



THE **QOG** INSTITUTE
QUALITY OF GOVERNMENT

Formal and Informal Institutions in
Groundwater Governance in Rajasthan
- A Case Study of Chota Nayrana and Tilonia Village

Veronica Gherghe

QoG WORKING PAPER SERIES 2008:1

THE QUALITY OF GOVERNMENT INSTITUTE
Department of Political Science
University of Gothenburg
Box 711
SE 405 30 GÖTEBORG

February 2008

ISSN 1653-8919

Formal and Informal Institutions
In Groundwater Governance in Rajasthan
-A Case Study of Chota Nayrana and Tilonia Village-
Veronica Gherghe
QoG Working Paper Series 2008:1
February 2008
ISSN 1653-8919

Abstract

This paper examines the sustainable preservation of natural resources at the community level, with an emphasis on groundwater resources in Rajasthan, India. Considering that water is one of the resources that have been exploited by humans in an unsustainable manner - resulting in water scarcity in many places around the world - sustainable community development aiming at the preservation of natural resources has been of concern to theorists and legislators alike. They have advocated for a range of institutional and social transformations that could realise sound sustainable development of natural resources.

In India, efforts to preserve natural resources at the community level have been undertaken by the Indian legislator through local level decision-making, decentralisation, strong environmental laws and incentives offered to NGOs for working with sustainability issues. Legislator's efforts have however not been successful in many regions of India, of which Rajasthan is one. Nevertheless, in Rajasthan, despite acute natural water scarcity due to low quantity of precipitation in the region, the village of Chota Nayrana has managed to preserve and even increase the level of groundwater in the village. This has been achieved through community efforts strengthened by helpful water conservation programmes and projects by the Rajasthan State Government and an NGO called *Barefoot College*. However, water conservation programmes and projects introduced by the same NGO have not accomplished favourable results in another nearby village called Tilonia. This paper tests four different hypotheses connected to different institutional theories, including the theory of ecofeminism and women empowerment, for understanding inhabitants' behaviour towards the conservation of groundwater and it seeks to explain the discrepancies in water conservation in the two villages.

Veronica Gherghe
Department of Political Science,
University of Gothenburg
Box 711
SE 405 30 Göteborg, Sweden
veronica_gherghe@hotmail.com

Introduction

Sustainable development, with the aim of community maintenance of natural resources for future generations, is a key area of research in both academia and policy circles. In the wide range of Earth's natural resources, water is among those that have been exploited in an unsustainable manner. This has in various places around the world led to the scarcity of the resource. Water scarcity due to unsustainable water use by community members is a problem that affects many countries around the world, India being one of them. The overuse of natural resources at the community level has been of general concern for legislators and theorists, who argue that sustainable development can be realised through a range of institutional and social transformations. A range of theoretical perspectives focus on institutional transformation as a way for explaining community development and social change. Various institutional theories have been concerned with explaining sustainable development achievements and the sustainable preservation of natural resources at the local community level.

Problem and previous research

In India, the sustainable use of water has been a major issue for the Indian legislators stretching back from the 1980's to the present (Shiva 1998). The challenge stems from the overexploitation of the resource at the community level. The overuse of water resources contributes to groundwater shortages, which have negative implications for the long-term sustainability of natural water resources at the local level. The case of groundwater overexploitation with repercussions for water sustainability in the Indian subcontinent is of further significance as India provides a decentralised system through the 73rd and 74th Constitutional Amendments (which prescribe communities with power to manage natural resources at the local level), has strong environmental laws as well as a large chunk of NGOs engaged in sustainability issues.

The 73rd and 74th Constitutional Amendments are important as they provide a model of decentralised democracy that seeks to promote two distinct objectives of equal value: (a) citizens' participation in decision-making and (b) effective service delivery (Khanna & Kueck 1999). The objective is to reach institutional and social transformation at the local level, with positive implications for managing natural resources by the community. With respect to natural resource management at the community level, the Constitutional Amendments provide

community decision-making levels with responsibilities for the maintenance of natural resources under the guidance of the State Governmental Institution, District Rural Development Agency. The Constitutional Amendments offer a way to achieve social transformation through citizens' participation at the local community level, especially for marginalised groups like women and lower castes, who previously have been deprived from being involved in the decision-making sphere (Mathur 1998). For instance, the Constitutional Amendments offer one-third mandatory seats in the local decision-making level for women and lower castes such as Schedule Castes and Schedule Tribes. The model of institutional decentralised democracy in India combined with the problem of overexploitation of the groundwater resources at the community level, offer interesting perspectives in understanding the factors that give rise to groundwater resource overexploitation at the community level.

Cases of sustainable community solutions for preventing the overuse of groundwater have been observed in different regions throughout India, one of them being the Rajasthan region. Sustainable use of groundwater resources at the community level in the Rajasthan is of particular importance, as the region suffers from acute natural water scarcity due to low amount of precipitations, has a sizeable population (five percent of the Indian population live in the region) and offers a diverse social structure (Rajasthan Government 2007). In Rajasthan, the acute natural water shortage is coupled with the human overexploitation of the already scarce water resources.

One successful example of community sustainable efforts in managing the already scarce groundwater resources is offered by the case of Chota Nayrana village in the region of Rajasthan. Here, community efforts complemented with implementation of water management projects and programmes offered by the NGO called *Barefoot College*, have led to increased water table level and sustainable water use in the community (Frontline, volume 19, 2002). Whereas the case of Chota Nayrana village reveals a successful example of sustainable groundwater use, the same cannot be said for the nearby Tilonia village. Water management support programmes implemented by the NGO *Barefoot College* have also benefited the village of Tilonia, however without the same promising results. The village functions as the headquarters of the NGO and is situated in the region of Rajasthan, distanced thirteen kilometres from the village of Chota Nayrana. Having highlighted the discrepancies in the community sustainable use of groundwater in Chota Nayrana and Tilonia, the question that arises is *why is it that despite similar groundwater resources in the two case-study*

villages, one of the villages has succeeded in improving its groundwater resource management compared to the other village, bearing in mind that the groundwater is naturally scarce in both of the villages.

The cases of Chota Nayrana and Tilonia offer an appealing framework for researching the causes of different outcomes of sustainable use of groundwater resources because of a number of factors: the model of decentralised democracy, attributions of the decision-making level for preservation of local resources, and the diverse social structure in the Indian villages with respect to social discrepancies brought historically by the caste system of appurtenance and the marginalisation of women. Considering the variety of factors that may affect the different groundwater outcomes in the two villages, the situation can be examined by analysing the diversity and structure of the formal and informal institutions that explain human behaviour within rules, norms and strategies that the people follow (Ostrom 2005). In order to understand the deviating outcomes in the two case-study villages, institutional theoretical approaches combine explanations with respect to formal and informal institutional norms and rules that affect human behaviour. Of further importance for understanding the different outcomes of sustainable groundwater use in Chota Nayrana and Tilonia, besides the institutional theories, is the approach offered by the theory of ecofeminism and women empowerment. Theories of women empowerment and ecofeminism relate to the gender-power relations (Presser & Sen 2000) that are constructed in the family and community. Furthermore, the theory of ecofeminism maintains that women in general have better ability for natural resource preservation, but there is a risk that constructed gender discrepancies might be replicated in institutions. With concern for the gender discrepancies that historically have been inherited in India in general, and at the village level in particular, theories of ecofeminism and women empowerment offer a further approach in understanding the incongruity of groundwater sustainable outcomes in Chota Nayrana and Tilonia.

The paper aims to test to what degree different institutional theories, including the theory of ecofeminism and women empowerment, are able to explain the different outcomes of groundwater scarcity in the villages of Chota Nayrana and Tilonia.

Beyond the “bounded rationality” approach

Understanding the non-sustainable use of natural resources has for years preoccupied legislators and theorists, who have attempted to identify factors that influence the relation between institutions and community members impacting on the maintenance of natural resources at the local level. One approach is presented by research that has demonstrated that individuals, groups and organisations differ in their access to the means of making or influencing policies and decisions with repercussions for sustainable resource management (Huber & Stephens 2001). Furthermore, the environmental issues as such could be connected to Herbert Simon’s (1957) idea of “bounded rationality”. Simon postulates that the rationality of the decision-making process is bounded by decision makers’ knowledge and capacities, organisational environment and structure in which the decisions take place, which emphasise the importance of formal institutions. Developing the principle of “bounded rationality”, Elinor Ostrom (2005) shows that diversity and structure of the institutions are explained by human behaviour within the rules, norms and strategies that the people follow. Furthermore, Ostrom has proved (using a Game Theoretical model) that humans have complex motivations, including narrow self-interest as well as norms of proper behaviour. Because humans are institutionalised in different cultures with their specific rules that affect values of the individuals, both formal and informal institutions (culture and norms) do matter. Hence, cooperation among individuals is to be supported by good communication and trust. It is to be observed that if the rules (both formal and informal) are not perceived as legitimate, humans can “reward one another for actions that break the rules” (Ostrom 2005 p. 12).

Ostrom’s research, as a complement to the theory of “bounded rationality”, brings a wider perspective to our understanding about the implementation and acceptance of environmental rules at the decision-making and social-level from a human action motivation point of view. In addition to the manner in which humans tend to act, interact, and accept agreements, Ostrom has highlighted that the participants’ attributes, such as gender and social status, are also important factors for how people communicate, trust and make mutual decisions. The aspects of “bounded rationality” and human self-interest while alone or in group (as shown by Ostrom’s research) are characteristics developed by rational choice theory.

