

# **The Motivations, Attitudes and Values of Irrigators' in the South Saskatchewan River Basin towards Water Use and Water Re-allocation**

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## **Abstract**

Water scarcity has become a reality in the South Saskatchewan River Basin (SSRB) where irrigation activities account for more than 70% of consumptive water use. Growing demand for water in the SSRB is therefore likely to require re-allocation of water from the irrigation sector to meet new demand. In order to achieve this, the cooperation of the irrigation sector is needed. Research suggests that currently a large portion of irrigators are sceptical about water transfers and particularly the reallocation of rural water to meet new urban and environmental demand. To overcome this, it is essential to understand the factors that influence this scepticism. Little research has been conducted concerning the values and attitudes of irrigators towards water reallocation in the SSRB. This research will attempt to fill this knowledge gap through the employment of a theoretical model influenced by social psychological and human geographical research. It is expected that the findings will be useful for behavioural studies and for political purposes.

## **1. Background**

In 2005 Alberta Environment generated statistics regarding future water demand in the South Saskatchewan River Basin (SSRB). According to the report, the population of the SSRB is expected to grow from approximately 1.3 million in 1996 to more than 2 million by 2021 and 3 million by 2046 (Alberta Environment, 2005). Demand from non-irrigation users has been predicted to increase by 35-67% by 2021 and by 52-136% by 2046 from 1996 demand (Alberta Environment, 2005). Given the already strained water resources, this is causing concern amongst policy makers and various other stakeholders for what Dr. David Schindler phrases as "an impending water crisis on the Canadian prairies" (Schindler and Donahue, 2006).

In order to deal with potential water scarcity problems in the SSRB, the government of Alberta has developed goals and objectives that are highlighted in an overall water management plan called the Water for Life Strategy (WFL). Among the objectives of WFL are to implement economic instruments to meet water conservation and productivity objectives by 2010 and to improve the efficiency and productivity of water use by 30% by 2015 (Alberta Environment, 2003).

The implementation of market based, economic instruments is typically synonymous with water markets that were introduced with the Water Act (1999) and further with the

Irrigation Districts Act (2000). In regards to water allocation the water market serves as the primary economic instrument to facilitate water re-allocation in Alberta, and in particular the Bow, Oldman and South Saskatchewan River sub-basins. The water market is conceptually important because it offers the possibility of using a market based instrument to alleviate environmental concerns and future water security.

Licensed water allocations in Alberta are issued under the first-in-time, first-in-right (FITFIR) or 'prior allocation' principle. Under this policy, an older license has precedence of water use over a younger or junior license. Irrigators in the SSRB account for roughly 75% of all water allocation in the basin with most of the water controlled by irrigation districts which also have some of the most senior licenses in the region (Grinder, 2010). Due to this characteristic irrigator cooperation and participation in the water market is needed in order to achieve the WFL objectives. This was clearly acknowledged in the WFL strategy. As demand rises from urban areas where the majority of Albertans live the market is intended to provide a financial incentive for irrigators to sell their water through temporary or permanent license transfers. Without irrigator participation, the functioning of the market to its fullest potential may not be achieved, and the future of satisfying urban demand via the water market may be in jeopardy.

## **2. Problem Description**

The literature suggests that many irrigators are sceptical of separating water allocations from land, and selling them on a permanent basis in the market. Some studies suggest that irrigators' perceptions of water rights as an inherent part of their property causes this scepticism (Bjornlund, 2003; Tisdell and Ward, 2003). Gaffney (1997) identifies lack of seller motivation and public perception as two main impediments to functioning water markets in the United States, a sentiment shared in Bauer's (1997) assessment in Chile. Bauer's (1997) study indicates that cultural and psychological attitudes regarding the importance of irrigation was an impediment for the functioning of water markets in Chile. In an Albertan context, irrigator scepticism has been expressed towards rural to urban transfers and water conservation objectives (WCO's).

