's Pyramid*. [online]
<<http://narrativestructures.wisc.edu/home/aristotle>> [Accessed on 16 October 2013]
- de Waal, R.M., n.d. *Shaping sustainable energy landscapes: the need for and elaboration of a narrative design approach*. Wageningen: Wageningen University. PhD thesis.

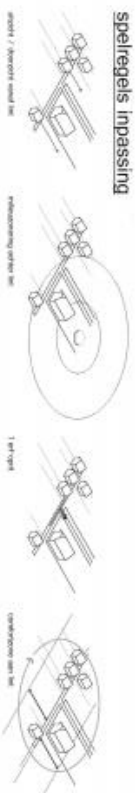
APPENDICES

A1: Poster presentation of 'Wat weet een boer van saffraan?' in Dutch (Agenda voor de Veenkoloniën, 2012)



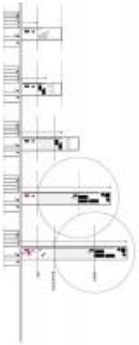
wat weet een boer van saffraan

De Veenkoloniën zijn bekend om hun landbouw, met name de landbouw van de veenkolonisten. Dit is een landbouw die is ontstaan uit de veenkolonisten, die in de veenkoloniën zijn ontstaan. Door het ontbreken van de veenkolonisten, zijn de veenkolonisten in de veenkoloniën ontstaan. Het ontbreken van de veenkolonisten, zijn de veenkolonisten in de veenkoloniën ontstaan. Het ontbreken van de veenkolonisten, zijn de veenkolonisten in de veenkoloniën ontstaan.



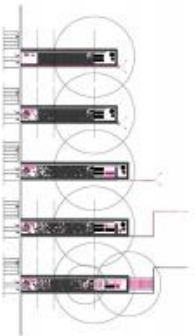
opstrek erf

Het ontwerp van het erf moet een beeld van de omgeving geven. Het ontwerp van het erf moet een beeld van de omgeving geven. Het ontwerp van het erf moet een beeld van de omgeving geven. Het ontwerp van het erf moet een beeld van de omgeving geven. Het ontwerp van het erf moet een beeld van de omgeving geven.



ontwikkeling erf

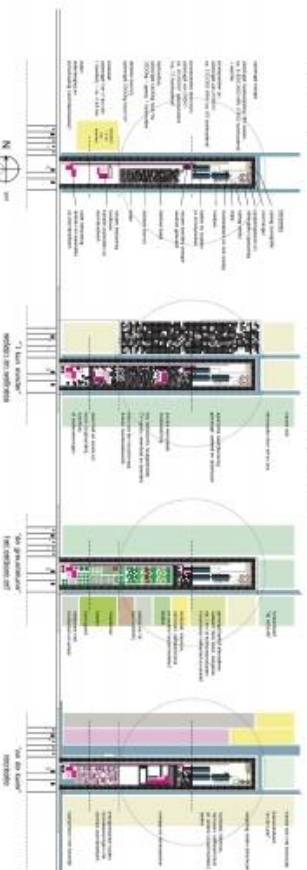
De omgeving is belangrijk. Het ontwerp van het erf moet een beeld van de omgeving geven. Het ontwerp van het erf moet een beeld van de omgeving geven. Het ontwerp van het erf moet een beeld van de omgeving geven. Het ontwerp van het erf moet een beeld van de omgeving geven.



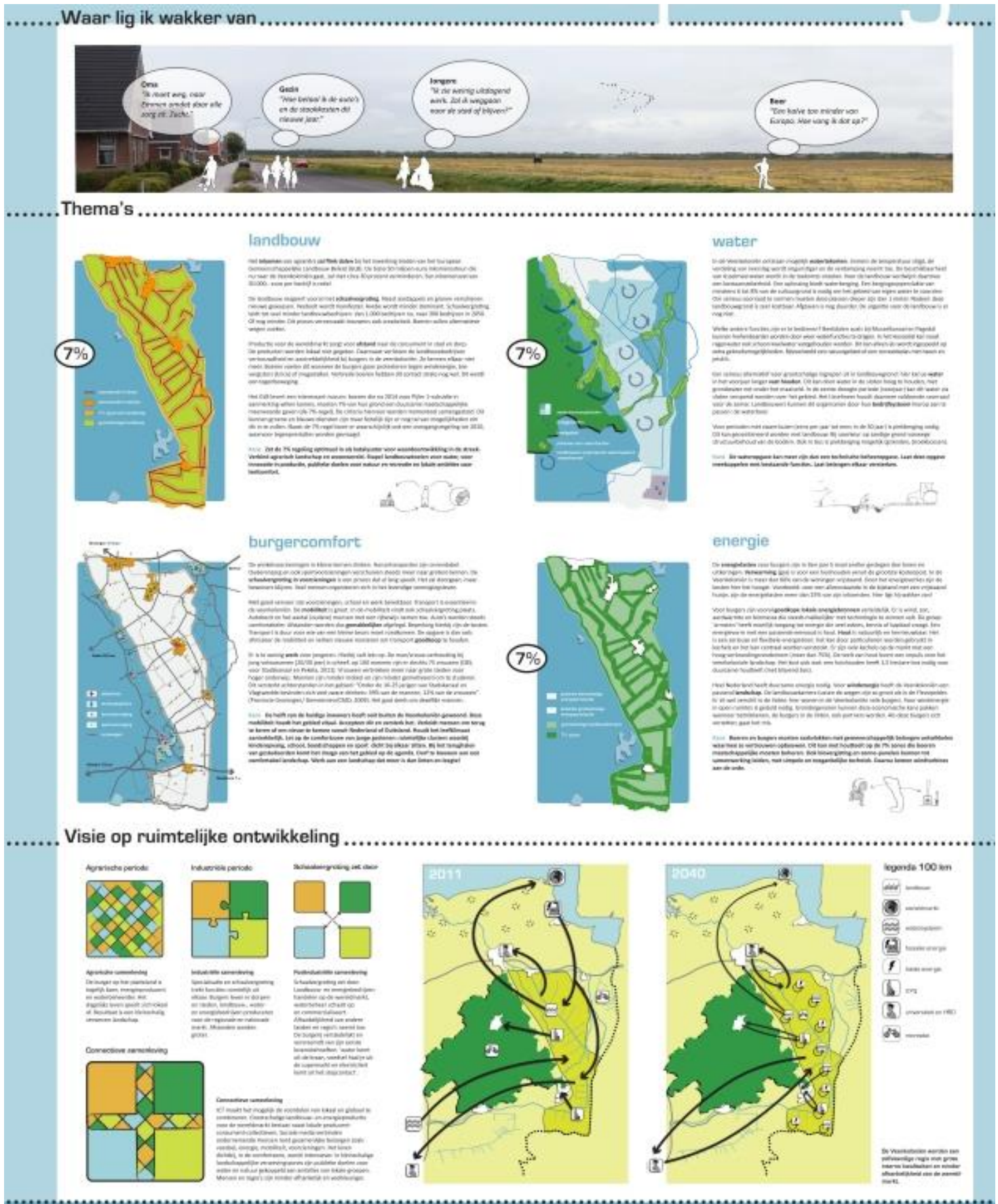
ingenieurs erf

principe erf

mogelijke kop en tussenland



A2: Poster presentation of '7Sprong' in Dutch (Agenda voor de Veenkoloniën, 2012)



