

Let me tell you how it will be; There's one for you, nineteen for me.

An institutional analysis of sharecropping in North Gujarat, India



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*Let me tell you how it will be
There's one for you, nineteen for me
Cos I'm the taxman, yeah, I'm the taxman*

*Should five per cent appear too small
Be thankful I don't take it all
Cos I'm the taxman, yeah I'm the taxman*

*If you drive a car, I'll tax the street
If you try to sit, I'll tax your seat
If you get too cold I'll tax the heat
If you take a walk, I'll tax your feet*

*Taxman!
Cos I'm the taxman, yeah I'm the taxman*

*Don't ask me what I want it for (Aahh Mr. Wilson)
If you don't want to pay some more (Aahh Mr. Heath)
Cos I'm the taxman, yeah, I'm the taxman*

*Now my advice for those who die
Declare the pennies on your eyes
Cos I'm the taxman, yeah, I'm the taxman*

*And you're working for no one but me
Taxman!*

Lyrics: Taxman, The Beatles

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Glossary

<i>Baghewi</i>	sharecropping
<i>Bajri</i>	millet
<i>Baxi Panj</i>	Other Backward Casts
<i>Chapera</i>	grass and cotton and bamboo houses
<i>Dahlia</i>	an open canal which brings the water from the <i>kundi</i> to the network of irrigation canals in the farm field
<i>Dhenkwa</i>	former groundwater harvesting technique
<i>Gram Panchayat</i>	Village Council
<i>Juwar</i>	type of wheat
<i>Katcha</i>	mud shelter
<i>Kaka</i>	uncle
<i>Kosh</i>	former groundwater harvesting technique
<i>Kundi</i>	the tank which connects and underground pipeline with the surface in order to lift the water up and make it available for irrigation
<i>Lakh</i>	1 <i>lakh</i> is 100.000 Indian Rupees
<i>Mug, mud</i>	mung-beans, green and yellow
<i>Mur</i>	unit of weight. 1 <i>mur</i> is 20 kg
<i>New Sarkat</i>	land in which the government has a stake. The land cannot be sold, no tax has to be paid, and it is registered as government property and not of the tiller.
<i>Old Sarkat</i>	land which is completely owned by the farmer himself. The farmer has to pay tax, and the land is registered on the name of the farmer owning the land. The land can be sold to other parties.
<i>Paka</i>	house of bricks and cement
<i>Rahent</i>	former groundwater harvesting technique
<i>Sarpanch</i>	council leader, elected by the Panch members
<i>Simanth</i>	farmer smaller than small
<i>Talathi</i>	secretary of <i>Gram Panchayat</i> , employed by the government
<i>Taluka</i>	administrative unit also known as district block
<i>Vikas</i>	5 <i>vikas</i> is 1 hectare
<i>Vaas</i>	block of houses in the village organized by caste
<i>Yamin</i>	land

Abbreviations

AIDMI	All Indian Disaster Mitigation Institute
CGWA	Central Ground Water Authority
CGWB	Central Ground Water Board
GDP	Gross Domestic Product
GEB	Gujarat Electricity Board
GM	Genetically Modified
GWRC	Gujarat Water Resources Council
GWRDC	Ground Water Resources Development Corporation
JGS	Jyotigram Scheme
NCA	National Commission on Agriculture
ft	feet
ha	hectare(s)
kg	kilogram(s)
km	kilometer(s)
km ³	cubic kilometer(s)
mm	millimeter(s)
Rs	Indian Rupees

1 Introduction

1.1 Background

Food security, defined as '*access to the food required for a healthy and productive life*' (GEF¹, 2002), can be influenced by political, economic, social, and environmental factors. This thesis focuses on the environmental characteristics related to food security. Environmental degradation threatens food security, as both quality and quantity of land and water affect agricultural productivity. Soil degradation, polluted waters and groundwater depletion threaten food production, especially in densely populated countries. Sustainable land and water use will influence food production in the long term.

India, with large dry regions, depends upon agriculture as a significant income sector; together with logging, fishing, forestry and dairy it accounts for 18.5% of the GDP, and about 60% of the population is dependent upon agriculture for their livelihood (IEO², 2007). The country has a rich history of land and water use and management practices. Even before British colonization Indians were working on surface-water harvesting techniques for agriculture. However, due to population growth, agricultural innovation, and the Green Revolution, food production increased. To sustain a high level of production an increase in inputs was necessary. Groundwater-based agriculture started to become important, especially in the dry regions of India.

The lowering of the water table in India started during the British period; British colonial law had brought individual property rights combined with the right to extract groundwater. A landowner could extract as much water from below his property as he wanted without any restrictions, and he even received state subsidies and tax exemptions to invest in tubewells (Mukherji and Shah, 2005; Prakash, 2005). Groundwater levels decreased in the dry areas of India, and especially in the state of Gujarat. About 27% of the total area of the state is drought-prone, and thus Gujarat is predominantly dependent upon groundwater for irrigation water: 82% of the irrigated area is groundwater irrigation. Gujarat has an estimated replenishable groundwater volume of 17.3 km³ of which 10.2 km³ is extracted every year. Today, 31 *taluka*'s (administrative regions) in Gujarat are over-exploited. Furthermore, 71% of Gujarati tubewells observed between 2000 and 2003 experienced a decline in water level, of which 34% showed a water level decline of more than 4 m. 1.38 million pumps contributed to this rapid decline, of which 50% were electric pumps with high capacity to allow water to be pumped from increasingly deep levels (Mukherji, 2006).

