Social Representations of Climate Change

– Farmers in Sweden

Aschalew Mekonnen Bekele

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Abstract

The scientific community concludes that the climate is changing. However, publics around the world have formed diverse opinion about climate change which is strongly influenced by local cultural dynamics, value orientation, and political orientation. Among these parts of the society, communication with farmers about climate change has proven to be difficult, with relatively low acceptance of anthropogenic climate change or the idea that climate change will negatively affect agriculture.

The purpose of this study was to analyze how farmers in Sweden make sense of climate change in relation to agricultural production - a sector characterized as climate sensitive. The social representations perspective reflects the social dimensions of thinking and the perceptual organization and structure of social reality.

In this study, the researcher analyses how farmers talk about climate change as one of the factor affecting agricultural production. Semi-structured phone interviews were conducted to examine challenges encountered, overcoming challenges, and the implementation of climate change policy towards the agricultural production. Responses from farmers indicated:

- The farmers are aware of the negative effects of GHGs to the changing climate.
- Measures taken to protect the environment, challenged the agricultural production.
- Climate change has both challenges and opportunities to Northern part of the world.
- Farmers' representation in decision making helps to meet environmental goals, and as a result combat climate change.
- Farmers make sense of society and policy as something they do not trust.

This study recommends state authorities to satisfy the needs of farmers and engage them in policy formulation and implementation for a better results. The researcher could not identify the interplay between scientific and everyday knowledge which is highly significant in the study of social representations of climate change but does describe other knowledge forms significant to study farmers.

Acknowledgement

Table of Contents

Acronyms

CC	Climate Change
CCC	Climate Change Communication
EU CAP	European Union Common Agricultural Policy
GHG	Green House Gases
IPCC	International Panel for Climate Change
OECD	Organization for Economic Co-operation and Development
SRT	Social Representation Theory
LRF	Lantbrukarnas Riksförbund – The Federation of Swedish Farmers
SBA	Swedish Board of Agriculture
WFD	Water framework Directive
CGIAR	Consultative Group for Internatinal Agricultural Research
WRI	World Resource Institute
UNFCC	The United Nations Framework Convention on Climate Change
EU	European Union
FAO	Food and Agricultural Organization

1. Introduction

Studies in the early 1990s found that climate change would have limited agricultural impacts globally, but with varying effects across regions (Nelson et al., 2014, p. 1). The climate change scenarios appearing during the last decades are the underlying reason for climate impact studies on agriculture, and provide different sets of driving forces for these studies (Eckersten et al., 2008). In these studies, "there is a robust and diverse body of scientific evidence which suggests that the global climate change over the past years is largely attributable to human activities, predominantly through the burning of fossil fuel, land-use change, and agricultural practices, all of which increase atmospheric concentration of greenhouse gases" (Acosta, 1999, p. 10). According to studies, "the extent of climate change in the future will depend upon the achievement of lower stabilization levels of GHGs through global mitigation effort over the next 20-30 years. However, effective mitigation will require investment in and adoption of low carbon energy generation, changes to lifestyle and behavioral patterns, and changes to industrial and agricultural practices" (ibid. p. 25). Because of this, "the impact of climate change cannot be considered in isolation from other human influences on local environments, such as land-use change, land degradation, population growth, and rising urbanization" (Acosta, 1999; Nelson, et al., 2014). Publics around the world have formed diverse opinions about natural hazards such as climate change that are strongly influenced by local cultural dynamics, value orientation, and political orientation. Understanding how climate change interacts with other environmental, economic and social pressure is fundamental to improving our ability to assess what the future nature and scale of climate change impacts may be, and how we should respond (Moloney, 2005, p. 23).

When something unfamiliar emerges or when something familiar does something unexpected people need to make sense of what is emerging or going on (Moloney, et al., 2005). In recent years, "people across the globe have been faced with making sense of climate change" (Wolf and Moser 2011, Moloney, et al., 2014). Even though, "different segments of society are likely to interact in diverse ways and at varying degrees of intensity with concepts such as climate change. Scientists working on climate change engage with the concept more frequently than do distinct branches of government and many in the public" (Moloney, 2005; Wolf and Moser, 2011). For over a decade, "studies endorsing the public engagement in science perspective emphasize that increased scientific literacy is not a sufficient goal of climate change communication, instead public needs to actively take part in learning and action on climate change; engagement involves, minds, hearts, and hands'' (Dryzek, 2012; Ballantyne et al., 2016; Wolf and Moser, 2011, p. 550). Hence, the conversation has shifted from informing and educating the ignorant masses to engaging people with the issue of climate change (Ballantyne, et al., 2016).

2. Social Representations of Climate Change

Climate change is a highly scientifically mediated issue. Social sciences approach to climate change are concerned with understanding how this environmental problem is represented in society, on the one hand, and how people think and feel about it, on the other (Reusswig and Meyer-Ohlendorf, 2012; Jaspal, *et al.,* 2014). This study employs the Social Representations Theory (SRT) to address both these issues within an integrated framework that draws upon the Social Representations Theory (SRT). SRT provides a framework for understanding and exploring how scientific knowledge, such as that associated with the climate change debate, diffuses in society and can become associated with intergroup power struggles (Jaspal, *et al*., 2014). A social representation is defined as a system of values, ideas, and practices regarding a given social object, as well as the elaboration of that object by a group to communicate and behave. Accordingly, it provides a given group with a shared social "reality" and "common consciousness" vis-à-vis a particular social object (ibid. p. 111). Therefore, the social representation (SR) approach offers specific advantages for studying a group's relationship to the environment (Caillaud, 2011). This approach is particularly pertinent for the canvas of our study because social representations are socially constructed, shared on a local and global level, and can take into account this double aspect of local and global environmental problems. In other words, with an SR approach, we can study the global phenomena and local consequences of climate change which themselves inspire change in individual practices (ibid., p. 365).