B1: Data analysis 'Wat weet een boer van saffraan?' in Dutch (van den Berg, 2013)

1 Wat weet een boer van saffraan

2 Het landschap van de Veenkoloniën is een landschap met bebouwingslinten en een |
3 aaneenschakeling van agrarische bedrijven. Een indrukwekkend open landschap. De
4 ontginningslinten bepalen tot op de dag van vandaag het beeld van de Veenkoloniën. Schakel alle
5 linten aan elkaar en je komt van Groningen tot de stad Luxemburg. Deze eindeloze
6 aaneenschakeling van woningen, bedrijven en agrarische erven maakt het landschap van de
7 Veenkoloniën uniek. Dit landschap met het agrarisch bedrijf als belangrijkste speler heeft een
8 enorme kracht. Bij het opstellen van een methodiek moet juist deze kracht moeten worden benut.
9 De methodiek richt zich op het aanjagen van de boeren tot dynamische ondernemers, daar ligt de
10 grootste kans en de grootste uitdaging. De transformatie van het agrarisch bedrijf leidt de
11 transformatie van het landschap zowel in ruimtelijke als sociaaleconomische zin. Alle agrarische
12 erven samen dragen de linten en de linten dragen op hun beurt de hele regio. Het boerenerv als
13 motor van de comfortzone. De vraag is nu, hoe krijgen we die motor aan de praat?

14 De Energie Compagnie

15 De eerste stap is het opzetten van de Energie Compagnie. Dit is een coöperatie op basis van
16 particulier initiatief. De Compagnie bouwt aan een financieringsmodel voor duurzame
17 ontwikkelingen in de regio en koopt stroom en gas in voor al haar leden. De Compagnie bedingt
18 korting bij energieproducenten. Tegelijkertijd wordt de Energie Compagnie energieproducent door
19 het contracteren van diverse lokale duurzame energie-opwekkers, en in het bijzonder door het
20 steunen en oprichten van energie-erven. Bij de start van een energie-erf dekt de Energie
21 Compagnie het investeringsrisico af. Dit is cruciaal, omdat het ondernemersrisico in de weg staat
22 wanneer wordt afgeweken van de gangbare bedrijfsvoering.

23 Een andere taak van de Energie Compagnie is bemiddeling. Voordat er een schop de grond in gaat
24 moet eerst een meningsverschil tussen boeren en de bewoners worden opgelost. Het plaatsen van
25 windturbines in de achtertuin van de bewoners in de linten is onaannemelijk. Er komt geen
26 medewerking voor agrarische ontwikkeling wanneer de molens in de weg blijven staan. Een lint
27 van windmolens langs de Provincialeweg N366 en het kanaal lijkt een betere keuze dan een
28 windpark in de Monden. Hier staan de molens zo veel mogelijk buiten het gezichtsveld van de
29 dorpslinten en maken ze onderdeel uit van een grootschalige, bovenregionale structuur.

30 Een ander onderdeel van bemiddeling is het dirigeren en sturen van geldstromen die voortkomen
31 uit mogelijke bouwontwikkelingen op de energie-erven. Met een grondbank-constructie worden
32 opbrengsten die voortkomen uit het opwarmen van agrarische grond ingezet ter bevordering van
33 duurzame ontwikkelingen.

34 Het erf en de bionier

35 Zes procent van de agrarische bedrijven in de Veenkoloniën komt binnen enkele jaren vrij. De
36 Compagnie koopt één of meerdere boerenbedrijven ergens in de Veenkoloniën. Op deze
37 vrijgekomen gronden worden enkele nieuwe agrarische bedrijven gevestigd met de ontwikkeling
38 van duurzame energie als drijfveer. De beheerder van het energie-erf is de bionier. De bionier
39 wordt de aanjager van het transformatieproces van het traditionele boerenbedrijf naar het nieuwe
40 gemengde bedrijf. De gemengde bedrijven worden verzamelpunten van kennis over verschillende
41 combinaties van agrarische bedrijfsvoering en het opwekken van duurzame energie. Het energie-
42 erf wordt een informatiecentrum van waaruit alle agrarische bedrijven worden aangespoord mee te
43 doen.

44 Daarnaast wekt het energie-erf ook sociale energie op. Door middel van werkprojecten en
45 voorzieningen worden mensen uitgedaagd deel te nemen aan activiteiten. Dit zijn activiteiten voor
46 kinderen, bewoners en specifieke doelgroepen van mensen die buiten het reguliere arbeidsproces
47 zijn komen te staan. Met evenementen, buurtfeesten en werkprojecten worden mensen met een
48 bijstandsuitkering, wsw'ers, en gepensioneerden bij het reilen en zeilen van het energieerf
49 betrokken. Met manifestaties gericht op de agrarische bedrijfsvoering worden de boeren op het erf

50 genodigd. Het erf wordt een sociaal brandpunt waar ontmoetingen plaatsvinden en waar
51 belevenissen worden opgedaan. Met publiciteit over de evenementen rond de bionier en het energie-
52 erf komt de motor op gang. Na de eerste energie-erven komen er meer duurzame, gemengde
53 bedrijven. Goed voorbeeld doet goed volgen. het energie-erf en de bionier

54 **Het Veenkoloniale erf**

55 Hoe ziet zo'n nieuw energie-erf eruit? Bij de opbouw van een nieuw erf mogen de uitzichten van de
56 aangrenzende bewoners in de linten niet worden geblokkeerd. Daarom is de beste vorm van een
57 erf, een erf met het in Groningen welbekende recht tot opstrek. Bij deze nieuwe vorm van opstrek
58 wordt het boerenerf lijnvormig naar achteren uitgebreid. Het erf wordt uit elkaar getrokken. De
59 mate van opstrek is vrij, tot maximaal een derde tot het volgende lint, ter vrijwaring van de
60 karakteristieke openheid. Landschappelijk ongewenste alternatieven, zoals meer bebouwing aan
61 het lint of plaatsing van gebouwen midden in het open landschap, zijn op deze manier niet nodig.
62 Dit opgerekte boerenerf past goed in het lijnvormige landschap. De nieuwe erven zijn als het ware
63 "scheuten" aan de oude ontginningslinten. Hier loopt het landschap van de Veenkoloniën opnieuw
64 uit.

65 Ieder nieuw erf krijgt een gebiedseigen uitstraling. Zo zijn er in de Veenkoloniën vier deelregio's te
66 onderscheiden: de Oude Ontginningen (noord), de Monden (midden), het Veen (zuid) en de
67 beekdalen van de Hunze en de Mussel-Aa (oost en west). De erven zijn uiteenlopend in opbouw
68 waardoor er genuanceerde landschappelijke verschillen ontstaan. De nuance komt tot stand door
69 anders om te gaan met groen, water en de ordening van bebouwing. In de toekomst ontleen de
70 regio's hun identiteit aan de vier typen erven: Het Landgoed in de Oude Ontginningen, De Kamer in
71 de Monden, Het Water-erf in het Veen en De Coulisse in de Hunze.