Groundwater withdrawal by electric tubewells is in the hands of rich farmers who have capital to invest in high capacity technology and electricity to exploit groundwater at a deeper level. The extracted water is primarily used for the pump-owner's purposes; the surplus of water is sold and exchanged with small and marginal farmers. The government of Gujarat has responded to the grave groundwater depletion by developing various policies to curtail groundwater exploitation, for example raising the price of electricity. These burdens, however, are transferred to the small and marginal farmers who have become dependent on those with capital to invest (Verdery, 2004). For small and poor farmers, a result of natural resource concentration by rich farmers is sharecropping (Prakash, 2005). This form of tenancy

¹ Global Environment Facility

² Indian Economic Overview <http://www.economywatch.com/indianeconomy/indian-economy-overview.html>

arrangement transfers risks, crop failures, and low water availability to the more vulnerable in society.

Policies in Gujarat were aimed at securing access to land and water to increase crop production and reduce food insecurity. However, policies have not had the intended impacts. The groundwater table is still lowering and the government has neither been able to implement groundwater regulations, nor has it been able to increase the electricity tariff. And the small and marginal farmers in rural Gujarat still live on the edge of security and risk. Access to land and water is based on productive capacities in addition to other socio-political factors such as caste and class. The customary institutional environment shapes the mechanisms available to gain access to natural resources. The institutional environment as provided by the Federal Government of India and the state government of Gujarat hardly influences local practices. A liberal approach has been chosen including the stimulation of private property rights to land and groundwater. Insecure property rights to land are thought to decrease the willingness to invest in and upgrade land, while private property rights to water are thought to increase efficient use and stimulate transactions. However, the customary institutional environment is reshaped and restructured as to secure its production in a different way, as a response to a changing environment. Social differentiation, a plurality of formal institutions, and multiple access mechanisms create a dynamic reality far removed from the assumptions made by policy makers. There is a noticeable gap of understanding between those who make policy and those for whom the policy is meant to apply.

1.2 Research objective

This study aims to provide insight into the access mechanisms farmers use in order to make productive use of land and water, and to display the customary institutional environment in relation to the institutional environment as provided by the state. This research limits itself to the study of two villages where the institutional environment consists of laws and policies on the one hand, and customary rules on the other hand. It further aims to analyze characteristics of institutional arrangements available to the farmers and seeks to show how they affect property relations with regard to land and water.

1.3 Research questions

In this thesis land and water are seen as crucial assets for sustaining the livelihoods of many people living in the rural areas of India, where land and water become scarce due to multiple uses and claims on the same resources. Land and water are not seen just as physical units, but reflect social, economic and political relations in which they are embedded and to which they are subjected as well.

This means that the organizational, institutional, legal and political aspects relating to land and water are as important as people's stories and arguments on choices and perception of their practices. Moreover, the research question: *In what way do people get access to land and water, how do these rules constitute the customary institutional environment, and how does the state-institutional environment impact these mechanisms?* delineates the distinction in the focus of this research between the access to land and water according to customary principles, and the role of the government within this. In order to meet these objectives the following questions have guided this research:

- 1) What historical developments related to the state-institutional environment on land and water management have taken place within the Federal Government of India and the state government of Gujarat?
- 2) What are the main characteristics of gaining, maintaining and controlling practices to constitute access to land and water by farmers?
- 3) What rules and principles have been institutionalized within the customary institutional environment in order to shape access to land and water?
- 4) In what way has the customary institutional environment impacted on property relations?
- 5) What is the relationship between the state-institutional environment, the customary institutional environment and property relations in access to land and water?

1.4 Research theory

For the analysis of access to natural resources, access theories are used. According to Sen (1999), access can be described as the endowment-entitlement nexus, in which entitlements are transformed endowments. Endowments constitute the possibilities; entitlements constitute the embodiment of those possibilities into practice by using the total set of rights and opportunities available. Access to these rights and opportunities determines whether endowments can be transformed into entitlements. However, this definition of access is a-political as it does not include power-relations, which can influence access. The access theory elaborated by Ribot and Peluso (2003) includes power relations in a useful way. Political ecology directs the attention to the analysis of environmental issues in relation to political forces, which allows for a better understanding of the context in which the local reality is shaped.

Many studies have taken the unequal distribution of natural resources between social differentiated groups in Indian rural area as the basis for analysis. This research will elaborate upon that by focusing upon the various mechanisms farmers and groups of farmers use in order to get access to natural resources analyzed through a theory of access. This research will investigate the access mechanisms people use, from traditional mechanisms to new access mechanisms that have developed over time due to policy-interventions, agricultural developments and ecological changes. The research will be conducted in two Indian villages in the state of Gujarat, which are heavily dependent on the use of groundwater for agricultural use and where the groundwater table is rapidly lowering due to extensive extraction by means of electric tubewells. In addition, population is growing, leading to high pressure on utilized lands. Faced with uncertainty over access to land and water, farmers have to make decisions and strategies in order to secure their share of these resources.

1.5 Thesis outline

This thesis aims to contribute to the understanding of mechanisms and strategies farmers use in order to secure access to natural resources, taking into account the impact policies have on the dynamic of access strategies and security by adding another dimension to farmer decisions. The research will focus on the access mechanisms farmers create and what institutional arrangements have been made in order to secure access. The outline of this report is as follows. Chapter two develops the research questions followed by a theoretical framework to identify access mechanisms, institutional arrangements and legal pluralism concerning access to natural resources. Then, the methodology for data collection and reporting is discussed.

Chapter three describes the state-institutional environment by providing historical information on agriculture in India. The chapter focuses on groundwater exploitation and land policies in Gujarat including historical developments, management strategies and laws and policies constructed by the Federal Government of India. This is followed by two chapters devoted to the description of the research sites. Chapter four provides detailed information on the research villages, including physical, political, social and economical topics. Data concerning land and water allocation in the villages, which mainly focuses on the institutional arrangements, is shown in Chapter five. Chapter six is dedicated to a further analysis of the reallocation of property. Finally, Chapter seven provides an overview of the main findings of this research, the drawing of conclusions and presents a discussion and consideration for further research.