Further research in the Indian context reveals that the complexity of the social structure with respect to the historical perspective of the informal institution of caste appurtenance is still persevered in many rural areas of India, despite the implementation of the 73rd and 74th

Constitutional Amendments (Thorat 2000) and its juridical prohibition. The Amendments seek to empower the lower caste groups. Moreover, reforms in the field of formal institutional development at the village level following the 73rd and 74th Constitutional Amendments have proven not to be efficient. Research has underlined that decisions at the village level, known also as village *panchayat*, are in many cases taken without transparency and adequate accountability towards the rest of the community members (Meenakshi 2000).

Thus the review of some of the inconsistencies in the functionality of formal and informal institutions brought about by historic and present circumstances demonstrates that human behaviour matters in explaining the deviating groundwater outcomes in Chota Nayrana and Tilonia. However, a deeper understanding of historic functional mechanisms of formal and informal institutions cannot be covered implicitly by the theoretical approach found in Ostrom's research. A more comprehensive perspective is delivered in this case by the historical institutionalism theory. Ostrom's research based on rational choice theory seeks to explain how institutions matter in shaping the behaviour of actors in reaching mutual agreements. A further perspective of rational choice is to be considered for answering the question of different groundwater outcomes in the two case-study villages.

Auxiliary literature purports that women, particularly in the rural areas of Rajasthan, are objects of male domination that is rooted in the patriarchal historical gender discrepancies (Chambers 1993). Improvements regarding women empowerment have, nevertheless, been made after the initiation of the Constitutional Amendments, which focus on women involvement in decision-making. Women empowerment through involvement in decision-making contributes to self-motivation of other women and have positive effects on the management of natural resource as women tend to pose strong motivation (Mellor 1997) for preserving the natural world, in the sense that women in general have been concerned with securing the survival of family in harmonic connection with the surrounding nature. The welcoming involvement of women in decision making has unfortunately proved not to be problem-free. In addition, research has shown that women in decision-making positions tend at times to make decisions in accordance with resolutions made by male co-workers at the decision-making level (Baviskar 2002). The importance of gender characteristics unveiled by Ostrom's research when discussing human actions and motivations in accepting rules and norms is further developed by the theory of ecofeminism and women empowerment.

As I have mentioned above, starting from the theory of “bounded rationality” and going beyond it with the help of Ostrom’s research from 2005, I consider that the different groundwater outcomes of the two Indian case-study villages may be explained by the complementary understanding of rational choice institutionalism, historical institutionalism and women empowerment/ecofeminism. The assertion is based on the complexity of social factors in rural India, such as caste and gender relations that affect human behaviour. To this should be added the functionality of formal institutions and their impact on human behaviour. Regarding the intricate relation of factors that can provide an answer to the deviating groundwater outcomes in Chota Nayrana and Tilonia, more than one theoretical approach is required.

Rational choice institutionalism in the Indian case study context

The problem of overexploitation of common resources was approached already in late ‘60s by Garret Hardin (1968). At that time, Hardin concluded that communal-property regimes fail to provide sustainable common resources because of the assumption that utility maximisation is and will remain the primary motivation of individuals (Peters 2005). In this sense, individuals expect to maximise personal utilities of the common resources, as there is no motivation of the communal-property regimes to provide incentives for individuals to act for the benefit of the whole community.

In contrast to Hardin’s conclusions, Elinor Ostrom (1990) showed that actor’s individual rationality could be overcome when the individuals realise that their goals could be achieved most efficiently through institutional action, their behaviour being shaped by the institutions. An institution has been defined as ranging from formal government structures (legislatures, electoral laws etc.), according to Thelen and Steinmo (1992), to more amorphous informal social institutions (Peters 2005). Moreover, research based on community action has shown that trust and good communication between members as well as between community members and formal institutions is of importance for achieving cooperation in collective action (Ostrom 2001).

Given Ostrom’s research on small community-based management of common resources, one can relate her approach on the community-based management of the groundwater resources to the two case-study villages, Tilonia and Chota Nayrana. Taking into account the case of

Tilonia village, questions arise over the rational choice institutionalism approach in understanding the small community-based management of the common resources. Logically, it would be to the advantage of the community to prioritise the improvement of the groundwater level because this would benefit the community in the long term especially after having received assistance with programmes and projects for ameliorating the groundwater scarcity from the NGO *Barefoot College*.

Furthermore, responsibilities attributed by the State Government to the local formal institutions, the village *panchayats*, for preserving the local resources are further motivations for actors' behavioural change. Responsibilities given to the village *panchayats* include (a) local responsibilities to be carried out in form of people representation and participation and (b) provisions for standing committees to carry out various sectoral and establishment matters. Thus these institutions may play a role in explaining the difference in outcomes in Tilonia and Chota Nayrana.

Historic institutionalism in the Indian case study context

Approaching the groundwater scarcity problem from a historical institutionalism point of view, it becomes an issue about the idea of policy choices, i.e. choices made with the formation of the institution or when policies have been initiated. Processes of initial institutional choice have a continuing and largely determining influence over the policy, far into the future (Peters 2005). The standard term for describing initial institutional choices influencing policies far into the future is known as "path dependency". The term is further connected to situations where "there is an inertial tendency for those initial policy choices to persist" (Peters 2005 p.71). The path is "[r]ather [...] to be followed in the absence of other pressures" (Peters 2005 p.74) with the possibility to alter the course through the influence of ideas.

From the historical institutionalism perspective, the existing water scarcity problem in the village of Tilonia is assumed to be the result of path dependency of the formal institutions in the village *panchayat*. This approach may offer a possible explanation for the non-rationalist actions of the *panchayat* village institutions in solving the groundwater scarcity problem. The explanation for the success of solving the groundwater scarcity problem in the village of Chota Nayrana may be, from the historical institutionalism point of view, the punctuation of

the path, which results in enabling the stream of new ideas and changes to institutional structures.

Moreover, the existence of informal institutions - in this case the Indian caste system - may also play a role in the process of path dependency, which can affect institutions. The informal social institutions are characterised by a set of norms, characteristic of respective institution (Peters 2005). These norms can hardly be broken when having become institutionalised and having created a path of dependency. In order to break the path the embracement of new ideas is necessary. Some scholars argue that ideas pose a significant explanatory power even without their institutional trappings (Peters 2005). Additionally, Martin Rein (1983) discusses the importance of ideas as one of the three principal factors explaining policy choices in contemporary political systems (Peters 2005). In this sense, advocates of the historical institutionalism explain that ideas are institutional and not independent of the institution. "Institutions may adopt and embody ideas, but it is not clear that they actually determine the nature of the institution" (Peters 2005 p. 83). Considering the historic hierarchic institution of caste that have characterised the Indian society from its early beginnings it has to be taken into account that actors have inherited multiple social identities with respect to their caste appurtenance. In this sense, change of social identities that have strongly been emphasised by the Indian legislator through juridical banning the informal institution of caste, still carries the risk that actors adopt or emphasise identities they have carried all along (Stålgren 2006). Having said this, one can raise the question about the mechanisms behind the informal institution of the Indian caste system and the norms that have enabled the resolution of the groundwater problem in the village of Chota Nayrana. The institution of caste is also to be considered in understanding the unsuccessful outcomes in the village of Tilonia.

Women empowerment/ecofeminism in the Indian case study context

Feminist movements argue that gender-power relations are constructed in the family and community and are then replicated and reinforced in economic, political, legal structures and institutions controlled and mediated by the state and the market (Presser & Sen 2000). It is also apparent that both the state and society have a critical role to play in empowering women at different levels. Empowerment is a process whereby the powerless gain control over the circumstances in their lives. It includes empowerment both over resources (physical, human, intellectual, financial) and over ideology (beliefs, values, and attitudes) (Batliwala 1994). "It means not only greater extrinsic control, but also a growing intrinsic capability, greater self-

confidence, and an inner transformation of one's consciousness that enables one to overcome external barriers to accessing resources or changing traditional ideology" (Presser & Sen 2000 p. 21). In this sense, empowerment implies a change in power relations.

By linking the feminist empowerment movement to ecofeminism one can find that there is a tendency to identify ecofeminism with an essentialist universalism, which posits a biologically based unity between women and the natural world that excludes men and unites all women through their essential life-giving, life-loving "natures" (Mellor 1997). The history of ecofeminism is founded in the range of women's involvement in environmental issues and grassroots struggles around the world.

The centrality of ecofeminism is that women have been seen as playing a socially constructed mediating role between hu(man)ity and non-human nature. However, few women can play this role purely as women because of the framework of social and economical inequalities existing in society (Mellor 1997). Ecofeminism also carries a danger of reproducing those inequalities within its own structure and development. What ecofeminism reveals is a wider analysis of relationships of mediations between society and nature (Mellor 1997).

Considering the newly empowered women positions in the local decision-making level offered by the 73rd and 74th Constitutional Amendments, complemented by women's tendency of involvement in environmental issues, one could examine the role women play in managing the groundwater scarcity issue at the *panchayat* level in Chota Nayrana and Tilonia. Furthermore, one has to bear in mind the danger of reproducing the inequalities of society as it is emphasised by the theory of ecofeminism to which shall be added the still unbalanced gender relations in the Indian society, despite efforts of women empowerment. Women capability in solving the groundwater scarcity in Tilonia and Chota Nayrana considering the above presented context will be examined through the perspectives offered by ecofeminism and women empowerment. It is of interest to understand whether women in the *panchayats* in the two case study villages carry with them social inequalities which might lead the difference in the groundwater outcome in Chota Nayrana and Tilonia.

