Chapter 3
Climate Information Use:
An Actor-Network Theory Perspective

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ABSTRACT

This chapter employed an interdisciplinary attempt to investigate agricultural climate information use, linking sociology of translation (actor-network theory) and actor analysis premises in a qualitative research design. The research method used case study approaches and purposively selected a sample consisting of wheat growers of the Fars province of Iran, who are known as contact farmers. Concepts from Actor-Network Theory (ANT) have been found to provide a useful perspective on the description and analysis of the cases. The data were analyzed using a combination of an Actor-Network Theory (ANT) framework and the Dynamic Actor-Network Analysis (DANA) model. The findings revealed socio political (farmers' awareness, motivation, and trust) and information processing factors (accuracy of information, access to information, and correspondence of information to farmers' condition) as the key elements in facilitating climate information use in farming practices.

INTRODUCTION

Climate information has become recognized as a basic production factor affecting agricultural systems (Harrison and Williams, 2007). This is while, despite significant improvements in the climatic information production in the last decade (Subbiah*et al*., 2004; Ziervogel*et al*., 2005; Hu *et al*., 2006; Artikov*et al*., 2006), farmers as focal decision makers of farm systems and main users of uncertain Agricultural Climate Information (ACI), have not altered management decisions to take advantage of this type of information (Articov*et al*., 2006; Hu *et al*., 2006; Nazemos'sadat*et al*., 2006).

Decision making in complex dynamic environments, like the field of agricultural process management, takes place in a network of dif-

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ferent actors with their own interests, concerns, and control of a part of the resources needed for successful farming practices (Hermans, 2005). The issue of not considering climate information in farming decisions was scholarly investigated from different perspectives.

Existing literature on economic and management research related to climate science shows increasing attention to necessity of stakeholder interactions to both contribution to and learning from climate applications and indicates that the methodologies commonly used in modeling decision-making are based on the assumption that users have an idealized response to the information (Sherrick*et al*., 2000). Each methodology is appropriate to (Hansen and Sivakumar, 2006): 1) understand how uncertain information can be incorporated into decisions, 2) serve as a bridge between physical and social sciences and decision-makers, and 3) reveal the conditions under which climate information can have value. However, as human actors are not always optimizing, rational and idealized decision-makers, smallholder farmers will not all make the same decisions in the same way and in isolation (Ziervogel, 2004).

In contrast to an earlier wave of optimism in economic and management science regarding the use of climate information, psychological theories aim to explain the relation between intention and action in particular contexts and in relation to specific practices. The scholarly literature reveals that these theories have also been criticized by some psychologists (Richetin*et al*., 2008) for relying on analyses of correlation, rather than causes, and for assuming too much about the instrumental relation between attitude and intention (May and Finch, 2009). Therefore, in the 1980s, a growing interest in the social foundations of behaviour within the Information Systems (IS) field led to a shift towards a broader perspective with the continuum of theories, all of which examine the relationships of individuals and technology, the varying influences that affect these relationships and how together they influence technology adoption and use. Giddens' structuration theory, Bijker's social construction of technology, Orlikowski and Gash's technology frames, and Latour and Callon's sociology of translation (Actor-Network Theory – ANT) are amongst this stream of attempts (Mac Leod, 2001), which are now used much more extensively in investigating information systems and IS adoption. The ANT approach by posing opportunities to function as a go-between for the two extremes of actor and system perspectives, has inspired a number of IS researchers to conceptualise the interrelation of actors in the socio-technical contexts of systems development during the past decade (Walsham, 1997; Tatnall, 2000; Dunning-Lewis and Townson, 2004; Bakhshaie, 2008; Everitt-Deering, 2008).

Policy science, as another body of scholarship, focuses on different approaches available to study the characteristics of actors and networks. Stakeholder analysis (Cameron, 2005; Rubas*et al*., 2006; Lybbert*et al*., 2007), social network analysis (Ziervogel, 2004; Ziervogel and Downing, 2004; Ziervogel *et al*., 2005), and actor perception analysis (Bots *et al*., 2000; Hermans, 2008; Hermans and Thissen, 2009) are probably the most widely used approaches by environmental management in policy science literature.

A comparison of the aforementioned theoretical approaches suggests that perceptions, values and interests, and resources are the three basic dimensions in multi-actor decision making processes (Hermans, 2005; Hermans and Thissen, 2009). Perceptions (causal beliefs, cognitions or frames of reference) are the image that actors have of the world around them, both of the other actors and networks, and of the substantive characteristics of a problem (Bots *et al*., 2000; Enserink *et al*.,

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