2 Theory and methodology

This chapter describes the theoretical points of departure that underpin the method of data collection and analysis used in this study. It dwells upon the interdisciplinary approach of political ecology. The political ecology approach focuses on the social construction of natural resources and the relationship of natural resources in a broader political, economic and social system. Nature has been embedded within the livelihood context of human beings, making nature and humans interrelated and interdependent. Hence, scarcity of natural resources will have effects on the social and political life of those who are dependent upon them. In addition, the way a society responds to changes in the environment will reflect social and political differences.

Further, the concept *access* and related theories will be discussed. These theories of access have guided specific types of questions in the interviews held. The use of access as a key concept enables the exploration of local practices in relation to natural resources in a broader way than solely rights as described in state law. Policies and legislation are taken into account as seen in reality (Chapter three). Access in the villages will be analyzed by making use of the strategies *to gain*, *to maintain* and *to control* land and water as used by the villagers. In the villages mechanisms and strategies, based on the institutional environment are used to constitute access to natural resources. Access is constituted by making use of institutional arrangements, which results in restricted property (Chapter five). These institutional arrangements will be analyzed through the theory of property (von Benda-Beckmann 2006). Property is seen as a bundle of rights which is divisible with regard to customary law, but seen as indivisible by state law. Through local institutional arrangements parts of the bundle of rights are transferred to create access (Chapter six).

In order to analyze the impact and use of implemented policies and legislation at local level the theory of *legal pluralism* will be used (von Benda-Beckmann, 2003; Pradhan and Pradhan, 2000). Legal pluralism sheds light on the co-existence of different right-systems which can both provide legitimacy to certain actions. Roughly the various right-systems can be divided in government rules and legislation, and customary law. Through negotiation, contestation and forum-shopping these institutions are used, changed, adjusted, adapted and adopted. In other words, legal pluralism stands for multiple legal systems existing at local level where actors can willingly or unwillingly choose which legal systems suits them best at a specific time, location and action. Chapter seven will analyze state law versus customary law in the villages by discussing up to what degree legal pluralism can be applied to this study. Finally, this chapter ends by describing the methodology of data gathering and analysis.

2.1 Theoretical framework

2.1.1 Political ecology

Increasingly over the last few decades, legal pluralism, property regimes, access mechanisms and institutions have been analyzed in the studies of equity and natural resources distribution in relation to agricultural development in developing countries (see for example Hardin, 1968; Pradhan and Pradhan, 2000; Meinzen-Dick and Bruns, 2000; De Soto, 2003; von Benda-Beckmann and von Benda-Beckman, 2006) as well as in post-socialist countries (see for example Burawoy and Verdery, 1999; Verdery, 2004; Hann, 2003) and conflict regions (see for example André and Platteau, 1998; Le Billon, 2001; Turner, 2004). The theoretical

foundations for these analyses are often provided by political ecology. Political ecology follows on already existing theories, yet with a focus on central questions *'about the relation between human society, viewed in its bio-cultural-political complexity, and a significantly humanized nature'* (Greenberg and Park 1994:1). Political ecology is developed out of several disciplines, and knows two specific influence fields: political economy and ecological analysis. This enables the link between the division of power with human activity in production; and the relationships between human activities and ecological characteristics. In addition, political ecology follows the increasing focus on the role of institutions and power hierarchies in the distribution of natural resources (Greenberg and Park, 1994). The approach includes a focus on different levels of society since the interactions between local and global phenomena are important, and the way in which the change in nature and society have impacts on these different levels (Mehta, 1998).

The origin of political ecology can be found in texts from the seventeenth to nineteenth century writers such as Hobbes, Malthus, Smith, and Marx. Marx relates individuals, their production activity, human society, and nature. He considers nature and society both as socially constructed, though at the same time it is acknowledged that the social and natural systems have their own dynamics. Hence, *'Political ecology expands ecological concepts to respond to this inclusion of cultural and political activity within an analysis of ecosystems that are significantly but not always entirely socially constructed'* (Greenberg and Park 1994:1). The study of political ecology is *'a wide set of approaches that make more explicit the role of human institutions and social, economic and political forces in shaping both environmental problems and the ways people are affected by them and deal with them'* (McCay, 2002). This theoretical perspective is relevant for this thesis as it aims to increase the understanding of the relationship between social and environmental change focusing on water and land use, including the uneven impact these changes have on different people. Here, the environment is not only seen as a stage where multiple claims and conflicts over resource access and control are negotiated and fought out, but is considered as a unit of analysis in itself (Zewuster, 2006).

A central focus of political ecology is the relationship between societal forces of power and nature: *'it explores the nature of relations of power and production at global and local levels, and how access to and control over resources or property rights are defined and contested in a wide range of areas'* (Mehta 1998:15). The empirical analysis in this study will focus especially on the access mechanisms used by farmers that are shaped by the political and environmental context in which these mechanisms are embedded. And so, there is a need to understand *'the intricate web of power and social relations governing access to and control over natural resources at the [...] micro level'* (ibid:15). The context of local histories and ecologies are equally important. Political ecology refers to the way in which access to and control over natural resources occurs: who gains, who loses, who controls, and in what fashion? For responding these questions, it is important to discuss how politics function in a particular social setting. *'Society is not a mere sum of individual acts but rather a complex totality of interacting individuals tied up with specific social and economic relationships and interdependent structures. Individuals in society are embedded to particular class-relationships and class interests. Political life is an expression of dependency and state domination. The elite, particularly formal power holders, have an interest in maintaining such a dependent structure so as to get the most benefit from the system'* (Upreti 2001:7).