Explaining diverging outcomes of local natural resource management

Taking into account previous theoretical approaches applied to social transformation and sustainable preservation of natural resources at the local level in general, further understanding of the particular factors behind the deviating groundwater outcomes in Chota Nayrana and Tilonia is required. Having pointed out linkages between presented theoretical perspectives as well as particularities of the decentralised democratic system and social structure in rural India, factors of contribution to deviant groundwater outcomes in the two case-study villages are to be analysed by establishing a set of hypotheses. These will be set as follows:

In conformity with the rational choice institutionalism theory, there is a probability that the village *panchayat* as well as community inhabitants of Chota Nayrana demonstrate a higher degree of cooperation for conserving the water in the village. The cooperation has been initiated through water conservation programmes and projects implemented in the village by the NGO *Barefoot College* as well as the assistance with local natural resources preservation offered by the Rajasthan State Government to the village *panchayat* through conservation programmes. In this respect, the first hypothesis is that:

(H1) the importance of water conservation programmes and projects implemented by the NGO Barefoot College and the State Government are perceived and afterwards implemented differently by members of the village panchayat and community inhabitants in the two case-studies, which leads to different outcomes in water conservation and management in the two villages.

Furthermore, the theory of path dependency propagated by representatives of historical institutionalism is helpful in explaining possible factors in the different outcomes of groundwater resources in the two case-study villages with implications of a path affecting village *panchayat* structures. The village *panchayat* structure is of relevance for this case as it is linked to the decentralised democratic system in India prescribed by the Constitutional Amendments, the village *panchayat* being the only formal institution in the research villages. In this respect, the second hypothesis is that:

(H2) there is an arrangement difference of the village panchayat structure (proceeding from the initial outline of the village panchayat) of the two case-study villages, which enables a lower prioritising of the groundwater conservation in Tilonia village compared to Chota Nayrana.

Historical institutionalism's path dependency can be a further explanation of the functional informal institutions, adding explanatory concerns to the discrepancy in managing the groundwater in the two case-study village. Analysing the informal institution of caste is significant because of its characteristics as the oldest informal institution in Indian society that contributes to the shape of social identities due to its hierarchic structure. In this sense, the third hypothesis is that:

(H3) the caste system, although not allowed anymore from a juridical perspective, has repercussions on the groundwater outcomes due to social norms ascribed by the caste hierarchic position. In this respect, the caste appurtenance hierarchy of the village panchayat members in Tilonia may be emphasised stronger compared to the village panchayat members in Chota Nayrana.

In conformity with ecofeminism, women are more successful than men in administrating natural resources. Furthermore, the feminist and ecofeminist theories emphasise that higher numbers of empowered women in society lead to better managerial outcome of natural resources in the society, due to women's commitment to environmental issues. The enlightenment of ecofeminism and women empowerment is relevant in the context especially because of the gender empowerment features at the village *panchayat* level that have been brought about by the implementation of the Constitutional Amendments. In this sense, the fourth hypothesis is that:

(H4) women representation and their approach at the village panchayat level vis-à-vis water conservation programmes in the two case-study villages lead to different groundwater outcomes in Chota Nayrana and Tilonia.

Empirical Illustrations

In order to have the possibility of saying something about the differences in the groundwater outcomes of the two case-study villages in the region of Rajasthan, it is necessary to make a comparative study of the two villages. The specific choice of Chota Nayrana and Tilonia village is based on the following facts. In the case of Tilonia, the village suffers from groundwater scarcity, like many other villages in the region of Rajasthan, despite having benefited from programmes and projects aimed at improving the groundwater level by both the NGO *Barefoot College* and Rajasthan State Government through the Tilonia *panchayat*.

On the other hand, the village of Chota Nayrana is also situated in the region of Rajasthan and has similarly benefited from water conservation programmes and projects implemented by *Barefoot College* and the Rajasthan State Government through the Chota Nayrana *panchayat*. In addition, the two case-study villages are situated thirteen kilometres apart and do not differ much in their size and number of inhabitants. Because Tilonia and Chota Nayrana are quite similar to one another regarding size, number of inhabitants and help received from *Barefoot College* as well as the Rajasthan State Government through their village *panchayats*, the most similar design is the best alternative to choose for this analysis. Consequently, the two villages have been selected strategically. Choosing the case studies strategically cannot be said to be representative of the entire population (i.e. other Indian villages that have a groundwater scarcity problem), but provides a possibility to generalise the deviating groundwater outcomes in Chota Nayrana and Tilonia to those theories I test. In this way, one lifts up general aspects that can expect to say something about the other similar cases in the population (Esaiasson et.al. 2004).

A theory testing strategy has been used because it gives the possibility to test the values of the independent variable that one believes can explain the variation in the dependent variable (Esaiasson et.al. 2004). The theories to be tested are rational choice institutionalism, historical institutionalism and ecofeminism.

Exploring differences at the village level - The analytical instrument

I have constructed an analytical instrument that is composed of the variation in the independent variable affecting the groundwater outcome in Chota Nayrana and Tilonia. The analytical instrument functions as criteria for understanding to what degree the independent variables influence the deviant groundwater outcomes in Chota Nayrana and Tilonia. The independent variables are connected to different institutional theories as well as the theory of women empowerment and ecofeminism. The criteria originate from the paper's hypotheses and are formulated as follow:

Question 1: Are there any significant differences in the way in which the village panchayat decision-makers as well the community inhabitants in Chota Nayrana and Tilonia regard and cooperate towards the groundwater programmes and projects introduced by the NGO Barefoot College and the State Government? If yes, where does the difference lie?

Question 2: Is there any difference in the arrangement of the village panchayat structure in the two case-study villages that enables a lower prioritising of groundwater conservation in Tilonia compared to Chota Nayrana? If yes, what is the structural difference and what role does this play in the groundwater outcomes?

Question 3: Is there any possibility of shorter versus longer self-maximising priority of the groundwater resources by the village panchayat representatives in Tilonia and Chota Nayrana with respect to their caste appurtenance? If yes, in which way does the caste appurtenance of village panchayat representatives in Tilonia and Chota Nayrana influence the priority of the groundwater resources?

Question 4: Is there any difference in the percentage of women at the village panchayat level in Tilonia and Chota Nayrana? If yes, is there any difference in approaching measures for solving the groundwater scarcity problem?

The results received from these questions will be used to verify to which degree different hypotheses connected to the theoretical approaches that I test in this paper explain the variation in the groundwater outcomes in the two case-study villages.

Independent variables

Explanation of outcomes

Yes

No

	Yes	No
(H1) Water conservation programmes and projects are perceived and implemented differently by village <i>panchayat</i> members and community inhabitants in Chota Nayrana and Tilonia		
(H2) Possible structural differences of the <i>panchayats</i> in Chota Nayrana and Tilonia may enable a lower priority of groundwater conservation in the two case-study villages		
(H3) Caste appurtenance of the <i>panchayat</i> members in Chota Nayrana and Tilonia may play a role in the deviant groundwater		

outcomes		
(H4) A difference in women representation in the <i>panchayat</i> level in Chota Nayrana and Tilonia as well as their approach vis-à-vis water conservation programmes may play a role for the different groundwater outcomes in the two case-study villages		

Table 1: Analytical instrument

The purpose of the hypotheses is to generate an answer about the mechanisms that have led to the different groundwater scarcity outcomes in Tilonia and Chota Nayrana. Being interested in finding an explanation for the variation in the two case-study villages concerning the groundwater issue, I have made place-based observations on programmes implemented for recovering the water scarcity in the two case-study villages as well as observations of the structures of the *panchayat* level in the two villages and women representation in the village *panchayat*. To the place-based observations I have added interviews with representatives of the decision-making level, the village *panchayat*, and the community people in the two case-study villages.

Furthermore, I am interested in providing an explanation to the differences in groundwater outcomes in the two case-study villages by using the following theories: historical institutionalism, rational choice, ecofeminism and women empowerment. I employ the perspective of these theories as earlier research has proven that these theories are important for understanding human behaviour within norms and rules. Additionally, considering the complex social structure, i.e. caste hierarchy and traditional gender discrepancies, of the Indian village complemented by formal institutional functionalities, an explanation in the variation of the groundwater scarcity issue in the two villages is offered by complementarities of the above-mentioned theories.

The material I use in order to test each hypothesis of this paper has been operationalised as follows:

Hypothesis 1: I have used respondent interviews in comparing the answers of the *panchayat* representatives and community inhabitants in the two case-study villages. Here my focus was

on their perception regarding water conservation programmes introduced by the NGO *Barefoot College* and the Rajasthan State Government in the two-case study villages as well as their mutual collaboration to conserve and manage the water.

Hypothesis 2: I have compared the structure of the village *panchayats* in the two case-study villages. The purpose of this comparison is to see whether the structural form (for instance different departments in the village *panchayats*) enables the prioritising of water issues in one village but not in the other.

Hypothesis 3: For providing answers to the third question of this paper, I have interviewed respondents. This is necessary, as I have to understand if the caste belonging of the village *panchayats'* representatives influences the discrepant outcomes of groundwater in Chota Nayrana and Tilonia. For example, do short versus longer-term priorities of the water conservation programmes and projects exist with respect to village *panchayats'* representatives belonging to a particular caste.