A 2008 study indicates that some irrigators in the SSRB are sceptical of the efficiency and productivity targets and do not support them (Bjornlund et al, 2008). Irrigators in the study claim that the targets are too ambitious, different districts should have different targets and that commodity prices and other financial constraints are impediments to the adoption of new irrigation technology (Bjornlund et al., 2008). Another 2008 study in the SSRB cites that irrigators in the region are adopting improved technologies at a decreasing rate and those trends are expected to continue into the future (Nicol, et al., 2008). The study suggests that the main reasons why irrigators adopt improved technologies are to increase yield and to save energy and labour costs, whereas water savings were considered a less important reason (Nicol, et al., 2008). A prior study in 2007 indicates that on-farm efficiency in the region has doubled from 1965

to 1999, and that only half of the respondents believe that economic efficiencies can be improved. Only 26% of the respondents believe water-use efficiency can be improved (Bjornlund, et al., 2007). This scepticism is reiterated in a 2009 study comparing technology adoption and management practices in the Taber and Raymond irrigation districts (Bjornlund, et al., 2009).

### **3. Research Gap and Research Question**

Since Ashby's (1926) studies on agricultural decision making, the rural social environment has been cited as an important factor in farmer decision making. This notion of the importance of social and psychological factors playing a role in agricultural decision making have been cited by several scholars as having an important effect on the perceptions and behaviours of farmers (Gasson, 1973; Fairweather and Keating, 1994; Mayberry et al., 2005; Kuehne et al., 2008).

The literature often associates motivation with attitude and value orientations, and these motivations influence farmers' decision making. Motivation, as defined by Hofstede (1998) refers to "an assumed mental programme that is often associated with both attitudes and values" (Hofstede, 1998, p.479). Certain incentives and willingness to partake in action is generally referred to as a 'motivation'. The attitudes and values affecting motivations are social constructs shaped by a combination of socialization programmes and personal experiences (Hofstede, 1998; Williamson, 2000). Constructs in this case are "not directly accessible to observation, but inferable from verbal statements and other behaviours and useful in predicting still other observable and measureable verbal and non-verbal behaviour" (Levitin, 1973, p.492). Social constructs affecting attitudes and values affect certain motivations, which in turn may affect behavioural intention and action.

Throughout the literature there have been varying definitions of values. Some, such as De Groot and Steg (2008, p.331) refer to values as "guiding principle(s) for selecting or evaluating people, behaviour and events." Others, such as Schwartz (1992) define values as criteria to justify actions and evaluate beliefs. The concept of values as beliefs guiding behavioural influences is expressed throughout the literature by social scientists in many disciplines. Rokeach (1973) conceptualized this definition of values by classifying values into two separate types: terminal values and instrumental values. Terminal values refer to the ultimate objectives and end-goals of the individual. Terminal values, according to Rokeach (1973) change very slowly and are driven by the socialization of the individual. Instrumental values, on the other hand, refer to beliefs that influence behaviour on a short term basis thereby constituting a more dynamic belief disposition.

Fishbein and Raven (1962) refer to attitudes as the evaluative dimension of a concept shaped by beliefs. Rokeach (1973, p.18) expanded on this concept by referring to attitudes as "an organization of several beliefs around a specific object or situation." In terms of behaviour, Beedell and Rehman (1999, p.168) highlight attitudes as a "positive or negative pre-disposition

to behave a certain way”, and that these attitudes are influenced by subjective norms and perceived behavioural controls. Attitudes have been defined throughout the literature as the evaluative pre-disposition to a certain object or situation that capacitates subjective perception.

Few studies have been conducted in the SSRB exploring the motivations, attitudes and values of irrigators. This represents a contextual gap in the literature. As attitudes and values affect motivations, they play a key role in behavioural intention and action of irrigators towards water use. Particular attitudes towards water re-allocation are also important regarding water markets in the SSRB. This study will therefore attempt to answer the following research questions:

*“What are the motivations, attitudes and values that irrigators’ have in the South Saskatchewan River Basin towards water use and water re-allocation?”*and,

*“How do these motivations, attitudes and values influence irrigators’ policy preferences for water re-allocation and the adoption of more efficient irrigation technology and management practices?”*

#### **4. Conceptual Framework**

There have been many models throughout the literature that have attempted to identify the causal relationship between motivators, attitudes and values, and behaviour. Identity theory, social identity theory, structuration theory and the theory of planned behaviour will be drawn upon to develop the conceptual model for this study that will attempt to explain this causal relationship. The time course paradigm is acknowledged in this conceptual framework, and the dimension of space is introduced to attempt to give the model more explanatory power.