In order to understand how natural resources are controlled and divided, research has to be conducted especially at local level. It is necessary to examine the complex and dynamic

interactions between the social structure of local populations and larger political economies in which these local populations are embedded, as an exploration of the impact of the government system on the local sphere. In specific local settings, the population creates its own system of regulation and by doing so alters the policies and legislation which are 'implemented' by government authorities. As Ostrom (1992) confirms, '*changes in formal regulations do not automatically become changes in rules-in-use*' (1992, 26). Thus, even though local populations are embedded in the larger socio-political and economic structure, they construct and influence their own living environment as well as policies, to let the policies 'meet their own needs'. This social constructivism enables a continuously reshaped local reality.

2.1.2 Political ecology in land and water distribution and allocation

To attain a better picture of the local social dynamics in the two villages in North Gujarat in relation to their activities with the environment, the concept access will be used. Theories on access are provided by Sen (1999), Ellis (2000) and extensively by Ribot and Peluso (2003). They present practical methods for analyzing access mechanisms: a focus is given to practices and activities applied by land and water users in order to secure and maintain access to natural resources. To understand access profoundly, the terms *property*, *institutions*, *institutional environment* and *institutional arrangement* are used for the analysis.

Allocation and distribution of land and water is a result of gaining, maintaining and controlling strategies. These strategies are based on the possibilities provided by the institutional environment. The institutional environment can be divided in state law and customary law. When analyzing the allocation and distribution of land, the concept of property rights serves as a useful tool to identify the content of the right to land. According to state law, property rights are defined as indivisible, individual and solely indivisible. In customary law, property rights are defined as divisible and temporary transferable. To refer to the latter, the term *bundle of rights* will be used. A bundle of right with regard to property means that the property right is a bundle of rights including the right to use, the right to exclude others, the right to manage, and the right to sell. Institutional arrangements serve as the informal contracts to transfer parts of the bundle leading to a restricted property right. Such a restricted property right enables the use of land without having the complete bundle of rights. Hence, access to land is constituted. To analyze water allocation, gaining, maintaining and controlling strategies will be utilized. Access to water is further analyzed by the bundle-of-rights approach.

2.1.2.1 Access

Access as a concept of analysis is widely used in research on natural resources. The study to access enables alternative ways to investigate property. Access focuses on the actual use of the natural resources by actors instead of a focus on property as indivisible asset. According to Sen (1999), access can be described as the endowment-entitlement nexus, in which entitlements are transformed endowments. Endowments constitute the possibilities; entitlements constitute the embodiment of those possibilities into practice by using the total set of rights and opportunities available. Access to these rights and opportunities determines whether endowments can be transformed into entitlements. And so, endowments are the rights to use natural resources while entitlements reflect the actual use of natural resources.

A more economic view on access is provided by Ellis (2000), who analyses the concept access by distinguishing different types of assets in the livelihood system: human assets, physical assets, social assets, financial assets and natural assets. These forms of assets are transformed into resources. The resources are used for activities in order to make a living. The access households or individuals have to various types of assets is important for the transformation of assets into resources. Ellis states that the transformation of assets into resources is dependent upon social relations, institutions and organizations which mediate access to the five types of assets. In other words: social relations, institutions and organization can stimulate, induce and constrain access to assets. Access to assets is necessary in order to make a living, since it is the assets that have to be transformed into resources.

2.1.2.2 Access mechanisms and strategies

Ribot and Peluso (2003) developed a framework to study mechanisms used, wherein property-rights are one of the manifold strategies to gain access to natural resources. They start by defining the concept of access: access is the *'ability to benefit from things'* (ibid: 153) drawing a useful distinction between this broad category and the narrowly defined *'right to benefit from things'* (ibid: 153) which can be inscribed in law. Hence, access to land and/or water is not necessarily determined by rights articulated by the government. To define access as the ability to benefit from things – or in this case, natural resources - the authors rely upon institutional arrangements. These arrangements are defined as access mechanisms, of which the rights-based mechanism is just one. The mechanisms are based on social relationships and are embedded in the socio-political environment, as such creating the so-called *'structural and relational access mechanisms'* (ibid:164). They note that *'legally forbidden acts can also shape who benefits from things'* (ibid:156) and consider rights-based access to also encompass illegal access since *'rights define the bounds of illegal activities'* (ibid:161). In addition to rights-based access mechanisms, Ribot and Peluso describe alternative access mechanisms which include *'technology, capital, markets, labour, knowledge, authority, identities and social relations'* (ibid:161-62). These will *'shape or influence access'* (ibid:165). For a more detailed description of these mechanisms, see Annex 1.

These categories of mechanisms are interrelated, since for example identity might determine someone's resource base and enables him or her to be in the possession of large capital, leading to authority and the ability to control natural resources. However, this interrelation is not fixed, and can evolve due to changes over time in the policy environment, the socio-economic structure or the ecological features of the region. Hence, the mechanisms used in order to secure access to natural resources are subject to change, along the line of the social, economic, political and environmental changes, and simultaneously they all are forms of social relations. This broad range of mechanisms affects people's ability to benefit from things. Access has to be *gained, maintained* and *controlled* in order to secure long term access. Control of access is the ability to mediate other people's access, the checking and direction of action of others (for a detailed description of the concept 'control' see Annex 1) Maintenance of access is the expenditure of resources or powers to keep resources access open. Control and maintenance of access can be done by means of physical, institutional and political actions.