72 **Een ingenieus erf**

73 Het energie-erf is een broedplaats voor alle denkbare combinaties van activiteiten. De opbouw is
74 flexibel. Zo komt er ruimte voor schaalvergroting en kunnen milieubelastende activiteiten buiten de
75 woonbebouwing worden geïnstalleerd. Bijvoorbeeld een mestvergistings-installatie krijgt op deze
76 manier een nieuwe plek achter op het erf ver van het lint. Voor op het erf komt rond de oude
77 boerderij ruimte vrij voor een plan. Zoals vroeger de klassieke tuinen rond de boerderijen lagen,
78 kunnen nu allerlei eigentijdse tuinen worden gemaakt in combinatie met nieuwe of
79 gereconstrueerde bebouwing. Op het erf worden koppelingen gemaakt tussen de opgewekte
80 duurzame energie en de nieuwe bebouwing. Vraag en aanbod worden op elkaar afgestemd,
81 waardoor ook laagwaardige energie zoals warmte uit verbranding of vergisting wordt benut. Om de
82 aantrekkingskracht van de erven te vergroten, kunnen de erven thematisch worden ingericht. Het
83 erf "t kun minder" krijgt een invulling die mikt op welzijn. Een bundeling van een bos met
84 duurzame houtverbranding, een sociale werkplaats, een gezondheidscentrum en een project met
85 zorgwoningen is hierbij denkbaar. De "greuntetune" ontplooit zich tot een grote moestuin met
86 boomgaarden, kassen, en alternatieve teelten, en koolzaadvelden voor olie. Wellicht is hier ook een
87 restaurant of een kleine groentemarkt te vinden. Een andere insteek is "an de kuier". Dit erf zet in
88 op een recreatief gebruik. Een samenvoeging van bijvoorbeeld een pension, vakantiewoningen, een
89 camping en een manege is een mooi vooruitzicht.

90 **Het erf in groter verband**

91 Wat is de waarde van het nieuwe erf voor de Veenkoloniën? Een verzameling van alle bedrijven
92 heeft een effect op het totale gebied. De nieuwe erven zorgen voor een schaalverkleining van het
93 landschap waardoor het aantrekkelijker wordt om in te wonen en te recreëren. De linten worden
94 als het ware "dikker" en groener zonder het uitzicht op het open landschap te verliezen. Een
95 belangrijke regel is dat de opritten van de nieuwe erven openbaar toegankelijk zijn. Het zijn de
96 toegangen van een netwerk van wandel- en fietsroutes die de erven verbinden. Op deze manier
97 worden de Veenkoloniën voor de recreant en de eigen bewoners opnieuw recreatief ontgonnen.

98 Bouwen is in de huidige marktsituatie in de Veenkoloniën niet erg waarschijnlijk. Toch herbergen
 99 de erven een bouwpotentie en bieden ruimte voor specifieke doelgroepen zonder afbreuk te doen
 100 aan de landschappelijke eigenheid. Spreiding van bebouwing heeft nadelen maar is voor de
 101 Veenkoloniën wel een geschikte keuze. In essentie is het intensiveren van de linten een stimulans
 102 voor een meer vitale samenleving in de Veenkoloniën.

103 Ook voor de waterhuishouding en de natuur speelt het erf een rol. Een optelsom van alle
 104 fragmenten water op de erven vergroot de piekberging in het gebied. De natuurvriendelijke oevers
 105 kunnen op hun beurt een bijdrage leveren aan het natuurschoon. Boeren die onder de paraplu van
 106 de Energie Compagnie hun bedrijven verbeteren leveren hun bijdrage aan het maken van nieuwe
 107 ecologische-verbindingen en waterstructuren.

108 **Slot**

109 Duurzame energie is bij uitstek lokale en regionale energie die de Veenkoloniën onafhankelijker
 110 kan maken. Energie van en voor de eigen regio die tot stand kan komen door initiatieven van
 111 onderaf. Alle bewoners en ondernemers spelen daarom een belangrijke rol bij de gang naar een
 112 sterke regio en zouden hier bij succes de vruchten van moeten kunnen plukken. Omdat de meeste
 113 vormen van duurzame energie nog niet economisch rendabel zijn zonder subsidies, is het
 114 belangrijk een organisatievorm zoals de Energie Compagnie te hebben die lokale initiatieven kan
 115 stimuleren met financiële prikkels. Daarnaast is er behoefte aan experimenten met combinaties
 116 van agrarische bedrijvigheid met duurzame en sociale energie. Goed werkende voorbeelden zoals
 117 het energie-erf openen de weg naar een veelzijdig landschap. Dit nieuwe landschap is het
 118 fundament onder de beoogde comfortzone

119 Geanalyseerd karakter

120 Geanalyseerd event

121 Geanalyseerd setting

122 Hoe geanalyseerd?

123 Ontworpen karakter

124 Ontworpen event

125 Ontworpen setting

126 Hoe ontworpen?

127 Analyse

128 Ontwerp

B2: Data analysis '7Sprong' in Dutch (van den Berg, 2013)

Comfortabel leven met minder middelen, minder mensen, minder overheid, minder plannen. Deze trendbreuk is de uitdaging die de inwoners van de Veenkoloniën ons meegeven. We zoeken het antwoord in verbinden en combineren van mensen en productiemiddelen, wat leidt tot bespaarmodellen naast verdienen modellen. Urgente kwesties brengen ondernemende mensen in beweging. Voor burgers zijn dat stijgende kosten voor energie en mobiliteit. Voor boeren de dalende landbouwsubsidies met verplichte tegenprestaties in de vorm van 7% areaal voor publieke doelen. Wat begint als samenwerking uit welbegrepen eigenbelang groeit uit tot meer gezamenlijkheid, meer onafhankelijkheid, meer gebiedskwaliteit en meer persoonlijk comfort.

Dilemma in de Veenkoloniën

Luisteren en observeren in de Veenkoloniën brengt dilemma's aan het licht waar een ontwikkelstrategie antwoorden op moet bieden:

Er is behoefte aan leefcomfort en betrokkenheid, aan menselijke maat en kleinschaligheid. Tegelijk vragen marktmechanismen en efficiency in voorzieningen om de grote schaal.

Zit de kracht van de streek in de pioniersgeest, of juist in het volgen van tradities?

Naam en faam van de Veenkoloniën zijn de zetmeelaardappelen, maar in ongewisse tijden is risicospreiding verstandig. Moeten we opnieuw inzetten op vormen van specialisatie, of nemen we diversiteit van mensen en van het gebied als uitgangspunt?

De behoefte aan onafhankelijkheid, het zelf kunnen rooien en bepalen, is groot. Tegelijk realiseert men zich de voordelen van Europese subsidies, en van de internationale markt.