I will study the social representation of climate change in the context of farmers in Sweden for two basic reasons:

First, agriculture is the most vulnerable to climate change and a significant source of greenhouse gases (GHGs) that are driving those changes emerge from this sector (IPCC, 2007; Tubiello, et al., 2007). Among the direct impacts of climate change on agriculture: change in mean climate, climate variability and 'extreme weather events'(e.g. extreme temperature, drought, heavy rainfall and flooding, and tropical storms), increased soil erosion, and decreased crop productivity (Jemma, et al., 2010; Prokopy, et al., 2015, pp. 15-20), which presents immediate and localized economic risks to farmers. As a result, climate change poses a credible and mounting threat to the production of food, feed, fuel, and fiber worldwide (Prokopy, et al., 2015).

Second, farmers potentially differ from the general public, in how they make sense of climate change because their skills and experiences, manifested a high level of adaptability to climate variation (IPCC, 2007). Moser (2010) argues that, "as the daily lives of farmers are mainly dependent on weather and climate as compared to the general public, which spends relatively little time in nature, farmers are more likely to observe and notice subtle environment changes" (p.10). Nevertheless, "farmer's beliefs about climate change and the need for adaptation and mitigation vary with trust and perceived risk of climate change" (Rohling, 2016). The ultimate temperature rise will depend on mitigation measures put in place to limit emissions over the coming years

(Campbell, 2009, p. 4). Concerning this notion, the formation of attitudes towards relatively new, emerging attitude objects such as climate change may be more strongly influenced by values and worldviews than objective data (Weber, et al., 2011). To this point, the study of climate change communication depicted communication with farmers about climate change has proven to be difficult, with relatively low acceptance of anthropogenic climate change or the idea that climate change will negatively affect agriculture (Morrison et al., 2017, p. 2).

Although slightly fragmented in empirical focus, for over a decade, research in social representation of climate change has usually examined the general public understandings, and perception of climate change, there are now calls for more case-specific and audience-specific research. This study will analyze audience-specific social representations of climate change within the agriculture sector - a sector characterized as climate-sensitive (Asplund, 2014). Besides, the study contributes empirically to the study of environmental communication by exploring social representation as a means to climate change mitigation. This thesis offers such an audience-specific perspective by qualitatively exploring how Swedish farmers' make sense of climate change.

The paper addresses a specific research question relating to how do farmers in Sweden understand climate change and make sense of the causes, impacts, and responses. The paper further explores farmers' connection and engagement in climate change action (or inaction) in response. In general, the researcher seeks to develop and establish the meaning of phenomenon from the views of participants by identifying culture-sharing individuals, and how it develops within the social group.

2.1 Problem Statement

This paper identified gaps in climate change studies conducted in Sweden. First, to the researcher's knowledge, little effort has been exerted to consider farmers in studies regarding social representations of climate change in Sweden. The only exception is social representations of climate change study one by Wibeck (2014), which focus on Swedish lay-people interacting in focus group interview, which has also neglected farmers view as focus group participants (as the daily lives of farmers are mainly dependent on weather and climate as compared to the general public). Besides, the major proportion of studies on climate change done in different parts of the world including Sweden mainly focused on climate change communication Lorenzoni and Pidgeon (2006); Carlton and Jacobson (2013); Chou (2013) ; Buys *et al*., (2014); Read *et al.,* (1994); Asplund *et al.* (2012); Moghariya (2014); Asplund (2016); Asplund (2018); Wibeck (2014) all focuses on either public understanding of climate change, tries to find out public perceptions of climate change and associated risks in certain geographical contexts or measure laypeople's level of knowledge, awareness or attitudes towards climate change. Nevertheless, investigation of farmers' social representation of climate change wouldn't be free from criticism of biasedness as long as no attempt is made in considering the agriculture sector - a sector characterized as climate-sensitive. Agriculture is one of the sectors most affected by the

phenomenon of climate change. The largest share of global greenhouse gas emissions comes from the agricultural sector (UNFCC, 2016). According to the World Resource Institute (2014) farms emitted 6 billion tons of GHGs in 2011, or about 13 percent of total global emissions. That makes the agricultural sector the world's second-largest emitter, after the energy sector (which includes emission from power generation and transport). Farmers play a great role in the Swedish environmental and agricultural policy development and implementation. Therefore, ways to improve the agricultural and environmental policy to satisfy the interests and needs of diverse groups is highly relevant to understand the reality and perspectives of farmers'. This cooperation process is of great importance from a democratic and transparency point of view. Such a process gives guarantees for acceptance of the proposed new regulations from a different interest in society, and thereby that new guidelines or regulations will be respected in practice. Therefore, it is fundamental to ask all affected parties and consider their arguments, before adopting important political issues or new legislation.

2.2 Aim and Research Question

The overall aim of this paper is to analyze how farmers in Sweden make sense of climate change and related politics based on their particular values, knowledge, and practices. The empirical basis of the thesis comprises a one-on-one interview with farmers in Sweden. A dynamic theoretical view on the issue of social representations and social constructivism is applied to answer the following question:

- How do farmers make sense of climate change based on their beliefs, experiences, and understanding?
- How do farmers understand and make sense of climate change and agricultural policy?

This study tries to answer the above question by exploring the understandings, and experiences of farmers in Sweden.

3. Social Representation Theory

The section presents the fundamental theoretical aspects from where the study is developed. The study mainly uses social representation theory to understand how Swedish farmers make sense of climate change. The study further touches upon the concept of social constructivism.