The impact of the legal institutions on the mechanisms used by the farmers depends on which system has gained the most legitimacy in the specific case. As Ribot and Peluso (2003) mention, *'within this plurality, some actors may be able to enhance their own benefits—to maintain their own access or gain control over others' access by choosing the forum in*

which to claim their rights, and wherein they seek to have these rights enforced or adjudicated' (163). For this study, it will be explored whether these mechanisms and strategies can be defined as being institutions: the investigation of the mechanisms will reveal the arrangements in land and water distribution, as well as the effect of these arrangements on the common acknowledged rules in use.

2.1.2.3 Institutional arrangement and institutional environment

First of all the concept of *institution* has to be defined. An institution '*is the set of rules actually used by a set of individuals to organize activities that produce outcomes affecting those individuals and others*' (Ostrom 1992:19). '*Working rules must be common knowledge*' (ibid:20) and socially agreed upon. Institutions shape human behavior and at the same time are the outcome of social interactions embedded in the economic, political and environmental context and necessities (ibid). Within this thesis, a distinction has been made between the institutional environment and institutional arrangement in order to clearly demarcate the difference between the institution as common knowledge (institutional environment, both governmental and local rules) and a more specific and agreed upon institution contracted between a limited set of people (institutional arrangement).

A distinction between *institutional environment* and *institutional arrangement* is made as becomes clear in Figure 2.1. According to Voors (2006), the institutional environment includes the basic formal and informal rules of society, referred to as the rules of the game. This encompasses formal laws and the bureaucratic, legislative and judiciary functions of the government embodied in an organizational structure which set the rules and legal framework in order to control land and water management and use. Custom, convention and traditional law systems can be grouped in this category as well. Institutional arrangements, on the other hand, embrace a broad array of coordination mechanisms made in the local socio-political sphere governing land and water allocation and management. These arrangements can be described in the form of agreements such as contracts, cooperatives and associations as well as non-paper agreements, based on social contracts of trust and reciprocity. These social contracts are referred to as institutional arrangements (Saleth, 2005).

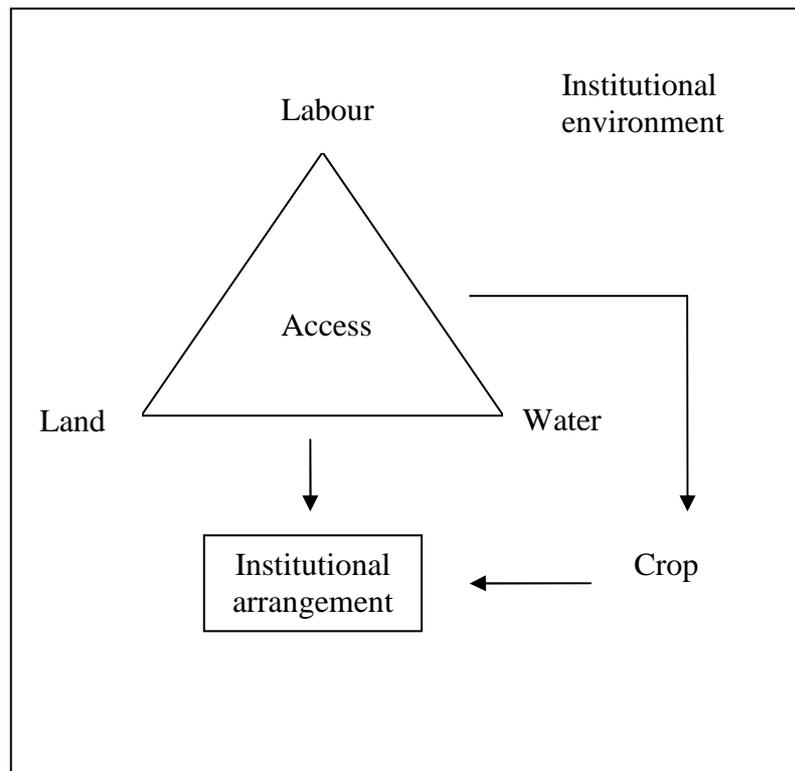


Figure 2.1 Institutional arrangements in transaction of modes of production

Figure 2.1 represents the role played by institutional arrangements within the context of access: they regulate transactions of, and access to, land, labour and water (the modes of production). Not in all cases these three means of production are involved in an institutional arrangement, since for example in a drought-prone area such as North Gujarat water is not continuously available. In such a case, another institutional arrangement will be created. These institutional arrangements are shaped within the institutional environment which stands for the rules of the game, the constraining or stimulating factors provided by customary and state laws. The investigation of the institutional environment shows to what extent governmental policies are complied with at the village level; furthermore, it shows local practices with regard to land and water distribution and allocation. It demonstrates the important factors of the society which direct the method of allocation. The investigation of institutional arrangements provides for a deeper insight into the power relations between landlords, water lords and farmers as well as the level of dependency and reciprocity. It shows the way of control of natural resources, reflected in the terms of contract of the institutional arrangement. Here environmental circumstances are taken into account referring to the terms risk, drought, scarcity, and transaction costs when trying to explain why the institutional arrangements occur within the village. It is concluded by stating that the (temporary) institutional arrangements shape the (steady) institutional environment. In other words, the institutional arrangements create access to land and water by distributing and reorganizing the rights to land and water. The system of rules which enables farmers to make use of the resources shape, recreate and negotiate the institutional environment. Property rights can be placed in the institutional environment, and are transferred by means of the institutional arrangement.