Dit soort dilemma's horen bij tijden van verandering. Transitie volgen het pad van variatie en selectie. We wedden daarom niet op één paard, maar gaan op zoek naar het beste van twee werelden: groot naast klein, traditie naast vernieuwing, onafhankelijkheid naast verbinding met andere regio's en de wereldmarkt. De vraag is welke trends dit dubbelspel in de kaart kunnen spelen? Een uitstapje in ruimte en tijd.

Grote lijnen in tijd en ruimte

Afb. 1 In de agrarische samenleving draait alles om overleven met de krachten van de natuur. De bodem is bepalend, de wereld is klein. Het landschap is een spiegel van de ondergrond: landbouw, water, natuur en zelfvoorzienende gemeenschappen zijn verweven volgens natuurlijke logica. Er zijn gemeenschappelijke marktegronden, geld speelt een beperkte rol, ruilhandel in natura is belangrijker.

Afb. 2 Met industrialisatie doet specialisatie haar intrede. Energie is een essentiële productiefactor. In de Veenkoloniën wordt het veen ontgonnen en afgevoerd over slimme waterstelsels. In de tijd van olie en gas neemt de afhankelijkheid van grote energiemachten toe. Landbouw bezet de ontveende, met kunstmest opgepepte gronden. Steden groeien en keren zich af van het land. De wereld wordt groter, vervoer sneller en massaler. Het technisch geoptimaliseerde watersysteem staat in dienst van landbouw en stedelijke behoeften. Natuurlijk areaal krimpt.

Afb. 3 In de tweede helft van de 20e eeuw zetten optimalisatie en specialisatie binnen deelsystemen door. De postindustriële samenleving biedt landbouw, verkeer, wonen, werken, energie, water, zelfs natuur en recreatie ieder hun eigen sectorale taartpunt. We zien die schotten terug in beleid, wetenschap, belangenbehartiging en begrotingen. Ruimtelijk leidt dit tot strakke scheiding van functies en tot hectareplanning en – strijd. De kwaliteit van de dagelijkse leefomgeving staat onder druk en gescheiden systemen leiden tot verspilling. Mensen vervreemden van hun eerste levensbehoeften: 'water komt uit de kraan, voedsel uit de supermarkt en elektriciteit uit het stopcontact'.

Afb. 4 Informatie- en communicatie technologie liggen aan de basis van de connectieve samenleving. Sociale media verbinden bedrijven en ondernemende mensen rond gezamenlijke belangen. Ook maakt ICT het mogelijk de voordelen van lokaal en globaal te combineren. Waarde creatie gebaseerd op maatschappelijk belang wordt een factor van betekenis¹.

Een meervoudige crisis stimuleert actuele onderstromen. Groter blijkt niet altijd efficiënter of goedkoper. Er ontstaat een levendige ruilhandel in diensten, goederen en ruimte. Drie reacties zijn op dit moment al feitelijk aanwijsbaar: recycling, intensieve benutting van productiemiddelen en productie door consumenten zelf. Lokale producent-consument-collectieven ontstaan, naast blijvende productie voor de wereldmarkt. Het leven dichtbij, in de comfortzone, wordt intensiever. In kleinschalige verwevingszones en ontmoetingsplekken in de centra zijn publieke, private en collectieve ambities gecombineerd. Dit levert besparing en extra leefkwaliteit. Mensen en regio's zijn minder afhankelijk en veelkleuriger.

Visie op de Veenkoloniën

Oogsteconomie Hoe pakt deze algemene trend uit in de Veenkoloniën? In krimpgebieden heerst de wet van de **stimulerende achterstand**: hier vallen op groei gebaseerde investeringsstromen het eerst weg. Voorspelbare reactie is dat men veel beter gebruik gaat maken van wat hier ruim voorhanden is: ruimte, arbeid, aandacht, gemeenschapsgevoel, verbinding met en kennis van de landbouw. Men stapt over van verbruik naar gebruik.

Uit **welbegrepen eigenbelang** gaan ondernemende burgers, boeren en middenstanders hun diensten en productiemiddelen op de virtuele markt uitruilen en gezamenlijk in- of verkopen. Niet volgens de regels van het snelle geld, maar gebaseerd op een 'oogsteconomie', waar continuïteit en kwaliteit leidende principes zijn en een laag rendement voldoende is om in kleine stappen te blijven ontwikkelen. Oogsten als voorwaarde om een gebied in stand te houden.

Zsprong Een belangrijke trigger tot slimme samenwerking is de zogenaamde 7% regeling van het **gemeenschappelijk landbouwbeleid** (GLB) die naar alle waarschijnlijkheid vanaf 2014 in gaat. Om nog langer voor subsidie in aanmerking te komen zal 7% per bedrijf voor '**publieke doelen**' moeten worden ingericht. Boeren doen dat het liefst op gronden waar je zo min mogelijk agrarische waarde verliest of waar je andere doelen dient, zoals duurzaam waterbeheer. Overheden en burgergroepen willen zich uitspreken over publieke doelen zoals natuur en recreatie, en waar dit het beste gelokaliseerd kan worden. Publiek-privaat-collectieve samenwerking leidt niet alleen tot behoud van miljoenen landbouwsubsidie voor de Veenkoloniën, maar tot winst op alle fronten: economisch, ecologisch, sociaal en landschappelijk.

Met deze heroriëntatie van het landbouwbeleid zal een instrument als ruilverkaveling, op moderne leest geschoeid uiteraard, weer uiterst actueel worden. Ditmaal primair om de 7% nutsgronden ecologisch én economisch renderend, en zo eerlijk mogelijk over deelnemende agrarische bedrijven te verdelen. Een '**Streekdeal**' (vergelijkbaar met de huidige Greendeals) stimuleert samenwerkende boeren, landschapsorganisaties, plattelandsondernemers en burgers om de krachten te bundelen. De overheid faciliteert met regelgeving en procesondersteuning, en diverse schappen (waterschap, recreatieschap, provinciaal landschap) zorgen voor de inrichting van de nutsgronden. Het beheer is in handen van boer-burgercollectieven.

De tijd dringt, 2014 is dichtbij. Maar niet alles hoeft tegelijk. De ruimtelijke transformatie waar deze '7sprong' toe leidt, kan stapsgewijs via een groeiend collectief worden gerealiseerd. Geleidelijk omzomen aaneengesloten nutsgronden waar waterbeheer, natuurbeleving, energiewinning, zorg of educatie gecombineerd worden, de grootschalige agrarische productiegronden. Aan de Streek de taak om de **voorwaarden** aan te geven bij de 'nutsgronden'. Aan ondernemers de uitdaging hierop gezamenlijk in te tekenen. De belangstelling voor de vier huidige Nederlandse 'pilot-collectieven' in het kader van het GLB geeft aan dat hier veel te winnen is.