Identity theory and social identity theory are concerned with the effects of the perception of identity on behaviour. The core sense of identity, according to identity theory, is the categorization of the self as occupant of a role and the meanings and expectations associated with that role (Stets and Burke, 2000). The explanation of these roles involves the social environment. In social identity theory, first proposed by Tajrel and Turner (1980), a social identity is synonymous with the categorization of an individual in a social category. According to this theory the self-conception of an individual as having a special social identity will influence group based and norm guided behaviour (Fielding, et al., 2008). Research has been shown that norms of behaviourally relevant social groups significantly can be a predictor of safer sex behaviour (Terry and Hogg, 1996), regular exercise (Terry, et al., 1999) and household recycling (White et al., 1994).

The theory of planned behaviour (TPB) associates attitudes and values, subjective norms and control beliefs with behavioural intention that in turn affects behaviour (Ajzen, 1991). Behavioural intention is dissected into three belief categories: normative, behavioural beliefs and control beliefs. Ajzen’s (1991) model was further refined by Armitage (2001) to add self-

efficacy as influencing action. This theory has been employed in studies of farmer behaviour and studies of conservation behaviour (Rehman and Beedell, 2000; Beedell and Rehman, 1999). According to the Rehman and Beedell (2000) models like TPB may not be fully sufficient in explaining all of the systematic variance in behaviour, but they offer a good starting point.

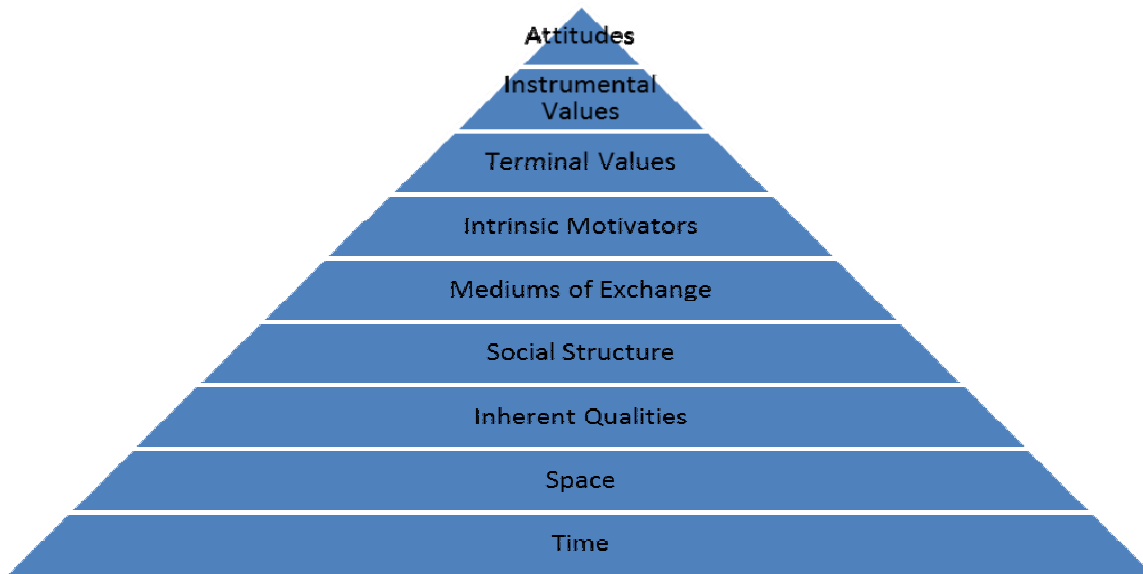
Giddens (1984) structuration theory attempts to reconcile the typological relationship between structure and agency. Structuration theory also takes into account the variables of time and space on decision making. As Giddens's (1984) states, the purpose of structuration theory is not to side with agency determinism or structural determinism, but to explain behaviour as "social practices ordered across time and space" (Giddens, 1984, p.2).

The variables of time and space are important for conceptually understanding the drivers behind human behaviour. If human agency and social structure are dependent on one another there is a relationship between individual motivators and social norms. The variable of time, however, is rarely discussed in the social psychological literature. The nature of action stems from responses to given circumstances. Those circumstances are brought into reality through changes of some sort. A central axiom of behaviour is therefore time, as defined by temporal changes giving rise to circumstances. The importance of time as a variable in decision making was stressed by Elder (1994) in an article on the life course paradigm discussing time, human agency and social change.