2.1.2.4 Land and water interface

The analysis of access to land and water entails a complex process especially when groundwater is concerned. In the study of access to land and water it has to be acknowledged that the two are completely interrelated: *'efforts at addressing agriculture related water needs must take into account the complex inter-linkages between land tenure and water rights'* (Krishnan 2007: 134). Land will define access to water: in many cases, access to groundwater is substantially related to having access to the land above. In other words, access to land means access to the water flowing underneath. Laws and policies directed to groundwater have emerged over the past decades simultaneously with the growing groundwater use, containing that the right to the land denotes the right to the connected water -as is the case with surface water. *'Land therefore has been considered as the most important property variable that determines the property character of irrigation water'* (Krishnan 2007: 135 citing Abeyratne, 1990).

However, a complexity is created when land is used by a tenant and owned by a landlord. Here it might occur that the tenant cannot benefit from the groundwater beneath the land, or only to a limited extent, because the landlord controls the water. The interface between land and water in relation to allocation can also be analyzed by legal pluralism. First of all, governmental legislation might contain diverging laws to land and water which are incompatible and therefore cannot be implemented. Above this, local arrangements add to the existence of legal pluralism because land and water can be subjected to various use systems at the same time. For example, the use of land might be based on a property right while the use of water on that same plot is based on a different mode of access. The use of property rights and access to regulate the use and control of land and water is used interchangeably.

Therefore, when analyzing both land and water this interrelation has to be taken into account, which can be accomplished by using the concepts property rights and access. Property rights on land are linked with rights to water, and to what extent this results in property rights to water. Access will be investigated by examining institutional arrangements which include the transaction of solely water, of solely land, and of land and water. The main question is: how is the control over water linked with the control over land? In this study, the property rights over irrigation water and over land will be expressed as water rights and land rights. *'Land rights include ownership as well as a range of other land holding use rights such as leasehold, usufruct, servitudes'* (Krishnan 2007:135 quoting Cotula 2006). *'Water rights are mechanisms through which users access water for a particular use without jeopardizing another users' right to the same'* (Krishnan 2007:135 quoting Van Koppen et.al 2004).

2.1.2.5 Property

Property will be discussed, distinguishing property as defined by state law and property as apprehended at customary level. Property by state law is defined as an indivisible complete bundle. The property can solely be sold; there is one owner who is in charge of the property holding and associated rights are controlled by this owner as well. These restrictions on property make the property holding inflexible concerning transfer.

On the other hand, a much broader vision on property is given by Benda-Beckmann and Benda-Beckmann (1992). They point out that: *'Natural resource property rights serve to legitimate control over the means of production, whether production is for market or for subsistence. They can be an important material basis for the social continuity of groups. They usually have political functions for states and non-state social organization, and tend to*

be a source of individual power and prestige. Natural resource property often also has considerable cultural religious meaning [...]. Given this political, economic and ideological importance, legal property regulations and rights therefore constitute crucial social resources in people's strategies, negotiations and struggle over natural resources' (2). Property can be considered as the rights and obligations of individuals or groups to use the resource base. The property of natural resources is a legally acknowledged actuality which allows excluding others from using that natural resource. A property right denotes the right to have such property. In this thesis, *'property rights are defined as the systems of rules, rights, institutions and processes under which land and water are held, managed, used and transacted'* (Krishnan 2007:135). Property rights can be split up by introducing the concept 'bundle of rights', including user rights, rights to exclude others, rights to manage and the rights to sell. The bundle of water rights is formed respectively by the withdrawal rights, the canal rights, the right to improve the resource use, the right to determine who will have access and who will not, and the alienation rights (Schlager and Ostrom, 1992). For land the same bundle of rights can be applied. The understanding of property as a divisible bundle allows for flexibility, efficiency and adaptation to changing circumstances.

Access and control are greatly influenced by property relations, since a well defined and enacted property right might be used to control the resources. An enacted property right allows excluding others from making use of the natural resource. Property rights are most often issued and enforced by governmental rule systems, in law and legislation. Most often they form the foundation for the local system concerning the regulation and allocation of natural resources. But to be embraced by a property right does not mean that one actually has access to it: dependent upon enforcement by the legal institutions as well as local acceptance of this right it is defined whether the right will be constituted in practice. Above all, environmental circumstances might change the role of property rights adjusting them to local reality.

The previously described bundle of rights can be placed within the discussion of access as well. Even though Ribot and Peluso (2003) give property right a place within the access strategies, the definitions of von Benda-Beckmann (1996) and Schlager and Ostrom (1992) enable to define access within property rights themselves by splitting up the concept of property right in four (land) or five (water) various rights. By making a difference between use rights and exclusionary rights, alienation rights and management rights, the view of property right as a bundle enables to transfer the use of the resource without the transfer of the complete property right. This transfer of use rights can be defined as the creation of access. To create access within the bundle of rights by transferring some but not all, institutional arrangements are used.

2.1.2.6 Sharecropping

Important institutional arrangements regarding access to natural resources are tenure arrangements, and its specified counterpart sharecropping, as illustrated in Figure 2.1. A *tenure* arrangement is a mutual arrangement between a land owner and a land tiller, and creates restricted access. Within the tenancy arrangement, the bundle of rights is divided. Hence, part of the bundle of rights is exchanged. The tiller is allowed to till the land in exchange of a rent, in cash or kind. A tiller has access to land, and the owner benefits from the land without the need to till the land himself or to seek for someone to till the land every season. Several tenancy arrangements exist, including fixed-rate tenancy; occupancy-tenancy; hereditary tenancy; sharecropping. The latter is the form of tenure the most to be found in the

research area of North Gujarat. The concept used by Prakash (2005) will be used: *'share tenancy is a land lease under which rent is a contracted percentage of the output yield from the tenant per period of time. As a rule, the landowner provides land, and the tenant provides labour; other inputs may be provided by either party [or another party]. Share tenancy (or sharecropping) is thus the share contracting, defined here as two or more individual parties combining privately owned resources for the production of certain mutually agreed outputs, the actual outputs to be shared according to certain mutually accepted percentages as returns to the contracting parties for the productive resources forsaken'* (ibid:169).