Besparen door combineren Ligt de trigger voor boeren bij het GLB, voor burgers zijn dat **stijgende kosten** voor mobiliteit en energie, onzekerheid over pensioenen en woningwaarde. Bij bewoners gaat het niet om **verdienmodellen**, maar om **bespaarmodellen**. De consument wordt producent. Dit kan bijvoorbeeld met een zonnepaneel op het eigen dak, auto's delen, moestuinen. Een collectieve aanpak biedt voordelen zoals kwantumkortingen en efficiency. Door samenwerking groeit ook het **sociaal kapitaal**. Een buurt met lage energieprijzen, goed en goedkoop voedsel, of deelauto's is goedkoper om in te wonen. Dit verhoogt de aantrekkelijkheid van de buurt en maakt dat de **woningen hun waarde vasthouden**. Productie door burgercollectieven heeft niet als doel aan die producten te verdienen, maar om kosten te beheersen en (vastgoed)waarden veilig te stellen.

Een andere effectieve besparing ligt in **functiecombinaties** zoals woonzorgcentra, brede scholen, werk-leeromgevingen. Steeds vindt een besparing van kosten plaats door ruimte,

127 productiemiddelen en voorzieningen samen te gebruiken. De verwevenheid van stad en land in de
128 Veenkoloniën biedt streekeigen combinaties aan van hoge kwaliteit.

129
130 Streekschap Met het uitschrijven van Streekdeals worden burgers, instellingen en ondernemers
131 uitgedaagd om het aanwezige **streekkapitaal** gezamenlijk in te zetten voor leefkwaliteit.
132 Belangrijkste voorwaarde is dat collectieven werken aan continuïteit van sociaal, cultureel,
133 ecologisch en economisch kapitaal. Het programmabureau van de Agenda Veenkoloniën groeit uit
134 tot Streekschap. Ze ondersteunt initiatieven in de startfase, genereert publiciteit en maakt het
135 gezamenlijke leerproces te gelde. Belangrijk hierbij is de 'kenniswerkplaats' die van collectieven
136 **leerwerkomgevingen** maakt. Dit versterkt het ambachtelijk vermogen van de streek en
137 bevordert een gevarieerde bevolkingssamenstelling.

138
139 Model voor burgercomfort De Veenkoloniën ontwikkelt zich als voorloper in de beweging van
140 **verbruik naar gebruik** van gebiedskwaliteit.

141

142 Van... Zoveel mogelijk van hetzelfde nieuw maken
143 Naar... Benutten van wat er is, recreatie en combinatie

144

145 Van... Snelheid en grote volumes
146 Naar... Geleidelijk, kleine hoeveelheden

147

148 Van... Veel grondstoffen en kapitaal nodig
149 Naar... Weinig grondstoffen en kapitaal nodig

150

151 Van... Afwenteling milieu effecten
152 Naar... Omgeving is integraal onderdeel en bron

153

154 Van... Korte termijn rendement (winst), tijd is geld
155 Naar... Lange termijn rendement (continuïteit), tijd geeft betekenis

156

157 Van... Moeilijk aan te passen
158 Naar... Aanpasbaarheid is het principe

159

160 Van... Rekenen met zekerheden
161 Naar... Rekening houden met onzekerheden

162

163 Van... Aanwezig sociaal kapitaal negeren
164 Naar... Sociaal kapitaal opbouwen

165

166 Van... Solitaire oplossingen
167 Naar... Solidaire oplossingen

168

C1: Filled in Excel sheet ordering geo data per theme 'Wat weet een boer van saffraan?'

Wat weet een boer van saffraan?						
Economical Narrative						
Exposition/Introduction		Location	Direction	Size	Shape	Topology
Aaneenschakeling agrarische bedrijven, het agrarische bedrijf is een belangrijke speler.	Toponym	-Boerenbedrijf	-	-	-Aaneenschakeling	-Aaneenschakeling
Thema?	Extent	Veenkoloniën			Veenkoloniën	Veenkoloniën
Economische activiteit, grondgebruik	Resolution	+/-			+/-	+/-
	Accuracy	-			-	-
Inciting incidents						
6% van de boerenbedrijven komt binnen enkele jaren vrij. Bij opstellen methodiek moet kracht van het boerenbedrijf worden benut. De methodiek moet boeren aanjagen tot dynamische ondernemers.	Toponym	-Boerenbedrijf	-	-	-	-
Thema?	Extent	Veenkoloniën				
Economische activiteit toekomst, grondgebruik	Resolution	+/-				
	Accuracy	-				
Rising action						
opzetten opgestrekt energie-erf waar Energie Compagnie gronden opkoopt met als doel om agrarische bedrijf terug te krijgen met een energie component. Het boerenerf biedt de mogelijkheid om diverse economische activiteiten te combineren met een thematische inrichting. Er wordt ook een koppeling gemaakt tussen lokaal opgewekte energie en nieuwe bebouwing: vraag en aanbod worden op elkaar afgestemd.	Toponym	-Agrarische bedrijf -Energie-erf -bebouwing -Lokaal	-	-	-Opgestrekt	-
Thema?	Extent	Veenkoloniën			Veenkoloniën	
Economische activiteit met mogelijkheden voor duurzame energie, grondgebruik	Resolution	+/- and -			+/-	
	Accuracy	-			-	
Climax						
Transformatie van traditioneel boerenbedrijf naar nieuw gemengd bedrijf.	Toponym	-traditioneel boerenbedrijf - -nieuw gemengd bedrijf	-	-	-	-
Thema?	Extent	Veenkoloniën				
Economische activiteit toekomst, grondgebruik	Resolution	+/-				
	Accuracy	-				
Falling action						
None	Toponym	-	-	-	-	-
Thema?	Extent					
None	Resolution					
	Accuracy					
Resolution/denouement						
Na de eerste energie erven komen meer duurzame gemengde bedrijven.	Toponym	-energie erven -duurzame gemengde bedrijven	-	-	-	-
Thema?	Extent	Veenkoloniën				
Economische activiteit toekomst, grondgebruik	Resolution	+/-				
	Accuracy	-				