The variable of space is related to the variable of time. Conceptually, time and space are related entities in the sense that temporal changes give rise to circumstance. The changes manifest themselves in a spatial environment. An example of this is in context of the life course paradigm is the interplay of human lives and historical time. The massive population booms in industrial cities on the onset of the industrial revolution presents an example of how societal changes in time result in changes of circumstance, which in turn influences social structure and human agency. The spatial plane offered the prerequisite for the industrial revolution, and was ultimately affected by the industrial revolution. Changing social practices were brought about by changing spatial relationships all within the greater context of time.

A central axiom in the theoretical model for this study is the interconnected nature that time and space have on social structure and, by virtue, motivations, values and attitudes. Another axiom is the dependence of all of the variables on one another and shall be named the axiom of dependent factors of human agency. It is predicted that all of the dependent factors of human agency are related to one another. For example, without time, space cannot exist. Without space and time, human beings would not exist, nor would social structure. This follows a linear path that ultimately ends with attitudes. This axiom is taken in part from structuration theory, stressing the interconnectedness of agency and structure through space and time. The theoretical model for this study is based on the dependent factors of human agency illustrated in figure 1.

**Figure 1 – Dependent factors of human agency**



## **5. Research Objectives and Empirical Analysis**

Due to the complexity of the theoretical model only certain factors will be tested. In order to answer the research question attitudes, instrumental values, terminal values and intrinsic motivations will primarily be tested. With the scope of the research established, the objectives of this research are to:

- 1) Answer the research question by identifying the motivators, attitudes and values of irrigators in the SSRB towards water use and water re-allocation.
- 2) Employ the theoretical model in empirical studies and,
- 3) Identify areas of future study that may enhance the explanatory power of the theoretical model empirically.

In order to complete the research objectives, this study will use two types of data extraction techniques: semi-structured interviews and survey questionnaires. Survey questionnaires have the obvious benefit of accumulating vast quantities of ordinal and interval data that are needed in certain statistical procedures such as correlation tests. Semi-structured interviews are useful in gathering nominal data and accumulating qualitative information.

It is hoped that the qualitative, nominal information obtained through semi-structured interviews can derive information about the relevant variables to use and how to word the questions to include in the survey questionnaire in such a way that they can be understood by the respondents. Focus groups will be used to further develop the questionnaire to ensure it is

effective. The semi-structured interviews will also identify any qualitative concerns so far not addressed in the conceptual framework, and will perhaps identify important variables that have not been examined in the conceptual framework. The goal of semi-structured interviews in this context is to accumulate qualitative data while ensuring the survey questionnaire is effective in accumulating quantitative data.

Once the data is extracted various statistical procedures will be conducted. Such analysis will include goodness of fit tests such as multiple regression and variance tests identifying within-group and between-group differences in attitude, value and motivation dispositions and test their influence on policy preferences and technology adoption. Factor analysis will be conducted on the value and attitude statements to organise the statements into value orientations. Factor analysis will also be conducted to identify the key motivations of irrigators.

## **6. Study Area**

The study area in which the research will be conducted will be the Bow River sub-basin. This consists of the Western Irrigation District (WID), the Bow River Irrigation District (BRID) and the Eastern Irrigation District (EID). The Western Irrigation District (WID) has roughly 96,000 irrigated acres and provides water to up to 400 farming operations (Western Irrigation District, 2011). The Bow River Irrigation District (BRID) has roughly 232,000 irrigated acres as of 2007 and delivers water to hundreds of farming operations (Bow River Irrigation District, 2011). The Eastern Irrigation District (EID) water to roughly 285,000 acres of crop land and also delivers to hundreds of farming households (Eastern Irrigation District, 2011). These irrigation districts vary in geographical landscape, cost of water, and farming activity. This will allow for a representative survey of irrigators across the districts. Another important factor is the legacy of rural to urban water transfers that vary significantly between the districts. While the WID has had experiences dealing with transfers (i.e.: Balzac Water transfer of 2007), relatively little trading activity has been conducted in the other two districts.

## **7. Conclusion**

Exploration of the motivations, attitudes and values of irrigators in the SSRB towards water use and water re-allocation may be useful for behavioural studies and for political purposes. From the behavioural point of view attitudes, values and motivations of irrigators' may help explain scepticism towards the WFL strategy. It is hoped that the theoretical model may provide more explanations as to why irrigators' have the attitudes and values they have towards water use and water re-allocation policies. Avoiding an economic deterministic explanation may be beneficial in the sense that other behavioural factors may be explored that also affect irrigators' decision making. The exploration of motivations, attitudes and values of irrigators may also be useful for policy purposes.

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