3.1 The Notion of Social Representations

According to Moscovici (1984), social representations are defined as a "system of values, ideas, and practices that establish a consensual order among phenomena" and "enable communication to take place among the members of a community by providing them with a code for social exchange" (Jaspal, 2014; Duveen *et al*., 1993, p. 91). In a dynamic view, "the social representations are conceived as a network of concepts and interactive images, whose contents evolve continuously through time and space" (Morera, *et al*., 2015). Such a framework is provided by social representations theory (SRT), a social psychology theory designed to capture the shared, common-sense and everyday representations through which people orient themselves to the world (Moscovici, 1988).

Although social representation is considered advantageous for the study of how individuals make sense of scientific studies, such as climate change, the theory is widely debated. As described by Moscovici (1984), social representations theory deals with how individuals jointly form shared or partly shared representations of the surrounding world. These representations may become transformed into common sense, i.e., a kind of everyday knowledge, by which individuals are held together and organize their social life (Wibeck, 2012). The social representational process is driven by people's motivation to 'know' the world around them by 'making the unfamiliar familiar' (Moscovici, 1961). This development of understanding achieved through two processes. First, "the new phenomena is anchored in phenomena with which the community is already familiar, and the meanings attached to the familiar phenomena influence how the new phenomenon is represented" (Moscovici, 1988; Wibeck, 2012). The second process is objectification, "the unknown or an abstract idea is transformed into something almost concrete and thereby transfers something in the mind's eye to something existing in the physical world" (Bauer and Gaskell, 1999; Walmsley, 2004), that we can experience with our sense.

The social representations perspective is chosen as the theoretical framework for this study because, "it enables the researcher to capture symbolic forms of thoughts in an organized and integrated way" (Walmsley, 2004). Besides, "social representations reflect the practical, everyday knowledge of the ordinary person rather than expert or scientific knowledge" (Walmsley, 2004). In this sense, "objectification is a more active process than anchoring when we need to familiarize the unfamiliar" (Moscovici, 1984), and it will be a focus of the analysis presented in this paper.

As a concept at the level of the group and its associated ideological frames, "the social representation approach has something to say about individuals as members of those groups, i.e. as socialized subjects" (Wolf and Moser, 2011, p. 2; Wagner, 1996). Accordingly, "things and ideas may be represented when they are absent, temporarily or geographically. Absent things or ideas may be hidden from (in)sight [object constancy], or they may have existed in the past [memory], or they may be possible futures [expectations or anticipation]" (ibid. p. 2). These basic functions of representation, i.e. "objectification, imagination, memory, and anticipation, are not mere epiphenomena of human activity" (Wagner, 1998). Also, "they constitute the internal environment in conjunction with the external environment of 'brute facts', empower and constrain individual and collective activity" (Bauer and Gaskell, 1999, p. 168). Thus, "a social representation is a collective phenomenon about a community that is co-constructed by individuals in their daily talk and action" (Wagner, 1996, p. 96). Central to the perspective of social representations, "psychological states are socially produced and that our representations determine our reactions" (Billig, 1993, p. 43). Social representations, "reflect a commonsense understanding of the social world, and it is formulated through action and communication in society and are a specific way of understanding and communicating what we know already" (Moscovici, 1984, p. 17). Therefore, "representations are not 'individually produced replicas of perceptual data' but are viewed as social creations and are, therefore, seen as part of social reality" (Billig, 1993, p. 43).

Broadly speaking, social representation is "a system of values, ideas and practices with a two-fold function: *first* to establish an order which will enable individuals to orient themselves in their material and social world and to master it; and *secondly* to enable communication by providing a code for social exchange and a code for naming and classifying unambiguously the various aspects of their worlds and their individual and group history" (Wagner et al., 1999, p. 96). As a consequence of giving priority to content, social representation researchers investigate "specific meaning systems in groups and societies, i.e. how people perceive, think about, imagine and explain socially relevant phenomena, objects, and events. This kind of perceiving, thinking, imagining, and explaining of phenomena is conceived as being constitutive and characteristic for small and large social groups" (Wagner, 1996, p. 248).

In everyday life, "scientific knowledge such as (e.g. climate change) often poses a challenge to understanding, how can the abstract and conceptual be rendered meaningful among outsiders? (Bauer and Gaskell, 1999). Although, "how expert knowledge is circulated is influenced by the views of experts (insiders) on the virtues and vices of sharing such knowledge with the public (outsiders). Among those not directly involved in science, this is achieved through associations, metaphors, images, and objectification" (Bauer and Gaskell, 1999, p. 166). Therefore, "social representation theory links society and individuals, media and public. Hence, social representations are processes of collective meaning-making resulting in common cognitions that produce social bonds uniting societies, organizations, and groups (Hoijer 2011, p. 3).

Consequently, "the perspective of the social representation recognizes human beings as 'thinking persons', capable of asking questions, seeking answers, and, in general, thinking about life" (Moscovici, 1984). It also acknowledges a historical dimension to ideas in social life. In other words, social representations are part of a society's collective memory and are the "substratum of images and meanings without which no collectivity can operate" (Moscovici, 1984, p. 19). Although they are linked to previous systems, images, and schema, they should not be viewed as permanent or static. They are "social entities with a life of their own communicating between themselves, opposing each other and changing in harmony with the course of life, vanishing only to re-emerge in new guises" (Moscovici, 1984, p. 10). A representation is the "product of processes of mental activity through which an individual or group reconstitutes the reality with which it is confronted and to which it attributes a specific meaning" (Walmsley, 2014). However, it is more than just a reflection of that reality. It also provides a "meaningful organization of reality and functions as a system of interpretation that governs relationships between individuals and their physical and social environment. As representations determine both behavior and practice, they thereby act as guides for action" (ibid., p. 3).

In general, the approach of social representation theory allows us to capture macro-social phenomena in their historical totality and dynamics. Also, it enables us to capture more aspects of the object of the study than a purely developmental, cognitive or media analysis approach (Wagner, et al., 1999).