Landscape Narrative						
Exposition/Introduction						
Landschap met bebouwingslinten, open landschap waar aaneengeschaalde ontginningslinten het beeld van de Veenkoloniën bepalen. Dit beeld is uniek. Alle agrarische erven dragen de linten en de linten dragen op hun beurt de regio.	Toponym	-Agrarische erven -Regio	-	-	-Bebouwingslinten -Linten -aaneengeschaalde ontginningslinten	-Open landschap
Thema? Bebouwing, grondgebruik	Extent Resolution Accuracy	Veenkoloniën +/- and - -			Veenkoloniën +/- -	Veenkoloniën - -
Inciting incidents						
Transformatie van boerenbedrijf leidt tot transformatie van het landschap.	Toponym	-Boerenbedrijf -Landschap	-	-	-	-
Thema? economische activiteit, bebouwing, grondgebruik	Extent Resolution Accuracy	Veenkoloniën +/- and - -				
Rising action						
Opgerichte Energie Compagnie bemiddeld in het plaatsen van windmolens langs de provinciale weg N366. Dit in plaats van een windpark in de Monden, zo blijven de windmolens buiten het gezichtsveld van de dorpslinten.	Toponym	-de provinciale weg N366 -de Monden	-	-	-weg -dorpslint	-langs de weg -buiten de dorpslinten
Thema? Wegen, bebouwing, duurzame energie, grondgebruik	Extent Resolution Accuracy	Veenkoloniën + +			Veenkoloniën + - -	Veenkoloniën + and +/- -
Climax						
Het nieuwe erf mag de uitzichten van de bewoners niet blokkeren en daarom zullen erven met recht tot opstrek worden gerealiseerd ter vrijwaring van de karakteristieke openheid. dit opgerekte boeren erf past goed in het lijnvormige landschap en ze pasen goed bij de oude ontginningslinten. ieder nieuw erf heeft een gebiedseigen uitstraling naar de vier verschillende deelregio's: de Oude Ontginningen (noord), de Monden (midden), het Veen (zuid), de beekdalen van de Hunze en de Mussel Aa (oost en west). de nuance komt tot stand door anders om te gaan met groen, water en de ordening van bebouwing. In de toekomst ontlent de regio's hun identiteit aan de vier typen erven: Het Landgoed in de Oude Ontginningen, De Kamer in de Monden, Het Water-erf in het Veen en De Coullisse in de Hunze. De nieuwe erven zorgen voor een schaalverkleining van het landschap waardoor het aantrekkelijker wordt om in te wonen en te recreëren. De linten worden als het ware dikker en groener zonder het uitzicht op het openlandschap te verliezen. Een belangrijke regel is dat de opritten van de erven openbaar toegankelijk zijn. het zijn de toegangen van een netwerk van wandel- en fietsroutes die de erven verbinden. in essentie is het intensiveren van de linten een stimulans voor een	Toponym	-het erf -opgerekte boeren erf -de oude ontginningslinten -de Oude Ontginningen (noord) -de Monden (midden) -het Veen (zuid) -de beekdalen van de Hunze en de Mussel Aa (oost en west) -de regio's -Het landgoed in de Oude Ontginningen -De kamer in de Monden -Het Watererf in het Veen -De Coullisse in de Hunze -opritten van erven	-	-schaalverkleining van het landschap	-opstrek -lijnvormige landschap -de linten worden dikker -wandel en fietsroutes -linten	-openheid open landschap -netwerk van wandel en fietsroutes die de erven met elkaar verbinden
Thema? Bebouwing, regio grenzen, groen, water, netwerk wandel/fietsroutes, grondgebruik	Extent Resolution Accuracy	Veenkoloniën + and +/- and - +/-		Veenkoloniën - -	Veenkoloniën + - -	Veenkoloniën +/- and - -
Falling action						
None	Toponym	-	-	-	-	-
Thema? None	Extent Resolution Accuracy					
Resolution/denouement						
goed werkende voorbeelden als het Energie-erf openen de weg naar een veelzijdig landschap.	Toponym	-Het Energie-erf	-	-	-	-
Thema? Bebouwing, water, groen, wandel/fietspaden, wegen, grondgebruik	Extent Resolution Accuracy	Veenkoloniën +/- -				

Communication Narrative						
Exposure/introduction		Location	Direction	Size	Shape	Topology
None	Toponym	-	-	-	-	-
Thema?	Extent					
None	Resolution					
	Accuracy					
Inciting incidents		Location	Direction	Size	Shape	Topology
None	Toponym	-	-	-	-	-
Thema?	Extent					
None	Resolution					
	Accuracy					
Rising action		Location	Direction	Size	Shape	Topology
None	Toponym	-	-	-	-	-
Thema?	Extent					
None	Resolution					
	Accuracy					
Climax		Location	Direction	Size	Shape	Topology
None	Toponym	-	-	-	-	-
Thema?	Extent					
None	Resolution					
	Accuracy					
Falling action		Location	Direction	Size	Shape	Topology
None	Toponym	-	-	-	-	-
Thema?	Extent					
None	Resolution					
	Accuracy					
Resolution/denouement		Location	Direction	Size	Shape	Topology
None	Toponym	-	-	-	-	-
Thema?	Extent					
None	Resolution					
	Accuracy					

Social Narrative						
Exposure/Introduction		Location	Direction	Size	Shape	Topology
None	Toponym	-	-	-	-	-
Thema?	Extent					
None	Resolution					
	Accuracy					
Inciting incidents		Location	Direction	Size	Shape	Topology
Transformatie boerenbedrijf leidt tot transformatie van sociale landschap.	Toponym	-boerenbedrijf	-	-	-	-
Thema?	Extent	Veenkoloniën				
Economische activiteit, grondgebruik	Resolution	+/-				
	Accuracy	-				
Rising action		Location	Direction	Size	Shape	Topology
None	Toponym	-	-	-	-	-
Thema?	Extent					
None	Resolution					
	Accuracy					
Climax		Location	Direction	Size	Shape	Topology
Op energie-erf worden ook sociale activiteiten georganiseerd. Door middel van werkprojecten en voorzieningen worden mensen uitgedaagd deel te nemen aan activiteiten. Dit zijn activiteiten voor kinderen, bewoners en specifieke doelgroepen van mensen die buiten het reguliere arbeidsproces zijn komen te staan. Met evenementen, buurtfeesten en werkprojecten worden mensen met een bijstandsuitkering, wsw'ers, en gepensioneerden bij het reilen en zeilen van het energie-erf betrokken. Met manifestaties gericht op de agrarische bedrijfsvoering worden de boeren op het erf genodigd. Het erf wordt een sociaal brandpunt waar ontmoetingen plaatsvinden en waar belevenissen worden opgedaan.	Toponym	-Energie-erf -het erf	-	-	-	-
Thema?	Extent	Veenkoloniën				
Voorzieningen, bevolkingskenmerken (demografie), economische activiteit, sociale brandpunten, grondgebruik	Resolution	+/-				
	Accuracy	-				
Falling action		Location	Direction	Size	Shape	Topology
None	Toponym	-	-	-	-	-
Thema?	Extent					
None	Resolution					
	Accuracy					
Resolution/denouement		Location	Direction	Size	Shape	Topology
Experimenten met combinatie van agrarische bedrijvigheid met duurzame en sociale energie zijn nodig .	Toponym	-	-	-	-	-
Thema?	Extent					
economische activiteit met mogelijkheden voor duurzame energie, grondgebruik	Resolution					
	Accuracy					

C2: Filled in Excel sheet ordering geo data per theme '7Sprong'