Hypothesis 4: For answering the fourth hypothesis of this paper, I have started by counting the number of women representatives in the village *panchayats* in the two case-study villages. Additionally, I have held key informant interviews concerning initiatives taken by village *panchayats'* women in Chota Nayrana and Tilonia vis-à-vis the groundwater issue.

Data collection – informant/respondent interviews

The material has been collected through respondent and informant interviews as well as place-based observations. The decision to conduct interviews for testing the four hypotheses of this paper was made due to insufficient previous research regarding perceptions of village *panchayats'* representatives as well as village inhabitants' vis-à-vis the groundwater scarcity problem in the region of Rajasthan. Considering the insufficiency of earlier research material, I regard that the best way to achieve the objectives of the paper is through conducting respondent and informant interviews.

The decision to mainly interview the village *panchayat* representatives in the two case-studies villages is based on broad knowledge of the village *panchayat* representatives about the water situation in the research villages as well as their ability to provide explanations for the different groundwater outcomes. Expanding the study to include interviews with village inhabitants in the two case-studies villages is also relevant when trying to maximise the variation (Esaiasson et. al. 2004) of those interviewed. Moreover, adequate micro-level insights regarding the perception of the groundwater scarcity issue in the two case-studies

villages could not be obtained by interviewing village *panchayat* representatives only. In this sense, a broader perspective on the way in which water projects and programmes introduced by the NGO *Barefoot College* and Rajasthan State Government in Chota Nayrana and Tilonia are viewed should also include responses from inhabitants in the two villages. Additionally, I have conducted interviews with the members of the community because of further insufficient previous material that can say something about the perception of village inhabitants regarding the groundwater resources in the two case-study villages.

The structure of the interviews

The number of interviews conducted in different categories in Chota Nayrana and Tilonia are given bellow:

Category of interviewees	Number of interviewees
<u>Decision-making level, Chota Nayrana</u>	
Male	4
Female	1
<u>Community people, Chota Nayrana</u>	
Community people	3
<u>Decision making level, Tilonia</u>	
male	5
Female	2
<u>Community people, Tilonia</u>	
Community people	4

Table 2. List of interviewees in Chota Nayrana and Tilonia

The literature on in-depth interviews, respondent and informant interviews, point to the importance of structuring the interviews into thematic and dynamic (Kvale 1997) as the most appropriate way for conducting interviews. The thematic is relevant for the area of research. The dynamic part of the interviews take into consideration the collaboration between the researcher and the interviewed through questions that are related to the thematic part (Kvale 1997).

Validity and Reliability

The validity of a research is based on three basic rules (Esaiasson et. al. 2004). These rules present a connection between the theory and operational indicators, non-systematic mistakes

when operating the study, and de facto research about what one is investigating (Esaiasson et. al. 2004). In addition, a theoretical approach of what is to be researched is required for exploring methods about how it is to be researched and, moreover, interviews must follow ethical guidelines (Kvale 1997). The validity of the result is afterwards to be generalised to the population. With regards to the study of this paper, the result is not to be generalised to the whole population (i.e. villages in India that suffer from a similar groundwater scarcity problem) but to verify the researched cases with the theoretical approaches and to see to what extent the theoretical approaches are relevant for the study.

Uncovering the causal mechanisms

As outlined above, I have created four hypotheses that connect to theoretical approaches aiming to understand the mechanisms behind the deviating outcomes of groundwater scarcity in Chota Nayrana and Tilonia. The hypotheses also function as operational instruments for the result of this paper. For an easier follow-up of the hypotheses, I have converted every single hypothesis into questions, which I use when performing the result collection. The result of this paper is thus lead by the hypotheses' operational questions. The answers received with the help of the research questions will enable me to evaluate the hypotheses and connect them to the analytic instrument.

Are there any significant differences in the way in which the village panchayat decision-makers as well the community inhabitants in Chota Nayrana and Tilonia perceive and cooperate towards the groundwater programmes and projects introduced by the NGO Barefoot College and the State Government? If yes, where does the difference lie?

Field observations that I made prior to the in-depth interviews and which aimed at answering the first question/hypothesis, showed that during around twenty years since the NGO *Barefoot College* was established in the region, the NGO has conducted various projects and programmes of water conservation. The projects are based on traditional water conservation methods like digging ponds and wells as well as rainwater harvesting from the roof of the houses. The construction of wells and ponds is important because they function as recharging sources of groundwater due to their ability to collect rainwater. In addition, the NGO provides water conservation programmes through “learning by doing” offered monthly (*Barefoot*

College 2007) to the inhabitants in Chota Nayrana and Tilonia by *Barefoot Collage's* representatives.

Furthermore, field observations in Chota Nayrana and Tilonia vis-à-vis the implementation of programmes and projects introduced by the Rajasthan State Government shows the construction of rainwater storage tanks as well as construction of a few hand pumps and ponds in the two case-study villages.

Having presented highlights of projects and programmes implemented by the NGO *Barefoot College* and the State Government in Chota Nayrana and Tilonia, it is of relevance for the results of this paper to understand how the implemented programmes and projects are perceived by both village *panchayat* decision-makers and community inhabitants.

Furthermore, the first hypothesis/question of this paper tries to find institutional factors of influence on the human behaviour that can contribute to the different groundwater outcomes in Chota Nayrana and Tilonia village. The question connects to the rational choice institutionalism in the sense that, in accordance with the already mentioned theory, humans are expected to collaborate with one another when realising that goals (in our case water conservation for decent survival) can be achieved through institutional action.

The institutional action with scope for community development and resource preservation provided by the guidelines of the 73rd and 74th Constitutional Amendments, “endow the *panchayats* with such a power and authority as may be necessary to enable to function as institutions of local self-government” with respect to “preparation of plans of economic development and social justice” (Shachdev 1998 p. 24). Furthermore, the Constitutional Amendments encourage the creation and involvement of NGOs in community development and natural preservation issues (Bogdanor 1999). Literature has likewise underlined that in the case of village *panchayats*, these bodies are entitled to take action to implement development programmes designed by the Government. The Government’s commitment to involve NGOs in the development process is confined mostly to implementation of development programmes (Meenakshi 2000). Moreover, research shows that instead of seeking incorporation or rejection of states’ involvement, NGOs adopt a posture of conflict towards the state and the dominant classes looking for the redistribution of resources with the help of state policies (Oomen 1994). The conflict situation between the state and the NGO institutions, literature demonstrates, has also proliferated between the village *panchayats* and

NGOs. The presented conflict situation between the village *panchayat* and NGOs is of importance for understanding the perceptions of the interviewees towards the water conservation projects and programmes of *Barefoot College* and the State Government in the study villages.

In order to understand the conflict situation between village *panchayats* and NGOs, it has been of interest to learn whether this situation was to be found in the case of village *panchayat* representatives in Chota Nayrana and Tilonia vis-à-vis water conservation projects and programmes introduced by the NGO *Barefoot College*.

While interviewing the village *panchayat* representatives in Chota Nayrana, the situation was exemplified by a majority of the village *panchayat* members as follows when being asked to describe their views towards *Barefoot College's* projects and programmes implemented in their village.

R: “The Barefoot College has helped the village numerous times. Whenever we have a problem of water, village *panchayat* representatives approach Barefoot College. The Barefoot College has benefited our village with many projects of water conservation. They are always here in the village two times a month for teaching methods of water conservation to the people in Chota Nayrana. The projects that they have introduced here have changed our way of life and thinking about water. Now we know that we cannot quickly consume or throw away the remaining water. Many people have learnt that water has to be shared and consumed in relation to family necessities. We have great trust in Barefoot College. The NGO has also benefited the village with labour because they have used villagers whenever digging up ponds or wells or installing hand-pumps”.

As illustrated by the quotation above, a positive view and strong recognition of *Barefoot College's* water harvesting and conservation projects have been adopted by the village *panchayat* members. Moreover, NGOs' projects and programmes have been regarded as highly valuable and helpful. It should be underlined that the village *panchayat* representatives in Chota Nayrana have highlighted the factor of trust that was existing towards NGO programmes and projects. Furthermore, the interviewees have emphasised the importance of learning programmes provided by *Barefoot College* to the inhabitants of the village in the matter of water conservation. The quotation above, which is representative of the rest of the answers given by the Chota Nayrana village *panchayat* members, does not indicate the existence of any conflict situation between the representatives of the *panchayat* and the NGO's water conservation programmes and projects.

Community inhabitants from Chota Nayrana share the opinions of the village *panchayat* members. Interviewing Chota Nayrana inhabitants about their perception towards projects and programmes implemented by the NGO *Barefoot College* in their village, the obtained answers point in the same direction as those of the village *panchayat* members. The quote below by one community member in Chota Nayrana is illustrative of the answers offered.

R: “The Barefoot College has constructed many ponds, wells and hand-pumps in the village. Without them, we would have perished here. The people now know that we have to save the water and not waste it. It helps the whole community to have a decent life even if we have sometimes conflicts regarding the water in the village when it is not raining much during the summer season. People from the Barefoot College come every month here in our village to teach and talk with the people about how to conserve the water”.