3.2 Social Constructivism and Social Representations Theory

According to some scholarly writing or research, there are evident relationships between the social construction of knowledge and social representations perspective. Social constructivism and social representations theorists both argue that subjects construct their knowledge of the social world through interaction and experience and that such knowledge is based on a practical, commonsense understanding of the world (Jodelet,1991 in Walmsley, 2004). Consequently, describing the association between the two schools of thought, Walmsley (2004) typifies their relationship. First, both are concerned with the role of symbolic processes and language in the definition of social reality (p. 4). Second, both emphasize discovery based on a direct empirical investigation of social phenomena rather than verification and theory testing. Third, both are concerned with social situations or "lesser units than total societies or social institutions" (Deutscher, 1984, p. 97).

As described by Emler & Ohana (1993), the emphasis in the perspective of the social representation on the communicated character of thought and the role of social groups in the development and continuation of social knowledge coincides with social constructivism (p. 91). Besides, Bertrand (1993) noted, the social constructivist orientation encourages the view of the subject as a social actor participating in a socio-historical project who inevitably influences the construction of his/her representations (Walmsley, 2004, p. 5).

3.3 The Four Functions of Social Representation

The social representation reflects the complex, true and imaginary, objective and symbolic relations the subject maintains with the object. These relations turn the representation into an organized and structured symbolic system, whose primary function is to apprehend and control the reality, permitting its understanding and interpretation (Morera, *et al.,* 2015;Wachelke, 2012). Moscovici (1984) argued that the purpose of social representations is "to make the unfamiliar familiar" (p. 24), and Doise (1986) argued it is "to regulate relations between social actors" (Walmsley, 2004).

Equally important are some functions attributed to the social representations within these general purposes, these are: (a) the knowledge function, (b) the identity function, (c) the orientation/guidance function, and (d) the justificatory function (Walmsley, 2004, p. 4; Morera, *et al.,* 2015; Wachelke, 2012). The *knowledge function* "enables reality to be understood and explained. In other words, the function of knowledge to allow the understanding and explanation of reality. The practical common-sense knowledge allows the protagonists to gain new knowledge and integrate it in a framework that can be assimilated and understood but should be in line with the cognitive functioning and with the values acquired to constitute a collective and common knowledge" (Wachelke, 2012; Morera, *et al.,* 2015). Social representations permit "social actors to acquire, integrate, and coherently assimilate knowledge with their cognitive system and values. This permits the communication, exchange, and diffusion of "commonsense" knowledge about the world" (Morera, *et al.,* 2015).

Subsequently, "the *identity function* situates individuals and groups in a social field and enables the development of a social identity compatible with the norms and values of the society. Besides, it defines identity and permits protecting the groups' specificity. The *orientation function* guides behavior and practice and is responsible for elaborating the conduct, behavior, and practices. The *justificatory function* permits after-the-fact justification of the general posture and general behavior. This role is essential because it intervenes after the action and allows the actors to explain and justify their conduct in a certain situation. Representations also provide justifications for social differences between groups, particularly when stereotypes and hostility are evident" (Walmsley, 2004; Morera, *et al.,* 2015).

4. Method

This section presents the way the study is conducted, with a focus on research design, data collection and sampling, and analysis of data.

4.1 Research design

The study was conducted with a qualitative approach since it is the most suitable method to grasp informants particular values, ideas, knowledge, metaphors, and practices (O'leary, 2017; Kvale, 1996; Ritchie, 2013). In order to understand the construction of social representations, it is likely to involve a more open approach to encourage participants to take the lead and shape their own narrative (Ritchie, et al., 2013, p. 148). In this study, I will apply the social representations theory (SRT) to analyze how farmers make sense of climate change and represent reality. This theory enables analysis of "how scientific knowledge is remolded and transformed into social representations, i.e. mundane understanding which are commensensical in character" (Wibeck, 2012). Sense making can therefore be studied with the help of responses given from interviewees in which "expressions and meaning patterns", will be revealed in conversations with the interviewer and available for analysis. Sugiman (1997) noted "instead of imagining representations within minds it is better to imagine them across minds, resembling a canopy being woven by people's concerted talk and actions" (Wagner et al., 1999). Subsequently, "the elaborated object becomes social reality by virtue of the object's representation which the community holds. Hence, ''subject and object are not regarded as functionally separate" (ibid., p. 96).

In many cases, "answers given in an interview are spontaneously formed into narratives" (Czarniawska, 2004). Thus, a semi-structured interview is chosen as a data collection tool because; unlike the structured, semi-structured interviews have no rigid adherence" (Adhabi et al., 2017, p. 89). Consequently, this method is suitable for data collection because social representation theory emphasize, "discovery based on direct empirical investigation of social phenomenon rather than verification and theory testing" (Walmsley, 2014). Thus, "an interview is well-suited to studying social representations as they are expressed and co-constructed by individuals in their daily talk and action" (Wagner, 1996, p. 96). Correspondingly, "interviewing is valuable method for exploring the construction and negotiation of meanings in a natural setting" (Cohen, et al., 2007, p. 29), "through which a phenomenon could be interpreted in terms of the meanings interviewees bring to it" (Schostak, 2006).

The interview questions are also designed to be broad and general to allow participants construct meaning on the object of the study i.e., farmers social representations of climate change. Similarly, this method of data collection allows the interviewer to prepare the interview questions in a more flexible manner to be able to develop a pattern of meaning. As described by Miller and Glassner (1997), "interviewees sometimes respond to interviewers through the use of familiar narrative constructs, rather than by providing meaningful insights into their subjective view" (Czarniawska, 2004, p. 51). Consequently, the goal of the research is to rely as much as possible on the participant's

understandings of the situation being studied, and the research process follows the constructivist worldview approach. According to Creswell (2004), "the qualitative approach and the constructivist worldview fit well together since they both require and enable to generate or inductively develop a theory or pattern of meaning" (p. 18).