2.1.3 Legal pluralism

This study aims to identify which institutional arrangements are at work and in what way they shape the institutional environment. The study of institutions is done by focusing on property rights and access, including the mechanisms and strategies applied to gain, maintain and control access to natural resources. The former section on property and access describes how various mechanisms and strategies might shape an individual or group method to gain, maintain and control access, wherein property rights are seen as institutions which might be used to secure access. As already shortly touched upon by the theory of Ribot and Peluso (2003) mentioning the 'right' as one of the available mechanisms to derive benefit from natural resources, the theory of legal pluralism goes deeper into this co-existence of multiple legal systems. These legal systems include the government and its laws, legislation and policies as well as conventions, values and traditions. In addition there are temporary arrangements are embedded within these various legal systems regulating and controlling local practices. As a result, society becomes a construction of several different layers of rule systems acting as legitimizing factors, each with their own particular use. These rules whether custom or legal are referred to as institutions. The institutions derived from the various legal systems all shape the property rights and access regime at work at the local level.

The institutional environment is shaped both by informal and formal systems of regulation. This is reflected in the rules of the game and shaped by legal laws and conventions. The institutional arrangements which occur in the transaction of land and water are derived from these regulating systems. Hence, it is important to also focus on the influence of governmental institutions on the occurring arrangements. The theory of legal pluralism allows the coexistence but also the simultaneous application of various sets of regulating systems that shape reality. Legal pluralism focuses upon examining these different layers within a society which determine local practice. Legal pluralism, as to the initiators of the concept, refers to *'the theoretical possibility of more than one legal order or mechanism within socio-political space, based on different sources of ultimate validity and maintained by forms of organization other than the state'* (von Benda-Beckmann 2003:1). A central point in legal pluralism theory is that social actors during interaction can shop from different levels of legitimacy and choose the best option for them at that specific moment. The role of law is seen as another level within the different systems existing within the world of interaction. There is space for negotiation and the rules of the system are disputed.

Laws are solely based upon rights which do not imply that these rights are enacted in the real world. Still, the concept of right is real when referring to the right derived out of any sort of regulating system which forms a source of legitimacy: *'Rights exist in the realm of law; they are claims (or interests) which are socially accepted and legitimized by law, whether state or local or both'* (Pradhan and Pradhan, 1997:203). The point is that these rights enlisted in law are part of the options the socials actors can choose from. And even more important, the rights

as written down are often not abided by the society since there are so many other legitimizing systems in practice which may overrule the legal right: *'the freedom or ability to obtain or make use of ... It includes the socially sanctioned and the illicit, the de jure and the de facto, the rights as only part of the ability'* (Pradhan and Pradhan, 1997:204). Concerning this, the legal law and right system is rather a relative concept dependent upon the meaning given to this social construction by the local practitioners. And so, law as a written down legitimacy system is not necessarily seen as powerful or decisive for much of society's population.

2.2 Methodology

This research was started in September 2007. Based on an extensive study of existing literature, research objectives and questions were formulated. Initial contacts with four different research sites led to the actual fieldwork, which started in March 2008 and was completed at the end of May 2008. Data was collected from 24 farmer-respondents in two villages in the North Gujarat –Rangpura and New Najupura and from three key-informants and local experts. Interviews were supplemented by visits to the local Department of Agriculture in Radhanpur.

The political ecology approach is chosen for this research, both in theory and methodology. A resource-oriented and case-oriented research has been conducted, where the concepts property and access have guided the questions for the interviews held. This research focuses on the interaction human-nature. It is examined in what way nature is engaged in society, and how this results in specific relations between society and nature. It focuses on (1) actors at local level and their treatment of natural resources, (2) the influence of conflicts, control and power over natural resources, and (3) the embeddedness of natural resources within the livelihood and social-political as well as economical system of the villages. Also, changes over time in these relations are taken into account. By making use of access and property it is found out in what way access is constituted in the villages, and to what extent access is created by state provided property rights or customary based regulations.

Several methods and techniques are combined to gather the required data. Data required can be divided into four categories: physical data; organizational data; social data; and policy data. As a consequence of research to access and control over natural resources, a process perspective has to be used. A process orientation investigates the strategies people use to define their access to and control over natural resources are, for which an actor-oriented approach is suggested. In order to understand the chosen mechanisms and strategies and to be able to place them in the socio-economic environment, both the local level context and the wider context has to be researched (Lund, 1994). For the investigation of the wider context, literature research has been conducted.

2.2.1 Research site selection

For the purpose of this research, data was collected from literature previous to the fieldwork, to gain more insight in the groundwater situation of Gujarat as well as the agricultural status of India in general. It provided useful background information which led to the design of the fieldwork. In the literature study, focus was given to the ideas and role of governmental institutions, as they publish their policy and regulation information through internet on papers and laws and extended regulations. Yet, before the fieldwork could actually begin, two villages had to be selected.

In order to select two suitable villages for the research, a pilot consisting of a visit to four villages was conducted. The four villages were partner-villages of the host organization “All Indian Disaster Mitigation Institute” (AIDMI). In the presence of four AIDMI representatives, the pilot took place during two days of visiting the four villages, situated at quite a distance from one another (in plaats van “not in each others near vicinity”). A questionnaire was prepared directing to various village actors to get a clearer picture of the existing variety and diversity of the village. In village A the questionnaire prepared for the Panchayat was used; in village B a farmer was interviewed following the questionnaire directed to farmers; in village C the main contact person for AIDMI with the village was interviewed using the questionnaire prepared for the Panchayat; and in village D again the questionnaire for the Panchayat was used although the respondent was not a Panch member, but still a contact person for AIDMI with the village. Yet, the information gathered could easily be compared as the general information was clear: the knowledge of the respondents contained the necessary information representative for the village (Annex 3).