7Sprong						
Economical Narrative Exposure/Introduction De geschiedenis van de Veenkolonien kan als volgt worden ingedeeld: de agrarische samenleving waar alles draait om overleven met de krachten van de natuur. De bodem is bepalend en de wereld is klein. Het landschap is een spiegel van de ondergrond: landbouw, water, natuur en zelfvoorzienende gemeenschappen zijn verweven. Met de komst van de industrialisatie doet de specialisatie haar intrede, energie is een essentiële productiefactor. In de Veenkolonien wordt het veen ontgonnen en afgevoerd over slimme waterstelsels. In de tijd van olie en gas neemt de afhankelijkheid van grote energiemachten toe, landbouw bezet de ontveende met kunstmest opgepepte gronden. De wereld wordt groter. In de tweede helft van de 20e eeuw zetten optimalisatie en specialisatie binnen deelsystemen door. In de laatste fase, de connectieve samenleving, spelen de informatie en communicatie technologie een belangrijke rol. De ICT maakt het mogelijk om globaal met lokaal te verbinden, sociale media verbinden bedrijven en ondernemende mensen rond gezamenlijke belangen.						
Thema? Economische activiteit verleden, Bodemgebruik verleden, water, groen, veenontginningen,	Toponym -landbouw? -water? -natuur? -het veen -globaal -lokaal	Location -	Direction -	Size -klein -groter	Shape -slimme waterstelsels	Topology -
Inciting incidents Dalende landbouwsubsidies met verplichte tegenprestaties in de vorm van 7% areaal voor publieke doelen. Marktmechanismen en efficiëntie in voorzieningen op grote schaal. Landbouw is sterk gespecialiseerd op de zetmeelaardappelen. Grote behoefte aan economische onafhankelijkheid, maar herkennen boeren ook de voordelen van Europese subsidies en de internationale markt.	Toponym -landbouw -internationale markt	Location -	Direction -	Size -op grote schaal -Europa -internationaal	Shape -	Topology -
Thema? Economische activiteit, landbouwsubsidies, voorzieningen, grondgebruik	Extent - Resolution - Accuracy -	Veenkolonien		Veenkolonien	Veenkolonien +/-	
Rising action Meervoudige crisis stimuleert actuele onderstromen. Groter blijkt niet altijd efficiënter of goedkoper. Er ontstaat een levendige ruilhandel in diensten, goederen en ruimte. Drie reacties zijn op dit moment al feitelijk aanwijsbaar: recycling, intensieve benutting van productiemiddelen en productie door consumenten zelf. Lokale producent-consument collectieven ontstaan, naast blijvende productie voor de wereldmarkt. Dit levert besparing en mensen en regio's zijn minder afhankelijk.	Toponym -lokaal -regio's	Location -	Direction -	Size -	Shape -	Topology -
Thema? recycling, lokale producent-consument collectieven	Extent - Resolution - Accuracy -	Veenkolonien				
Climax Hoe pakt deze trend uit in de Veenkolonien? In krimpgebieden heerst de wet van de stimulerende achterstand. Hier vallen op groei gebaseerde investeringsstromen het eerste weg. Voorspelbare reactie is dat men veel beter gebruik gaat maken van wat hier ruim voorhanden is: ruimte, arbeid, aandacht, gemeenschaps gevoel, verbinding met en kennis van de landbouw. Men stapt over van verbruik naar gebruik. Uit wel begrepen eigen belang gaan ondernemende burgers, boeren en middenstanders hun diensten en productiemiddelen op de virtuele markt uitrusten en gezamenlijk in- of verkopen. Niet volgens de regels van het snelle geld, maar gebaseerd op de 'oogsteconomie', waar continuïteit en kwaliteit leidende principes zijn en een laag rendement voldoende is om in kleine stappen te blijven ontwikkelen. Oogsten als voorwaarde om een gebied in stand te houden. Een belangrijke trigger tot slimme samenwerking is de zogenaamde 7% regeling van het gemeenschappelijke landbouwbeleid (GLB), die naar alle waarschijnlijkheid vanaf 2014 ingaat, om nog langer voor subsidie in aanmerking te komen zal 7% per bedrijf voor publieke doelen moeten worden ingericht. Boeren doen dat het liefst op gronden waar je zo min mogelijk agrarische waarde verliest of waar je andere doelen dient, zoals duurzaam waterbeheer. Publiek-privaat-collectieve samenwerking leidt niet alleen tot	Toponym -krimpgebieden -ruimte -landbouw -virtuele markt -gebied -gronden	Location -	Direction -	Size -	Shape -	Topology -ruilverkaveling
Thema? krimpgebieden, grondgebruik, economische activiteit, landbouwsubsidies, ruilverkaveling, functiecombinaties	Extent - Resolution - Accuracy -	Veenkolonien				Veenkolonien
Falling action None Thema? None	Toponym - Extent - Resolution - Accuracy -	Location -	Direction -	Size -	Shape -	Topology -
Resolution/denouement In de nieuwe situatie wordt er benut wat er is door re-creatie en combinatie. Waar lange termijn geleidelijk rendement belangrijker wordt en de continuïteit wordt gewaarborgd. Hierdoor zijn ook minder grondstoffen en kapitaal nodig en is aanpasbaarheid het principe.	Toponym -	Location -	Direction -	Size -	Shape -	Topology -
Thema? functiecombinatie	Extent - Resolution - Accuracy -					

Landscape Narrative						
Exposure/introduction		Location	Direction	Size	Shape	Topology
In de agrarische samenleving is het landschap de spiegel van de ondergrond: landbouw, water, natuur en zelfvoorzienende gemeenschappen zijn verweven volgens natuurlijke logica. Met de industrialisatie is het landschap erg veranderd door de ontginning van Veen. Steden groeien en keren zich af van het land. Het natuurlijk areaal krimt. In de postindustriële samenleving vindt strakke scheiding van functie plaats. dit leidt ruimtelijk gezien tot hectareplanning. de kwaliteit van de dagelijkse leefomgeving staat onder druk en gescheiden systemen leiden tot verspilling. De connectieve samenleving leidt tot het verbinden van van ondernemende mensen rond gezamenlijke belangen. Waard creatie gebaseerd op maatschappelijk belang wordt een factor van betekenis.	Toponym	-landbouw? -water? -natuur? -steden -land	-	-	-	-landbouw, water, natuur en zelfvoorzienende gemeenschappen zijn verweven -steden groeien en keren zich af van land -natuurlijk areaal krimt -functies zijn straf gescheiden: hectareplanning -ruilverkaveling
Thema?	Extent	Veenkoloniën				Veenkoloniën
Economische activiteit, grondgebruik, water, groen, veenontginningen, grenzen steden, functiescheiding	Resolution	-				+/- and -
	Accuracy	-				-
Inciting incidents						
De vraag is of de diversiteit van het gebied als uitgangspunt moet worden gebruikt voor nieuwe vormen van landbouw.	Toponym	-gebied -landbouw	-	-	-	-
Thema?	Extent	Veenkoloniën				
Economische activiteit, grondgebruik	Resolution	-				
	Accuracy	-				
Rising action						
None	Toponym	-	-	-	-	-
Thema?	Extent					
None	Resolution					
	Accuracy					
Climax						
Door heroriëntatie van het landbouwbeleid zal ruilverkaveling weer uiterst actueel worden. Deze ruimtelijke transformatie kan stapsgewijs via een groeiend collectief worden gerealiseerd. Geleidelijk omzomen aaneengelosten nutsgronden waar waterbeheer, natuurbeleving, energiewinning, zorg of educatie gecombineerd worden, de grootschalige agrarische productiegronden. De verwevenheid van stad en land in de Veenkoloniën door functiecombinaties biedt streekeigen combinaties aan van hoge kwaliteit.	Toponym	-nutsgronden -agrarische productiegronden	-	-grootschalige	-aaneengesloten	-ruilverkaveling -verwevenheid stad en land
Thema?	Extent	Veenkoloniën		Veenkoloniën	Veenkoloniën +/-	Veenkoloniën
Ruilverkaveling, functiecombinatie, verwevenheid stad en platteland, waterbeheer, natuurbeleving, energiewinning, zorg/educatie, nutsgronden	Resolution	- and +/-		-		- and +/-
	Accuracy	-		-	-	-
Falling action						
None	Toponym	-	-	-	-	-
Thema?	Extent					
None	Resolution					
	Accuracy					
Resolution/denouement						
None	Toponym	-	-	-	-	-
Thema?	Extent					
None	Resolution					
	Accuracy					