4.2 Data collection and sampling

In this study, while collecting data, "one-on-one interview type has been preferred, as it allows an interviewer and a single interviewee to express his or her thought. One-on-one interviews are generally face to face, but can also be done over the telephone in order to increase geographical range or capture a difficult-to-catch respondents" (O'Leary, 2010, p. 195). Accordingly, seven telephone interviews were conducted in Swedish language; three of the farmers are located in Uppsala County and the remaining four are located in the outskirts of Stockholm (all interview participants were also members of LRF). The lack of non-verbal cues in telephone interviews, however, can be a challenge to the researcher, understanding emotions of respondents. The interviews lasted between 45 minutes to 1 hour and were held in between 22nd April to 3rd of August, 2018.

Different challenges and constraints were explored during the interview process but an interview guide enabled to focus on the study topic and themes developed to analyse the data. While choosing participants, geographical location is not a focus, because the study seeks to find out the views of participants and subjective meanings given to the object of the study. In the process of collecting data, the researcher considers the "rule of thumbs" (Morgan, 1993), or "assumptions" (Fern, 1982) to capture the common choices that researchers' have made with regard to decisions about how the data should be collected (Morgan, 1997, p. 4; Fern, 1982). According to this 'rule of thumbs' mainly I will focus on the homogeneity of the groups, i.e. the participants are recruited from a limited number of sources, often only one as in this study (farmers in Sweden).

4.3 Analyzing the data

Data analysis for this study began during the interviews, as the interviewer posed questions to seek clarification or expansion of an idea or to test the accuracy of a tentative conceptualization. Following the phone interviews data analysis continued using the information generated through transcription of audio records, including impressions, reflections, ideas, and questions.

There is no doubt that "good qualitative analysis demand a degree of openness, a high level of curiosity, and a willingness to accept fluidity. Moving from raw data, such as transcripts, pictures, notes, journals, etc. to meaningful understanding is a process reliant on the generation/exploration of relevant themes, and these themes can either be discovered; through inductive reasoning or uncovered; through deductive reasoning" (O'Leary, 2010, p. 260). After initial coding, data analysis explored similarities and differences in the data within each code and between codes within the dimensions of social

representation theory. The data were continually reduced to illuminate the significant variations, patterns, and themes. The aim of this process was to identify and eventually explicate the significant social representations of climate change.

In this study, although the use of social representation theory was a pre-defined framework for analysis of the study, identifications of specific social representations of climate change followed an inductive approach within the analytical frames of social representation theory. Accordingly, "the goal is to move from raw data to rich theoretical understanding, this process is far from linear because qualitative data demands cycle of iterative analysis" (O'Leary, 2010, p. 262).

Based on the data generated through interviews, and social representation theory based on Moscovici (1988) built the bases from where the primary research question was drawn. Complete transcripts of 7 interviews to text enabled the researcher to have both an in-depth understanding about the data and a general understanding to analyse the whole data set simultaneously. The process of coding was an ongoing opportunity to reflect, explore, and search for meaning in the data. I made notes by questioning, and describing emerging relationships within the data. At the conclusion of this phase, I printed out reports for each code and analyzed the data for similarities, differences, variations, and negative instances. At this stage, data analysis was centered on the constant comparison of the data found within each code noting that social representation theory is a pre-defined framework for analysis of the study (Strauss and Corbin, 1990; Bohm, 2004; O'Leary, 2010).

Eventually, I wrote a summary of results for each code, considering similarities and differences as well as themes. At the conclusion of this process, codes were linked together to correspond to the dimensions of social representation theory, the research question and emerging ideas in the context of climate change. At the same time, there was an ongoing scanning of the content to identify possible themes, interpretations, explanations, and representations. I then made revisions to incorporate participants' feedback and concluded the data analysis process.

4.4 Limitations of the study

In general, the challenges and limitations of this study begin from, the language used to conduct an interview including, transcribing and translating the document and make it available for analysis. Besides, the interview was also semi-structured and it requires an intellectually presented follow up questions. Therefore, it was difficult finidng a person who knows and understand the subject (Climate change, agricultural policy and farming practices), and a native speaker of the Swedish language. The research interview was conducted in Swedish language because I bellived that, it allows interviewees speak what they have in mind using different metaphors, and practical wordings in their own context. Moreover, it was also difficult to set time to conduct a phone interview since they are of different geographical

locations. However, the phone interview unabled the interviewer to understand the interviewed farmers emotions about the object of the study.

5. Results

This section presents the empirical findings and is divided into three sections. The first section describes the understanding of farmers about climate change. Second section states what farmers need from the government to successfully comabat climate change (in)action. The third section emphasize the impacts of the CAP in the Swedish agriculture and farmers representation.

5.1 Farmers' understanding about climate change

One of the major finings of our interview was that all respondents do in fact talk about changes in the weather pattern in Sweden but there are slight differences in how they express this. For example, with regard to the consequences of climate change the informants make quite different statements but most have similar views on the physical consequences caused by climate change such as, forest-fire, glaciation, and droughts.