As this answer illustrates, there is a similarity between the perceptions of the community people and village *panchayat* representatives in Chota Nayrana regarding *Barefoot College's* water conservation programmes and projects. The answer above illustrates that there is a high amount of communication, trust and cooperation between the community and the NGO regarding the understanding and entertainment of water conservation programmes and an appreciation of the projects implemented in the village.

On the other hand, conducting interviews with representatives of the village *panchayat* in Tilonia regarding their perceptions towards the programmes and projects implemented by *Barefoot College* in their village, the received answers showed discrepancies in the interviewees perceptions in Tilonia compared to those from Chota Nayrana.

R: “The Barefoot College has done much for the village during the years. They have helped the villagers here with providing jobs in connection to ponds, wells and hand-pump construction in the village. They have also become rich here in Tilonia... they have just become bigger and bigger during the years. From where comes all the money if not from the people in Tilonia? If one asks them to build an underground water tank, they do it but one needs to pay for it you know? If they really wanted to help the village, they will not take any payment from the people. Money is important,” declared one male village *panchayat* representative.

As the quotation above reveals, there exists an accentuated conflict situation in Tilonia between the village *panchayat* representatives' perceptions towards the programmes and projects implemented by *Barefoot College* in the village. The programmes and projects that have been implemented by the NGO in the village are viewed as mostly benefiting *Barefoot*

College, in terms of finances. Despite the fact that the village *panchayat* representatives admit that the programmes and projects implemented in the village by the NGO have been to the benefit of the village community in terms of water conservation, the NGO's involvement is not perceived as being of elevated importance.

Interviews with the community inhabitants of Tilonia exemplify their perception regarding the projects and programmes implemented by *Barefoot College* in the village as: "useful ...they have helped the community. We know that we can always approach them if there is some problem with the water in the village. Every time when a hand-pump is dysfunctional, the people from the Barefoot College came and repaired it"... they have constructed many ponds and wells here. It has benefited mostly the poor and the Schedule Castes in the village. Before the Barefoot College came here, people belonging to the Schedule Caste community could not take water from the public pond as the higher caste people would not allow them".

The quotation reflects that the community representatives in Tilonia do not perceive the programmes and projects implemented by *Barefoot College* as conflicting with the villagers' interests. Furthermore, the quotation highlights that communication and cooperation exists between the NGO and the village inhabitants in matters of initiatives of water conservation.

In addition to the village *panchayat* representatives and community inhabitants' perceptions of water conservation projects and programmes introduced by *Barefoot College* in Chota Nayrana and Tilonia, I continued asking the interviewees in the two case-studies about their perception vis-à-vis programmes and projects implemented by the State Government. Previous research has emphasised that the Rajasthan State Government plays an important role in implementing projects and programmes for rural development, implicitly water conservation projects, through village *panchayats*. This has been of importance for further findings related to the first hypothesis/question of this paper.

Interview answers of the village *panchayat* representatives in Chota Nayrana in relation to the projects and programmes implemented in the village by the State Government discloses that:

R: "The office bearers of the concerned Government department believe that we do not have a big problem of water shortage in the village. They just think the people here complain unnecessarily... the Government does not help us too much. We in *panchayat* need to go and ask for funds many times. If we go there ten people, the Government will not listen to us but if we gather five hundred people then they listen".

As the quotation illustrates, the answers of the village *panchayat* representatives in Chota Nayrana reflect a relatively low level of confidence towards sufficient help from the projects and programmes of water conservation run by the State Government. Furthermore, the village *panchayat* representatives in Chota Nayrana have stressed the State Government's failure in engaging in productive communication with the village inhabitants, which leads to non-cooperation.

On the other hand, when asking village *panchayat* representatives in Tilonia about their perceptions concerning the implementation of programmes and projects by the Rajasthan State Government for improving the water situation in the village, some answers highlighted that: "the village has received Governmental programmes and projects for improving the water situation here. We always approach the Government. Governmental representatives have installed some water tanks in the village".

Judging by the responses received from the village *panchayat* representatives in Tilonia with respect to their perception and cooperation on programmes and projects implemented by the Rajasthan State Government for improving the water conservation in the village, it has been outlined that the village *panchayat* members hold a positive perception of the State Government programmes and projects implemented in the village.

However, when interviewing community inhabitants in Chota Nayrana regarding their perception and collaboration in relation to programmes and projects implemented by the Rajasthan State Government in their village, answers received have highlighted that:

R: "the Government promises all the time that they will help us. Their representatives come in the village and start building some tanks or ponds but after a while, they go their way and leave them unfinished. We do not rely much on the promises made by the Government".

In Tilonia, the interviewed community inhabitants concluded that:

R: "The aspirants for representatives of Government bodies at the State level come here nearby the elections and then they start constructing some pond or promise they will construct big water tanks for the village or that they will get a pipe line with water from Vilselpur (a nearby area). When the elections are over, they stop the work and do not turn up again until next elections. Water is politics here".

Thus the answers of the community inhabitants in Chota Nayrana and Tilonia are relatively similar with respect to the Rajasthan State Government's projects and programmes that have been implemented in the two case-study villages. The answers conclude that the Rajasthan State Government is not perceived as trustworthy due to failures in commitment concerning the State Government's involvement in water conservation in the two case-study villages. In addition, with respect to the Governmental projects initiated in both Chota Nayrana and Tilonia, inhabitants from both communities have emphasised the deficiency of the Rajasthan State Government's real involvement in the issue of water scarcity in the villages, except for in election times.

Is there any difference in the arrangement of the village panchayat structure in the two case-study villages that enables a lower prioritising of groundwater conservation in Tilonia compared to Chota Nayrana? If yes, what is the structural difference and what role does this play in the groundwater outcomes?

Considering the "path of dependency" advocated by historical institutionalism, the second question of this paper aims to test if the formal institutions, i.e. village *panachayat*, in Tilonia have established a path dependency, which might have negative influences on the groundwater conservation outcome in the village. In order to answer the question, it is necessary to compare the development of the village *panchayat* structures in Tilonia and Chota Nayrana after the 1992 introduction of the 73rd and 74th Constitutional Amendments.

Considering the aim of the Indian legislator to limit the interventionist and over-extended State (Raju 2003) for establishing a mean for social, economic and political development at the local level, the village *panchayats* have received various responsibilities through the 1994 *panchayat* Act. The *panchayats* are allowed to create working groups and subcommittees consisting of elected *panchayat* members and people who are interested in social welfare activities (Meenakshi 2000). Moreover, people representation and participation is ensured by the mandatory seat reservation for women, Schedule Castes and Schedule Tribes. The State Election Commission that supervises *panchayat* elections (Meenakshi 2000) certifies the representation. Regarding the functionality of standing committees, however, literature points to the fact that in many cases in the Rajasthan region the standing committee meetings are sporadic and more of a completion of formalities (Hooja & Hooja 2007). In addition, despite efforts made by the State Government to strengthen the power of standing committees

through self-help groups under the District Planning Committee, some *panchayat* bodies have felt that standing committees should not be allowed to emerge since they feel that the role of the *panchayats* might be threatened by their existence (Kumar 2006).

Field observations that I conducted with emphasis on the village *panchayat* structures in Chota Nayrana and Tilonia, have proven that the representation and participation at the village *panchayat* level in Tilonia and Chota Nayrana is in accordance with the acts of the 73rd and 74th Constitutional Amendments. It should be noted, however, that Tilonia has a greater number of village *panchayat* representatives compared to Chota Nayrana, but this difference is due to the size of the villages; Tilonia has a slightly higher number of inhabitants compared to Chota Nayrana. In conformity with the Constitutional Amendments, villages must have representatives at the *panchayat* level in accordance with the number of their inhabitants. Thus, the difference in the number of representatives at the village *panchayat* level in Chota Nayrana and Tilonia is not a structural one.

However, a closer study of the village *panchayat* structures in Chota Nayrana and Tilonia has in fact revealed a structural difference of the village *panchayats* in the two case-study villages. The difference was encountered with respect to the existence of standing committees. The village *panchayat* in Chota Nayrana has a water standing committee, a committee which does not exist in Tilonia. Three members of the village *panchayat* and twenty community members dealing with water issues in the village composed the water standing committee in Chota Nayrana. The interaction between the village *panchayat* representatives and community members in Chota Nayrana through the water standing committee learned to make a difference in the village vis-à-vis water issues. In Tilonia, no standing committee in general or water standing committee in particular was found. In Tilonia, issues regarding water conservation and groundwater scarcity were mainly discussed between the village *panchayat* representatives. It is important to mention that literature on *panchayat* institutions have exposed that meetings, discussions and decisions at the village *panchayat* level are not always conducted in a transparent way towards the village inhabitants (Hooja & Hooja 2007). Having outlined the structural differences at the village *panchayat* level in Chota Nayrana and Tilonia, one can highlight that the village *panchayat* level in Chota Nayrana functions in a more transparent way compared to that of Tilonia.

Is there any possibility of shorter versus longer self-maximising priority of the groundwater resources by the village panchayat representatives in Tilonia and Chota Nayrana with respect to their caste appurtenance? If yes, in which way does the caste appurtenance of village panchayat representatives in Tilonia and Chota Nayrana influence the priority of the groundwater resources?