Energy Narrative						
Exposure/introduction		Location	Direction	Size	Shape	Topology
Met de industrialisatie worden de Veenkolonien ontgonnen. In de tijd van olie en gas neemt de afhankelijkheid van grote energiemachten toe.	Toponym	-de Veenkoloniën	-	-grote	-	-
Thema?	Extent	Veenkoloniën		Veenkoloniën		
Veenontginningen	Resolution	-		-		
	Accuracy	-		-		
Inciting incidents		Location	Direction	Size	Shape	Topology
stijgende energiekosten	Toponym	-	-	-	-	-
Thema?	Extent					
energiekosten	Resolution					
	Accuracy					
Rising action		Location	Direction	Size	Shape	Topology
Een reactie die al feitelijk aanwijsbaar is, is recycling.	Toponym	-	-	-	-	-
Thema?	Extent					
recycling	Resolution					
	Accuracy					
Climax		Location	Direction	Size	Shape	Topology
De consument wordt producent. Dit kan bijvoorbeeld met een zonnepaneel op het eigen dak, auto's delen, moestuinen. Een collectieve aanpak biedt voordelen zoals kwantumkortingen en efficiency. Een buurt met lage energieprijzen, goed en goedkoop voedsel, of deelauto's is goedkoper om in te wonen. Dit verhoogt de aantrekkelijkheid van de buurt.	Toponym	-eigen dak -moestuinen -de buurt	-	-	-	-
Thema?	Extent	Veenkoloniën				
zonnepanelen, collectieve ontwikkelingen, energiekosten, aantrekkelijkheid buurt	Resolution	+/-				
	Accuracy	-				
Falling action		Location	Direction	Size	Shape	Topology
None	Toponym	-	-	-	-	-
Thema?	Extent					
None	Resolution					
	Accuracy					
Resolution/denouement		Location	Direction	Size	Shape	Topology
None	Toponym	-	-	-	-	-
Thema?	Extent					
None	Resolution					
	Accuracy					

Communication Narrative						
Exposure/introduction		Location	Direction	Size	Shape	Topology
In de connectieve samenleving liggen informatie- en communicatie technologie aan de basis. Sociale media verbinden bedrijven en ondernemende mensen rond gezamenlijke belangen. Ook maakt ICT het mogelijk de voordelen van lokaal en globaal te combineren. Waarde creatie gebaseerd op maatschappelijk belang wordt een factor van betekenis.	Toponym	-lokaal -globaal	-	-	-	-
Thema? Netwerken mensen	Extent Resolution Accuracy	Veenkoloniën - -				
Inciting incidents		Location	Direction	Size	Shape	Topology
None	Toponym	-	-	-	-	-
Thema? None	Extent Resolution Accuracy					
Rising action		Location	Direction	Size	Shape	Topology
None	Toponym	-	-	-	-	-
Thema? None	Extent Resolution Accuracy					
Climax		Location	Direction	Size	Shape	Topology
Computer technologie ondersteunt de verbindingen tussen mensen. Ook wordt een Streekschap opgericht welke initiatieven in de start fase ondersteunt, publiciteit genereert en maakt het gezamenlijk leerproces te gelde.	Toponym	-	-	-	-	-
Thema? Netwerken mensen	Extent Resolution Accuracy					
Falling action		Location	Direction	Size	Shape	Topology
None	Toponym	-	-	-	-	-
Thema? None	Extent Resolution Accuracy					
Resolution/denouement		Location	Direction	Size	Shape	Topology
None	Toponym	-	-	-	-	-
Thema? None	Extent Resolution Accuracy					

Social narrative						
Exposure/introduction In de agrarische samenleving zijn landbouw, water, natuur en zelfvoorzienende gemeenschappen met elkaar verweven. In de postindustriële samenleving worden functie gescheiden en raken mensen vervreemd van het gebied. In de connectieve samenleving, waarde creatie gebaseerd op maatschappelijk belang wordt een factor van betekenis.		Location	Direction	Size	Shape	Topology
	Toponym	-landbouw -water -natuur -het gebied	-	-	-	-
	Extent	Veenkoloniën				
	Resolution Accuracy	- -				
Inciting incidents Er is behoefte aan leefcomfort en betrokkenheid, aan menselijke maat en kleinschaligheid. Thema? Leefcomfort		Location	Direction	Size	Shape	Topology
	Toponym	-	-	-menselijke maat -kleinschaligheid	-	-
	Extent			Veenkoloniën		
	Resolution Accuracy			- -		
Rising action Een meervoudige crisis stimuleert actuele onderstromen. Het leven dichtbij, in de comfortzone, wordt intensiever. In kleinschalige verwevingszones en ontmoetingsplekken in de centra zijn publiek, private en collectieve ambities gecombineerd.		Location	Direction	Size	Shape	Topology
	Toponym	-het leven dichtbij? -de comfortzone -verwevingszones -ontmoetingsplekken -centra	-	-kleinschalige	-	-verwevingszones -ontmoetingsplekken in de centra
	Extent	Veenkoloniën		Veenkoloniën		Veenkoloniën
	Resolution Accuracy	+/- and - +/- and -		- -		+/- +/-
Climax De ruimtelijke transformatie kan worden gerealiseerd door een groeiend collectief. Door samenwerking groeit het sociale kapitaal. Het op te richten Streekschap zal kenniswerkplaatsen instellen die van collectieven leerwerkomgevingen maakt. Dit versterkt het ambachtelijk leervermogen van de streek en bevordert een gevarieerde bevolkingssamenstelling.		Location	Direction	Size	Shape	Topology
	Toponym	-kenniswerkplaatsen -de streek	-	-	-	-
	Extent	Veenkoloniën				
	Resolution Accuracy	+/- +/- and -				
Falling action None Thema? None		Location	Direction	Size	Shape	Topology
	Toponym	-	-	-	-	-
	Extent					
	Resolution Accuracy					
Resolution/denouement De opbouw van sociaal kapitaal zal de economische, ecologische en landschappelijke aspecten in de regio stimuleren. Thema? sociaal kapitaal, economische activiteit toekomst, ecologie		Location	Direction	Size	Shape	Topology
	Toponym	-regio	-	-	-	-
	Extent	Veenkoloniën				
	Resolution Accuracy	- -				