In response given to the question "how has the climate change affected you personally?" One of the interviewed farmer says, "*Yeah the climate is changing every time and even my own 'spring' almost went dry last summer and that has never happened before. So, yeah, I buy the climate change, it affects us all. It's really scary…., completely scary, I read in a book about this forest fire in Västmanland, that's also because of climate change; it's getting so violent*". In contrast, the other respondent perceives the changing climate as an opportunity instead of a challenge to his farming activity in Sweden. He says, "*In about 50 years, 'we' will be the winners when it comes to the changing climate. For example, I grow sugarcane on 1000kvm that wouldn't have been possible 40 years ago; so there will probably be even better conditions to grow here in the future. But then we might also get increased number of insects, if we get a lot of draught, and extreme weather you know. But I believe that 'we' in the long term will be winners over here. May be as a consequence of climate change we may have natural disasters such as forest fires, and draughts. But growing wise you know, we'll probably be able to grow pretty much anything here, 'they're saying' we'll get the same climate that they have in Southern France*".

Similarly, an interviewed farmer, when asked to share his practical experience about the changing climate, and its consequence on his farming activity. He says, "*the climate is changing but there are several factors for this change, I have read on a news that 'we' are the second emitters next to energy production, if then…I think we need to design and develop a sustainable way of production to continue farming for the coming generation*". This study also shows that, the type of energy used in the production system has a lot of effect on the changing climate. An interviewed farmer says, "*In the future, we can't use the energy as much as we do today, energy sources are incredibly limited and so far we are using energy consuming machines, and we don't even use the horses to harvest and, we dry our grain with oil*".

In sum, the quotes highlighted that farmers talk about climate change as a two-faced phenomenon. On the one hand, it opens the way for new forms of production in the north. On the other, it affects the existing biodiversity i.e. the variety of plant and animal life in the region.

5.2 Farmers representation helps to achieve environmental goals

In the current study, the interviewed farmers express that, state authorities give more emphasis to the protection of the environment than supporting them in their production process; as a result they are frustrated over their current situation. According to a response given when asked, how often are you getting support from the government in your farming activity? A respondent says, "*You know! authorities back in the 60's and 70's were very helpful and they were keen to support us to be more effective in our farming activity. However, currently we have a system of authorities who are just controlling instead of supporting us*". Besides, some of them explain how the government is managing the agricultural sector and treating farmer's in their activity. A respondent says, "*it is better to say, the state runs with a 'carrot' and 'whip' to steer the development to what they want ... so... the state takes and the state gives! They steer us in a certain direction*". Simultaneously, the respondents emphasize the implementation of EU Common Agricultural Policy, and the national environmental policy is highly affecting their agricultural production. Owing to the current agricultural policy, according to the respondents a large number of farmers left their farming business.

Altogether, the interviewed farmers express that "*we are not getting adequate support from the government side and our voice is not heard. Besides, the fact that we are also fewer in number, the state authorities are passing decisions on the bases of public opinions, and to what the environmental scientists are suggesting*". Also, the farmers' reflected a negative impression about Swedish environmental policy. The respondents said, "*When it comes to farming, unlike Sweden most other EU countries have completely different laws. For example, Finland favours their producers within the legal framework that EU has put up. Likewise, Norway and Austria adapted a regulation that fits to their national geography. However, Sweden often implements EU regulation as is, and also refrain from favouring farmers in the same way*". In sum, farmers in the interview expressed they should have more influence and better opportunities in decision making to achieve the national environmental goals, and eventually be part of the solution to combat climate change and develop the social representations of farmers.

5.3 The CAP contribution and farmers representation

The findings of this research depicted, EU citizens need to evaluate the CAP contribution to the benefit of the wider public. A respondent says, "*At first, we thought joining the EU, common agricultural policy (CAP[1]) would facilitate agricultural production, the market competition, and help us to get financial*

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[1] *Common Agricultural Policy*

support. But it didn't turn out so good because we have strong price competition in the EU, which is a big problem.". As a result, the respondents express, their frustration over the current EU agricultural policy at work and said, "*the regulation is so burly and there are a lot of formal things to follow to keep going as a farmer. Also, the environmental regulation followed by state authorities, become production hampering and increasing costs*". Besides, they mentioned a lot of pressure is coming from the government side to satisfy the demands of the CAP. An interviewed farmer says, "*the state authorities are imposing a lot of demand in our production process, they only need to satisfy the EU demands, and the state environmental objectives, but then again they need to understand our problem, how we can be productive, and the market competition and so on…*".

Moreover, the interviewed farmers talk about the common agricultural policy is highly affecting farmers productivity in the agriculture sector. According to the informants, the EU guarantees a minimum price to producers for certain products, irrespective of market prices. "*Usually Swedish food products are very expensive because of high production standards imposed, which often makes the price of the products very expensive, therefore, the prices of our products excel the common price, and therefore, it makes the market competition very difficult*", says a respondent. In contrary, "*there are food items available in the market which does not even satisfy the standards set in Sweden, and they are sold relatively with cheaper prices…often these food products are relatively made with 'lower standards', 'smaller budget cost', and are produced in short period*". In view of this, a land owner and also a farmer from Uppsala said, "*that is what we in the LRF (Lantbrukarnas Riksförbund), are trying our best to make the authorities understand the situation*". In relation, an interviewed farmer with a large plantation from Uppsala region mentioned his frustration about farming in Sweden. "*…the Swedish food production has diminished partly because of two reasons; first, some of the farmers don't want to continue as a farmer because 'it's too much work for too little money', and secondly, most farmers have other 'concurrent businesses', apart from farming*".