Regarding Ostrom's findings (2005), attributes of the participants such as social status are important in understanding the human motivation for accepting rules. The socially complex situation of Indian villages with respect to the hierarchy of the caste system (which is still relevant in many Indian villages despite the system's juridical prohibition and attributes of empowerment provided by the Constitutional Amendments with respect to the Schedule Castes and Tribes), raise questions about the possible influence of the caste appurtenance of the village *panchayat* representatives on decisions regarding the priority of water. The issue furthermore relates to the theory of historic institutionalism, which emphasises the importance of informal institutions, i.e. the caste system, in the process of "path dependency" that can affect institutions.

Literature has outlined that Indian society has been structured through history in castes with additional sub caste categories (Kerr 1996). Moreover, the caste system is hierarchical and the castes possess a strong feeling of caste patriotism. The hierarchy of caste depends on the occupations that the person's ancestors possessed. Moreover, the number of castes varies from region to region. Although in the historic socio-political context each caste had a defined place in the social hierarchy, the caste hierarchy through history has not always been static (Desai & Shab 1985). The caste social hierarchy has been changed though castes' improved economic status. This process is known as Sanskritisation (Desai & Shab 1985). Even if the process of Sanskritisation has benefited middle and lower castes to achieve higher social positions, it should be noted that groups of middle and higher castes realised that their status could not be protected only through economic interests but could be achieved by holding political offices (Desai & Shab 1985). Lower castes, especially the ex-untouchables such as Schedule Castes and Schedule Tribes, have succeeded through the years to strengthen their status, especially after the 73rd and 74th Constitutional Amendments that allow their political representation. The Amendments require the mandatory distribution of one third of the village *panchayat* seats to representatives of Schedule Castes and Schedule Tribes. The major goal of the Constitutional Amendments regarding the political representation of marginalised castes is

the break-up of the caste hierarchy as well as caste annihilation (Desai & Shab 1985). Other research, however, highlights that despite the political representation entitled by the Constitutional Amendments, higher castes struggle to consolidate their advantageous positions (Thorat 2000). Caste is a social reality and political relationships are bound to reproduce patterns of social dominance because in many cases, literature has emphasised, the political affiliation of the village leaders tend to be supported by a substantial number of caste members (Rockman 1993).

Considering the caste hierarchy, I have examined the caste distribution of the village *panchayat* representatives in Chota Nayrana and Tilonia. In Tilonia, the caste distribution of the village *panchayat* representatives is as follows: four of the village representatives belong to the Jat¹ sub caste (a sub caste that belongs to the Brahmins² caste); one village representative belonging to the Rajput³ sub caste (a sub caste that belong to the Brahmin caste); and two village representatives belonging to the Schedule Castes⁴. The distribution of village *panchayat* representatives in Chota Nayrana with respect to their caste appurtenance is as follows: one village representative belonging to the Jat sub caste; one village representative belonging to the Darzi⁵ sub caste; one further village representative belonging to the Gujar⁶ sub caste; and one village representative belonging to the Schedule Castes.

Having established that the caste hierarchy is related to ancient occupancies, it has been of interest to know whether the village representatives in Chota Nayrana and Tilonia perceive groundwater use as a priority for certain sectors depending on their caste appurtenance, as this could have implications for short- versus long-term groundwater use.

I asked the interviewees if they think that the groundwater in their village should be prioritised for a particular sector:

R: “A sector for which water is a priority is the agriculture...agriculture is important here for some families in the village”, was the answer of a Jat village representative in Tilonia.

¹ Historically, the major occupancy of the Jat sub caste has been agriculture and animal raising

² The highest caste in the Indian caste hierarchy

³ The major sub caste in Rajasthan, that has military chief as historic major occupancy

⁴ The ex-untouchables, through history deprived of rights by upper castes and considered as polluting when touched by higher castes

⁵ Sub caste belonging to the Other Backwards castes, historically with the major occupancy in tailoring

⁶ Sub caste belonging to the Brahmins group of caste, historically with major occupancy as cattle bearers and dealers

Another village representative in Tilonia belonging to the Rajput sub caste added:

R: “Agriculture is important for the community. The water priority for agriculture does not affect the community water resources, as the people in the village owning agricultural land dig their own ponds and wells on their private soil. They do not affect the water resources for the rest of community”.

The answers thus indicate that most of the village representatives in Tilonia believe that agriculture should have priority when using the groundwater resources. However, as illustrated by the answer of one of the village representatives, their knowledge about water circle and regeneration in the ground is unfortunate because of the perception that use of groundwater from private ponds and wells do not have negative implications for the community’s water resources.

A deviant response regarding the perception of groundwater priority has been received from one village representative in Tilonia belonging to the Schedule Caste, who added:

R: “Water should be equally distributed for all the people in the village. No sector should be prioritised... The wealthy people in the village have, though, more sources of water because they build personal ponds and wells”.

The answer indicates that the village representative in Tilonia belonging to the Schedule Caste highlights the importance of equal groundwater distribution in the village with no preference for any particular sector.

Summing up the answers of the village representatives in Tilonia in relation to the caste distribution of the village *panchayat*, most of the received answers indicate a tendency of the higher castes to give priority of the groundwater resources for the agricultural sector for short-term benefits. Moreover, the use of groundwater for personal agricultural purposes is not perceived as having negative long-term results for the rest of the community’s groundwater resources.

On the other hand, when asking the village *panchayat* representatives in Chota Nayrana about giving priority to a particular sector for the use of groundwater resources, one member belonging to the Gujar sub caste stated:

R: “Water should be equally distributed to all. It should not be prioritised for any sector. In the *panchayat* meetings we talk about how to have enough water for the whole village especially during the dry season”.

The rest of the village *panchayat* representatives in Chota Nayrana, including the Schedule Caste representative, came with arguments similar to the Gujar village *panchayat* representative when considering the priority of groundwater resources for a particular sector.

The result of the interviews in Chota Nayrana regarding the groundwater distribution/priority reveals that the village *panchayat* representatives believe with considerable unanimity that the groundwater should not be prioritised for any particular sector of activities. Their replies underline that water should be equally distributed in the community and managed in a proper way in order to meet the village's needs, especially during the dry season. Additionally, no pattern relating the village *panchayats'* caste appurtenance to opinions about the water distribution/priority for a particular sector of activities has been found.

Is there any difference in the percentage of women at the village panchayat level in Tilonia and Chota Nayrana? If yes, is there any difference in approaching measures for solving the groundwater scarcity problem?

Feminist and ecofeminist theories argue that socially constructed gender-power relations may replicate into the state and market institutions (Presser & Sen 2000) if efforts of women empowerment do not reflect a change in power relations. Moreover, women's environmental approach considers the danger of reproducing inequalities within its own structure when women movements emerge within a framework of social and economic inequalities (Amos & Parmer 1984). Gender aspects, Ostrom has further revealed, are important elements in the acceptance of new rules, i.e. environmental rules for human action.

Broadly speaking, women in rural India in general and in Rajasthan in particular, have not enjoyed a high degree of empowerment in society mainly because of a historically high degree of patriarchy that is still alive in rural India (Manikyamba 1989). Progress in empowering women in rural areas have however been made, especially through women's one-third mandatory representation in *panchayats*. Even though women are still in need of greater empowerment, particularly regarding education, research has highlighted that when inheriting *panchayat* functions, women largely tend to prioritise initiatives in the direction of household needs, water supply, tap water and toilets (Baviskar 2002). These observations are

valuable in understanding the village *panchayat* women's approach in Tilonia and Chota Nayrana concerning the groundwater scarcity issue.

When carrying out field observations, I noted that there indeed is a difference in women representation at the village *panchayat* level in Tilonia and Chota Nayrana; there are two women representatives in the Tilonia *panchayat* and one woman representative in the Chota Nayrana *panchayat*.

Differences in women's representation in the village *panchayat* in Tilonia and Chota Nayrana, stems from the fact that Tilonia has slightly more female inhabitants compared to Chota Nayrana, which implies more seats for women at the village *panchayat* level in accordance with the rules introduced by the Constitutional Amendments regarding women representation.

Furthermore, with respect to women empowerment being a part of the decision-making level, it has been of interest to understand whether there is any difference between the village *panchayat* women in Tilonia and Chota Nayrana in terms of their approach to methods of water conservation. Consequently, I have asked the village *panchayat* women to exemplify concrete measures that they have taken at the Village *panchayat* level for improving water conservation.

R: "I have talked to the rest of the village *panchayat* members to construct one additional water tank in the village with funds received from the Government. I have also proposed the village *panchayat* members to ask the Barefoot College to repair two hand-pumps in the village", was the answer received from one of the Tilonia *panchayat* women.

In addition, the second interviewed *panchayat* woman in Tilonia underlined that she has proposed and implemented measures in the village vis-à-vis water conservation issues by persuading "the people in the village to construct more personal groundwater tanks and use less water for the daily purposes".

The answers received from two interviewed *panchayat* women in Tilonia indicate that the women representatives here have been more focused on measures that concern water availability in the village and not too much about water conservation issues. For increasing the water availability in the village, women *panchayat* representatives have provided initiatives of community water tank construction as well as individual groundwater tanks. In

terms of empowerment, the village *panchayat* women in Tilonia have not exercised enough power of initiative related to issues of water conservation, as the measures concerned proposals rather than actions for water conservation.

When interviewing Chota Nayrana's *panchayat* woman representative about personal initiatives in terms of water conservation methods in the village, the answer received emphasised that:

R: "I always talk to the village *panchayat* representatives and community members about how to make sure that the water in the village is used properly and not wasted. Water is very important for us. I have also suggested the village *panchayat* the building of one additional pond in the village where we can store the rain water".

The answer reveals that the woman *panchayat* representative in Chota Nayrana was involved in initiatives concerning the conservation of water through water storage construction as well as initiatives of awareness-raising in the community regarding the importance of both water availability and conservation. Moreover, in terms of women empowerment at the village *panchayat* level in Chota Nayrana, the answers received highlight initiatives/suggestions of water conservation in the village initiated by the village *panchayat* woman representative. However, there was no evidence of her wielding a greater amount of power in taking initiatives for water conservation issues in the village.

Exploring the role of formal and informal institutions

Initiatives for preventing the unsustainable exploitation of natural resources at the community level have been of concern for legislators, grassroots organisations and theorists alike. In the case of India, the legislator has provided means for empowering communities in taking action on issues that directly affect the welfare of the community, such as finding solutions to the groundwater scarcity problem that affects many regions of the Indian subcontinent.

Community empowerment in India has been achieved through institutions of local decision-making, as ascribed by the 73rd and 74th Constitutional Amendments. Furthermore, the Constitutional Amendments offer possibilities for NGOs to participate in community development initiatives and resource preservation. In this sense, the Constitutional Amendments provide ways of social transformation that would lead to sustainable development of communities aiming at the maintenance of natural resources. Despite these provisions, the depletion of natural resources at the community level due to unsustainable use

is still a reality in many places around India, one of them being the case of Tilonia village. Moreover, despite the unsuccessful community management of the groundwater resources in Tilonia, success in managing the community groundwater resources has been registered in the case of the village Chota Nayrana.

Ostrom's research about human behaviour and human interactions when accepting new norms and rules has highlighted that humans tend to act in accordance with their institutionalised culture, which affects individuals' values, proving that both formal and informal institutions matter. Ostrom's research connects in this way to previous institutional theories that are also concerned with the functionality of formal and informal institutions affecting human behaviour. Regarding Ostrom's research that joins the importance of formal and informal institutions for human interactions/behaviour, one can connect her approach to theories that largely discuss the importance of the previously named institutions. The theories I have used for this purpose have been rational choice and historic institutionalism. Furthermore, Ostrom's research has highlighted that the attributes of the participants, such as gender and social status, are important when interacting and accepting norms. The gender perspective has further been developed by theories of feminism and ecofeminism, the latter connecting the gender dimensions to the view/exploitation of natural resources. The importance of social status attributes for human behaviour when accepting norms and rules has further been developed by the historic institutionalism tradition when it comes to informal institutions. The purpose of this paper has been to understand to what degree the above presented theories - rational choice institutionalism, historic institutionalism and women empowerment/ecofeminism - can provide an answer about the differences in human behaviour at the community level that lead to the deviant groundwater outcomes in Tilonia and Chota Nayrana. To this end, the theoretical approaches have been tested in connection to the social reality of the two case-study villages by exploring the hypotheses/questions of this paper, which were formulated by drawing from the theories, to obtain the results. Furthermore, considering the variation of the groundwater outcomes in Tilonia and Chota Nayrana I have constructed an analytical instrument composed of the variation in the independent variables (the paper's hypotheses/questions) in order to explore the community-level differences.

Testing the first hypothesis of this paper, the results from the interviews have underlined the factor of trust highlighted by Chota Nayrana's village *panchayat* representatives towards the

programmes and projects implemented by *Barefoot College*. In Tilonia on the other hand, the results of the interviews have pointed to the existence of mistrust at the village *panchayat* level towards the programmes and projects implemented by *Barefoot College* in the village. The Tilonia *panchayat* representatives revealed a sense of conflict towards the NGO's implementation projects. The existence of conflict situations between *panchayats* and the NGO's development goals has previously been highlighted by literature that has looked at the interactions between NGOs and *panchayats*. Furthermore, when testing the perceptions of the community members in the two case-study villages towards programmes and projects implemented by *Barefoot College*, the perceptions of the two community members were similarly positive. On the other hand, testing the perceptions of the village representatives in Chota Nayrana towards the programmes and projects offered by the Rajasthan State Government, the village *panchayat* representatives stressed low levels of confidence towards those programmes. In contrast, the village *panchayat* representatives in Tilonia hold a positive perception of the projects implemented by the Rajasthan State Government in the village. Nevertheless, community inhabitants in both Chota Nayrana and Tilonia have expressed negative perceptions of programmes and projects implemented by the State Government in their villages, reflecting the inefficiency of the Rajasthan State Government in offering solutions to the groundwater scarcity problem.

Linking the results of the first hypothesis/question of this paper to the rational choice theory, the findings disclose that the village *panchayat* members in Tilonia and Chota Nayrana regard the importance of programmes and projects implemented in their villages by *Barefoot College* and the State Government differently. No difference of perception regarding this issue has, however, been found at the community level in the two case-study villages. From a rational choice perspective point of view, which the hypothesis/question aims to test, one can conclude that in Chota Nayrana the community has realised that it is in its best interest to act in a common way for mitigating the groundwater scarcity problem. On the other hand, applying rational choice institutionalism to the findings in Tilonia, one can conclude that the negative perception of the village *panchayat* representatives towards programmes and projects implemented by the NGO *Barefoot College* have lead to inconsistent efforts at the village *panchayat* level in tackling the groundwater scarcity problem in the village. Nevertheless, results have pointed to positive community attitudes in solving the groundwater issue.

The second hypothesis/question of this paper aims to test historic institutionalism with an emphasis on the formal institutions. My own field observations have shown the existence of a water committee in Chota Nayrana, a committee that has not been found in Tilonia. Previous research has underlined that despite responsibilities received by the village *panchayats* after the introduction of the Constitutional Amendments regarding creation of standing committees as an input factor for social development at the local level, some *panchayats* have not taken such steps. The field observations showed, however, that the rest of the village *panchayat* structures in Chota Nayrana and Tilonia were alike. The results of the second hypothesis/question related to the theory of historic institutionalism underscores the apparent “path of dependency” in Tilonia connected to the configuration of the formal institutions; a path determined by the unwillingness of the village *panchayat* representatives to admit the creation of the standing committees at the village *panchayat* level. No “path of dependency” of the formal structure of the village *panchayat* has, however, been found in Chota Nayrana.

The third hypothesis/question of this paper intends to test historic institutionalism with an emphasis on informal institutions. Considering the vast historic social structure of Indian villages with respect to the hierarchy of caste, the caste appurtenance of the village *panchayat* members in the two case-study villages was investigated as a potential factor of influence for the deviant groundwater outcomes. As earlier mentioned in this paper, the historic hierarchy of caste is linked to the castes’ ancient occupational duties and, in the case of middle and higher castes, their tendency to find new means for perpetuating their historical privileged position. The results of the research showed that in the case Tilonia’s *panchayat* representatives, with the expectation of one Schedule Caste village representative, view agriculture as a sector that should be prioritised for the use of groundwater resources in Tilonia. In contrast, the findings in Chota Nayrana showed that groundwater resources should not be prioritised for any particular sectors, but should be distributed equally to all inhabitants. Furthermore, findings related to caste appurtenance with respect to its historic occupancy show that the village *panchayat* representatives in Tilonia have more representatives belonging to higher caste groups that have had agriculture and animal raising as historic occupancy. In Chota Nayrana, on the other hand, the caste distribution at the village *panchayat* level has shown to be more proportional than in Tilonia because of its incorporation of middle castes. Finally, the results of the third hypothesis/question emphasise that in the case of Tilonia, the caste appurtenance of the village *panchayat* members play a role in the decisions made for the use of groundwater resources in the village. In Chota

Nayrana, however, the caste appurtenance of the village *panchayat* representatives cannot be said to have influenced the decisions on the use of groundwater resources.

The fourth hypothesis/question of this paper aims at testing the gender attributes highlighted by theories of women empowerment and ecofeminism with an emphasis on women *panchayat* representatives' approaches on solving the groundwater scarcity problem. Results have, however, not shown any remarkable differences in particular initiatives taken by women *panchayat* representatives in any of the two case-study villages for improving the groundwater availability. Findings have, however, illustrated that the woman *panchayat* representative in Chota Nayrana was more concerned with initiatives for community water conservation while the women *panchayat* representatives in Tilonia were more concerned with measures regarding water availability in their village.

Having presented the general findings of the paper it is necessary to outline to which extent the presented hypotheses explain the deviant groundwater outcomes in the two case-study villages.