Consequently, the interviewed farmers mentioned the influence of new regulations in the agricultural sector coming from the EU saying, "*Before we went to the EU we were basically 100% self-sufficient, it was only coffee that we import, but now we import incredible amounts of food products. I don't understand how this is happening, should we import food, when we have all good conditions needed…? We have the cleanest soil and the best animal keeping in the world*". As a remedy for the current application and implementation strategy of agricultural and environmental policies, the interviewed farmers mentioned, "*We need our government to support us, on top of executing the environmental regulations… as usual the authorities always keep telling us 'things will be better' but in reality nothing has changed, it is getting worse, there's just more and more things to fill in all the time*". As a result, the respondents express frustration over the current EU legislation and how it is being implemented. The informants mention, "*to grow the existing farming business and attract new investment, the policy framework needs to be re-organized, and farmer's need to be given technical*

support to keep working in the sector. Besides, the some of the interviewed farmers have also difficulties to get subsidies on time which is coming from the EU". Regarding the subsidiy given from the EU, a budget allocated to subsidize farmers' to achieve the environmental objectives of the common agricultural policy. A respondent from Stockholm says, *"I heard on the radio the other week about this support which comes from the EU. They never come! They don't come on time, when you've asked them, so according to the interviewed farmers,they have to go to the bank and sit on their knees with the hat in their hands and ask to loan some money so they can keep going a while longer. Why don't they get this money? I don't understand how the authorities are going to solve this? They promise a ton of money and then it doesn't come; of course some of the farmers get mad! So then they stop farming"*. Furthermore, procedures are followed and the criterias need to be fulfilled to get the financial support. *"even though there are incentives (subsidies) given to support the farmers, but it is not easy to get that funding. There are two basic conditions to fulfill; production condition, and the proper management of your land"* says an interviewed farmer. Even though there are incentives given to support farmers, there are also administrative punishments (penalties) enforced. If a farmer lacks a given condition, then he/she will carry the cost individually. The informants have said, *"they have a very tough regulation, and the parameters constantly change, and this is an incredibly annoying system. At the end, it will be quite expensive for the farmer to carry the cost since it grows logarithmically"*.

According to the informants, the other challenge coming from the European Union affecting agricultural producers in Sweden is the Water Framework Directive (WFD). According to an interviewed farmer, *"WFD is another policy enforcement which is challenging owners of stream and eventually damaging farmers"*. Referring what the state authorities said the interviewed farmer explained the situation, *"the Baltic sea is surrounded by land and the sea water overflows towards the agricultural land and returns back with some nutrients from the ground, and therefore more endangered by pollution"*. Which I guess it could be, but the problem is, 'who should take the responsibility and give a solution?'. A interviewed farmers from around the region said, *"We are required to take responsiblity for the water pollution but we are victims of that society. You know, they want to solve this problem by making the land owner pay for the construction of dam to protect the water from overflowing to the agricultural land"*. In the same vein, we can also see another example where spme of the interviewed farmers talk about the government push responsibilities to only farmers' and that it is unfair. *"If you know that, Uppsala gathers water from a water system called Tärnsjö in northern Upland, and they pump it down into Fyrisån, then farmers get more water and it creates more problems in Fyrisån. As a result, the farmers will be in trouble all the time, and when something happen the farmers have to pay, but in reality it's the city's problem"*, says a respondent. In a nutshell, the quotes highlighted the the interviewed farmers formulate environmental and agriculture policy in terms of fair and unfair distribution of responsibilities. Besides, there is a difference between how authorities in their decision making relate to farming and farmers and how it is in "reality". Thus the interviewed farmers make sense of society and policy as something they do not trust.

6. Discussion

Grounded on the results from the data collection of 7 interviews, there are major issues that emerged out of the explanation given from farmers in Sweden. This chapter attempts to discuss these major issues. The results are also briefly discussed in relation to the theoretical framework applied in this study, that is, Social Representations Theory (SRT).

6.1 Major issues based on findings

6.1.1 Climate change poses both challenges and opportunities

The Swedish Board of Agriculture, SBA (2007) indicated climate change poses both challenges and opportunities for Swedish agriculture, but in a 25 year perspective, the opportunities are viewed to outweigh the challenges" (Asplund, 2012, p. 4). According to the findings of this study, the interviewed farmers indicated the challenges and opportunities climate change brings to agricultural production in Sweden. The participants discussed on the one hand, the opportunity of climate change would present to the agricultural sector mainly through increasing yields because of improved climatic conditions, and they also talk about the challenges of climate change on agriculture by increasing precipitation and more marked snowmelt, and increased temperature causes drought and pest outbreaks on the other. Moreover, Wibeck (2012) conducted a study on social representations of climate change in Swedish lay focus groups. Her findings emphasize the severe and distant consequences of climate change. On the one hand, experiences of participants shows that changes in weather, in particular mild winters with lack of snow and hot or rainy summers, were taken as a signal of a changing climate. On the other, some of the participants disagreed about whether higher temperatures were a consequence of anthropogenic climate change or of natural fluctuations in climate (p. 8). In this study, the respondents said that even though they are aware of the causes and consequences of climate change, the unfair judgement given by other actors contributed to the misrepresentation of climate change. Altogether, the respondents emphasize that part of the problem with climate change is knowledge and interests of the interviewed farmers are poorly represented by decision making bodies.

6.1.2 Farmers engagement and contribution in climate change

According to some writings and research on climate change studies, "when the majority of farmers are seen to be very concerned about a changing climate, then it is more likely that a national government will take climate policy more seriously. However, when a majority of farmers think that the impacts on agriculture will be negligible, the influence of farmers on climate policy is more likely to be marginal or even negative" (Morisson et al., 2017). Fleming & Vanclay (2010); Robertson & Murray-Prior (2016) highlighted on the

experience of engaging with farmers about climate change has proven to be challenging even in countries such as Australia where impacts are likely to be more severe (Morisson *et al.*, 2017, p. 3). There is still a debate in the literature about whether it is critical to convince people of the anthropogenic causes of climate change to bring about behaviour change, with some arguing that it is unnecessary and can be unhelpful (Arbuckle et al., 2014). The past decade has seen an immense increase in publications addressing the issue of climate change to lay audiences, who are emphasised as particularly relevant in the context of climate change (Ballantyne, et al., 2016). For example, previous studies on climate change focus on laypeople often misunderstand the causes and the effects of climate change (e.g. Lorenzoni and Pidgeon, 2006), and how laypeople make sense of climate change (Wibeck, 2012). However, in this study the interviewed farmers on the one hand highlight the challenges of climate change to the agricultural production and on the other, the influence of agricultural emission to the changing climate.

In this study, climate change studies are discussed in terms of risk, and catastrophe, in tones of misery and doom (Ambler, 2007; Boykoff, 2008), and emphasizing tipping points "in a sensational and alarming way" (Russil and Nyssa 2009:343) (Asplund, *et al.*, 2012). My data shows, the interviewed farmers understand the impacts of 'climate change' and describe it in relation to their agricultural activity. Altogether respondents mention climate change explicitly, and they observed human emissions as the main driver of a changing climate that in turn leads to perceived changes in weather patterns. Correspondingly, "Swedish news stories emphasize the assumption that human-induced global warming is a direct cause of climate change bringing with it dramatic consequences already at hand" (Wibeck, 2012). Also, this study demonstrates that, although respondents have slightly different knowledge about climate change but most agree on the physical consequences comparing with the past times. Altogether, the informants have common stance on the changing climate, and they are always trying to mitigate the situation through different measures.

6.1.3 Individuals role is central to representation

According to the research participants, climate change is a global problem with sever consequences. Given that a changing climate "is likely to have negative and potentially irreversible consequences for the environment and human beings, individuals play an active role in constructing and contributing to representations" (Jaspal, et al., 2014, p. 116). This study shows, the agricuturalists are aware of the responsibility agriculture holds and wants to become part of the solution. However, they are not actively involved in implementing government policy to combat climate change but they are active in constructing their own representations of government policy. Central to the perspective of social representations, "psychological states are socially produced and that our representations determine our reactions" (Billig, 1993, p. 43). At this instance, "the object is present in the form of images, ideas, concepts and (re)significations, which reflect this external object (given that the representation is always the representation of an object by the subject), but

which simultaneously reinterpret the individual or social subject's own activity and, therefore, are also expressions of this subject (Morera, et al., 2015).

Earlier studies on social representations of climate change stated that, "if people lack to understand that climate change is happening, that it will aggravate in the future, and either individually or collectively can do something about it, environmental policy as a purely governmental issue will most probably fail" (Billig, 1993), and "if climate change is not socially represented it is not there in the society" (Reusswig and Meyer-Ohlendorf, 2012). In sum, "this is the ultimate reason why the study of social representations of climate change is not only a meaningful, but even a necessary endeavour" (ibid., p. 5).

7. Conclusion and Recommendations

The aim of this study has been to understand and analyse how farmers in Sweden make sense of climate change based on their particular knowledge and practices. The study focuses on farmers social representations of climate change within the agriculture sector. A dynamic theoretical view on the issue of social representation was applied to the questions: How farmers in sweden make sense of climate change based on their knowledge, experiences, and understanding?

The study finds that, the interviewed farmers in Sweden understand the negative impacts of climate change. On the other hand, they also talk about the expected future benefits of the changing climate to the northern regions of the world. Altogether, the respondents emphasize, they are aware of the responsibility of agriculture to the changing climate but it is unfair to completely condemn agriculture for all climate change problems. When the farmers talk about climate change they also talk about agriculture policy and imbalanced allegation against agriculture which facilitates a general misconception about the role of agriculture. They said, simplified analysis and unfair accusations directed to agriculture is the cause of misrepresentation of climate change which is preventing what they think are the most important solutions and able to respect government regulations. On the other hand, some of the farmers emphasize they have several problems that requires the attentions of the government to continue working as a farmer. First, EU regulations and how Swedish authorities are implementing agricultural policy, indicating a discrepancy between reality and perception. Second, the government should continue supporting the farmers which is provided from EU as compensation to environmental matters. Moreover, the farmers suggested the government to take a precaution while executing policies which may affect agricultural producton. The farmers also claim that, even though we own large plantations, we are not well represented. The concerns of the state authorities are more often to respect the national environmental code, as well as international agreements but farmers and farming is not given a priority. Therefore, we need to have our own representation to defend our rights while environment related policies are formulated and implemented.

This study questions, how farmers make sense of climate change based on their particular knowledge, and practices. Consequently, my data shows farmers understood the effects of climate change in the short and long run. Besides, farmers observe the change and come across some of the hardships on their agricultural production due to climate change. As illustrated in the discussion, farmers express their concern about climate change from a collectively and socially constructed reality from everyday experience and communications. Furthermore, the farmer's emphasize the government to reconsider agricultural and environmental policy at work, and implement EU regulations considering the farmers situation like other member states. Thus, environment related problems such as, climate change are successfully addressed when every stakeholder, such as farmers, and the legislative body (the government) work together when executing policy directions related to agricultural production.

Agricultural production is highly sensitive to weather and hence directly affected by climate change. To analyze how farmers in Sweden make sense of climate change based on their particular knowledge, understanding, and practices this study has opened up for further important areas of inquiry. First, social representations are at stake when there are challenges concerning climate change policy implementation. But in this study, only the farmers are capable of answering on the question of social representations of climate change empirically. Switching perspectives and studying other stakeholders' point of views would contribute to a deeper understanding of social representations of climate change in Sweden. Second, to expand the result from this study, further studies could be done on the process of policy formulation, and political representation of Swedish farmers in relation to environmental matters. That would enable an even deeper analysis of the interplay between the government and the public under representation. Third, the system of administration (including the CAB and state authorities) covering all over Sweden function as a collective, which means that all decisions directed towards a state authority must be reached by the government collectively. Therefore, it is important to understand the distribution and decentralization of power to build a more complete understanding of how environmental and agricultural policies are implemented in Sweden.

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