Independent variables	Explanation of outcomes	
	Yes	No
<p>(H1) Water conservation programmes and projects introduced by the NGO Barefoot College and the State Government are perceived and followed differently by village <i>panchayat</i> representatives and community inhabitants in Chota Nayrana and Tilonia</p>	<p>-The village <i>panchayat</i> representatives in Tilonia do not perceive water conservation programmes and projects implemented by the NGO Barefoot College of significant importance for solving the groundwater scarcity in the village.</p> <p>-Contrary to the village <i>panchayat</i> representatives, community inhabitants in Tilonia perceive water conservation programmes and projects introduced by the NGO Barefoot College in the village <i>panchayat</i> in a positive way.</p> <p>-The village <i>panchayat</i> representatives, however, perceive water conservation programmes and projects introduced in the village by the State Government</p>	<p>-Water conservation programmes and projects introduced by the NGO Barefoot College are viewed positively, and implicitly followed, by both the village <i>panchayat</i> representatives and community inhabitants.</p> <p>-Water conservation programmes and projects introduced by the State Government are not perceived as beneficiary for the village, neither by the village <i>panchayat</i> representatives nor by the community inhabitants</p>

	<p>as beneficiary.</p> <p>-The water conservation programmes introduced by the State Government in the village of Tilonia, on the other hand are not considered as being beneficiary for the community by interviewed inhabitants</p>	
<p>(H2) Possible structural differences of the village <i>panchayats</i> in Chota Nayrana and Tilonia may induce a lower priority of groundwater conservation in the two case-study villages</p>	<p>-In Tilonia the village <i>panchayat</i> level has not allowed the creation of standing committees in general or water standing committee in particular</p>	<p>-In Chota Nayrana the village <i>panchayat</i> level has allowed the creation of a water standing committee. The committee plays a very important role in discussing and making decisions at the village level regarding water conservation issues</p>
<p>(H3) Caste appurtenance of the village <i>panchayat</i> members in Chota Nayrana and Tilonia may play a role in the deviant groundwater outcomes</p>	<p>-In Tilonia, most of the village <i>panchayat</i> members belong to higher caste categories. The caste appurtenance of the village <i>panchayat</i> members in Tilonia has proved to play a role in the way water resources are prioritised in the community</p>	<p>-In Chota Nayrana, the village <i>panchayat</i> representatives belong to a variety of castes. No higher caste category has been found to dominate. The caste appurtenance of the village <i>panchayat</i> members in Chota Nayrana have not proved to play a role in the way in which water resources are prioritised in the community</p>
<p>(H4) A difference in women representation in the <i>panchayat</i> level in Chota Nayrana and Tilonia, as well as their approach vis-à-vis water conservation programmes may play a role in the different groundwater outcomes in the two case-study villages</p>	<p>-In Tilonia, the number of women representatives in the village <i>panchayat</i> is larger compared to that of Chota Nayrana, due to more female inhabitants in the village.</p> <p>-The women representatives in the village <i>panchayat</i> in Tilonia tend to mainly focus on means that concern water availability rather than water conservation issues.</p> <p>-Village <i>panchayat</i> women in Tilonia have, however, not proven to hold enough power for taking initiatives for conserving the water resources in the village.</p>	<p>-In Chota Nayrana, women representation in the village <i>panchayat</i> is lower compared to Tilonia, due to the smaller number of women inhabiting the village.</p> <p>-The woman village <i>panchayat</i> representative in Chota Nayrana has shown concern for taking initiatives for water conservation in the village</p> <p>-The village <i>panchayat</i> woman in Chota Nayrana has, however, not demonstrated any greater amount of power for launching initiatives in regards to water conservation.</p>

Table 3: Results analytic instrument

Conclusions

The aim of this paper has been to understand to what degree different institutional theories, including theories of ecofeminism and women empowerment, explain the variation in the deviant outcomes of groundwater resources in Chota Nayrana and Tilonia. In order to explain the above named theoretical approaches, I have formulated four different hypotheses that have been connected to previous literature of Indian realities in general while drawing from the theoretical models.

Findings of the first hypothesis have proven that in Tilonia the village *panchayat* representatives have not experienced that common action shaped by institutional incentives for improving the groundwater level in the village is of concern. In this case, rational choice institutionalism does not fit with the observations from the Tilonia village. Contrary to the findings in Tilonia, the results of the interviews have shown that in Chota Nayrana one can apply the theory of rational choice institutionalism to the common actions of the village *panchayat* representatives and community inhabitants when accepting projects and programmes for increasing the groundwater level.

The results of the second hypothesis when applied to the theory of historic institutionalism have confirmed that a dependency path has affected the formal institutional level in Tilonia. Results show, however, that the path dependency situation cannot be applied to the case of Chota Nayrana.

The third hypothesis in relation to the theory of historic institutionalism has concluded that in Tilonia the informal institution of caste plays a role in the way groundwater resources are distributed. The village *panchayat* members in Tilonia with respect to their caste appurtenance prioritise the groundwater resources for agricultural purposes, which brings short-term benefits and would not be advantageous for the whole village community in the long term. In Chota Nayrana, on the other hand, the study of the informal institutions in terms of the caste appurtenance of the village *panchayat* representatives has demonstrated that it did not play a role in the groundwater resource use and distribution.

Findings of the fourth hypothesis, which investigated theories of ecofeminism and women empowerment, have outlined that these theories do not yield an important role in explaining the groundwater variation in Tilonia or Chota Nayrana.

Finally, the results of the research emphasise that the problem of groundwater scarcity in Tilonia depends mainly on the non-functionalities of the formal and informal institutions of the village *panchayat* in Tilonia, which has led to the individual maximising of the groundwater resources in the village to the detriment for the rest of the community.

Taking into account the hypotheses that I have tested in this paper, further studies into the unsustainable use of the groundwater resources at the community level in Tilonia can be conducted by further research in the area. Future research can provide supplementary responses on this issue by taking into account the role of the State Government in general and the District Rural Development Agency in particular in the village *panchayat*. Another important aspect to be considered is the role played by the political parties in the local elections. The impact and influence of political parties is of significance as the village *panchayat* representatives must stand in local elections, which could also have implications for community groundwater governance.

References

Printed sources

- Amos, V. & Parmar, P. (1984) “*Challenging Imperial Feminism*”, *Feminist Review*
- Baviskar, B. S. (2002) “*Including the Excluded, Empowering the Powerless: Case Studies of Panchayat Raj in Maharashtra*”, Institute of Social Sciences, New Delhi
- Batliwala, S. (1994) “*The Meaning of Women Empowerment: New Concepts from Action*”, in Gita Sen, Adrienne Germain and Lincoln Chen (eds.), “*Population Policies Reconsidered: Health Empowerment and Rights*”, Cambridge, Mass: Harvard University Press
- Barefoot College (2007) “*Report on Water and Environment*”, Barefoot College
- Bogdanor, V. (1999) “*Devolution: Decentralisation or Disintegration?*” *Political Quarterly* 70, no. 2
- Chambers, R. (1993) “*Challenging and Professions: Frontiers for Rural Development*”, London: Earthscan Publications Ltd

- Desai, I. P. & Shab G. (1985) " *Caste, Caste-Conflict and Reservation* ", Ajanta Publications Javahar Nagar, Delhi
- Esaiasson P., Giljam M. Oscarsson H., Wängnerund L. (2004) " *Metodpraktikan* ", Nordstedts Juridik AB
- Frontline (August 17-30, 2002) " *India's National Magazine* ", Volume 19, Issue 17
- Hooja R. & Hooja M. (2007) " *Continuity and Change in Rajasthan's Panchayati Raj* ", Rawat for Rawat Publications, Jaipur
- Huber E. & Stephens J.D. (2001) " *Development and Crisis of the Welfare State* ", University of Chicago Press
- Kumar, G. (2006) " *Local Democracy in India - Interpreting Decentralization* ", Sage Publications India Pvt Ltd, New Delhi
- Khanna, D.D. & Kueck, G.W. (1999) " *Principles, Power and Politics* ", Macmillan, New Delhi
- Kerr, J.M. (1996) " *Economics of pasture development and protection in Rajasthan* ", Macmillan: New Delhi
- Kvale, S. (1997) " *Den kvantitativa forskningsintervjun* ", Lund: Studentlitteraturer
- Mellor M. (1997) " *Feminism and ecology* ", New York University Press
- Manikayamba, P. (1989), *Women in Panchayat Raj Structures*, Gian Publishing House, New Delhi
- Mathur, P.C. (eds. 1998) " *Administrative System of Rajasthan: Institutional Landmarks*, Aalekh, Jaipur
- Morriss, P. (1987) " *Power: A Philosophical Analysis* ", Manchester: Manchester University Press
- Meenakshi, A. (2000) " *Representing Communities: The Caste of a Community- Based Watershed Management Programmes in Rajasthan India* ", Pacific Institute for Studies in Development, Environment and Security
- Oomen T.K. (1984) " *Social Transformation in Rural India, Mobilisation and State Intervention* ", Vikas Publication House Pvt Ltd, Bombay
- Ostrom, E. (2005) " *Understanding the Institutional Diversity* ", Princeton University Press
- Peters, B.G. (2005) " *Institutional Theory in Political Science, the New Institutionalism* ", Continuum
- Presser H. Sen G. (2000) " *Women's Empowerment and Demographic Processes* ", Oxford University Press
- Rein, M. (1983) " *From Policy to Practice* ", London: Macmillan

- Rockman, B.A. (1993) *“The new institutionalism in old institutions”*, Governing Process and Political Change Dynamics of American Politics
- Raju, K.V. (2003) *“Water Rights in India: A Case Study of Andhra Pradesh”*
- Stålgren, P. (2006) *“Worlds of Water: Worlds Apart”*, Department of Political Science, Gothenburg University
- Sachdev, P. (1998) *“Panchayati Raj Laws in Rajasthan”*, Rajasthan State Current Statues, Jodhpur
- Shiva, V. (1988) *“Staying Alive- Women, Ecology and Survival in India”*, Kali for Women A 36 Gulmohar Park New Delhi
- Thelen, K. & Steinmo S. (1992) *“Historical Institutionalism in Comparative Politics”*, Cambridge University Press
- Thorat, S. (2000) *“Empowering Marginalized Groups-Policies and Changes”*, New Delhi

Electronic sources

Homepage of Government of Rajasthan:

<http://rajasthan.gov.in/>