The execution of the pilot turned out to be important for the selection of two proper villages and as a test of the interview skills. Since the answers to the question not only contained factual information, personal and relational aspects became clear as well. These aspects made clear that time, trust, cooperation and participation were necessary tools for the succeeding processes of the research. To be able to investigate coping strategies and food security on the one hand, and irrigation and access mechanisms on the other hand, it was decided to select villages B (New Najupura) and C (Rangpura). Their specific irrigation and poverty characteristics made these villages most suitable (Annex 3)

2.2.2 Design of questions, data collection and selection of respondents

Fieldwork to obtain data about land and water management and their practical use by the respondents in New Najupura and Rangpura was conducted from the beginning of March 2008 till the end of May 2008. Data collection was guided by the assumption that the practice of water use and management can be explored through separating and comparing layers during fieldwork by studying: access mechanisms to land and water (based on Ribot and Peluso, 2003); transactions and transfer of land and water; conflicts and conflict resolution in practice concerning land and water; a focus on environmental transition inducing changes in the local practices. Hence, transfer, transaction, conflict and change can be seen as the basic indicators of the research.

The approach taken for the study is an actor-oriented approach based on qualitative methods for data collection. This means that the villagers themselves are being observed and questioned. This was accomplished through participatory observations during the preliminary field visit, and after the interviews. Different types of interviews were held: open, semi-structured, formal and informal interviews. By interaction, the practices of the actors were to be understood while at the same time by asking questions, data is collected in a direct way. The actor groups as research objectives are farmers, households, Gram Panchyat members, and staff of AIDMI. To complement the observation and interview strategy, an analysis of field documents was performed. These documents were found at the local Department of Agriculture, households such as the main contact person to an NGO in the village, and local organizations.

A start was made with a preliminary field visit to the villages New Najupura and Rangpura. Observations and interactions took place between the researcher and the villagers for five

days in each village. An exploration of all the existing water sources was realised, leading to an inventory of irrigation structures, dams, tubewells and surface storage areas. This was supplemented by the observation of all the other existing institutions such as shops, temples, modes of transportation, farm diversification strategies, schools and the *Gram Panchayat*. After observations, clarification and confirmation took place with the villagers, by mediation of a translator. In these first days, general village data was gathered by observations and interviews. Using the gathered general overview of the villages, a selection of the first farmer to interview could be made.

To obtain insight into the respondent's characteristics and to assess the indicators, a list of practical questions was developed to use in a semi-structured interview. The field research started with interviewing villagers, by way of an open and these semi-structured interviews supplemented by informal interactions. With the semi-structured and open interviews, the main questions to be answered were: in what way do households have access to land and water; how do they secure their access; and how do they maintain their access over land and water. The questions were open for revision after every interview. The main strategy used for questioning was to mainly ask for the facts concerning water. The questions used can be revised in Annex 2. As has been explained before, the indicators were used in order to structure the questions. These indicators were not directly asked for, yet the indirect posing of questions paved the way for a tremendous source of information from the respondent (Annex 4).

A 'follow-the-network approach' was used in order to reach several key-informants resulting from the interviews in the field. Triangulation, the use of different approaches in order to gather information is applied in the sense that observation, direct contact, analysis of documents and literature and interviews with key-informants were combined. This allowed the gathering of hybrid and heterogeneous information, thus enabling a cross-study of different aspects of the research. The knowledge of the key-person of the village was used extensively, as he knew the main characteristics of the households in the village. Partly based on his knowledge some respondents were chosen, since a respondent had to qualify to specific characteristics (for example applying irrigation, or the engagement into arrangements). Furthermore, the snowball-method of selecting key-informants from within the village was used dependent upon the number of farmers mentioning a specific person.

2.2.3 Analyzing data

Data were analyzed during the research at three different stages. First, after the preliminary field visit of five days to both villages, an overview of the gathered data was made in order to reflect upon the village and structure. This facilitated the formulation of the questions before starting the interviews. Then again, after four weeks of living in the villages and conducting interviews, the data collected in the interviews and gathered documents were analyzed at the AIDMI office in Ahmedabad. For this analysis the theory of access by Ribot and Peluso was drawn upon. Tables and schemes were produced in order to provide a clear overview of the obtained data and as such to find out what data was still lacking. This was presented at the staff of AIDMI, and feedback was received about these overviews (Annex 5). The next two weeks were used to fill up the identified gaps, by means of another series of field interviews.

For the final analysis the complete theoretical framework will be used in order to place the data within this given perspective. Here, the important concepts to be used are (i) property and access; (ii) mechanisms and strategies; (iii) to gain, to maintain and to control; (iv) power

and social relations; (v) institutional arrangement and environment; and (vi) trust, reciprocity and dependency. By using these concepts the local reality will be analyzed and placed within the broader perspective of governmental institutions and legislation. First, the local practices will be placed within the theory of access in order to understand how the regulations at local level can be described. Secondly, these local practices will be placed alongside the governmental laws and regulation, to make a comparison between the two showing both differences and similarities.

2.3 Concluding remarks

This chapter presented an overview of strategies to analyse land and water allocation and distribution processes, taking into account official legal systems as well as customary rule systems. The former will be investigated through literature research, the latter by means of empirical studies. The concepts of access, institutional arrangements and institutional environment will be used for two reasons. First, to understand the way in which land and water is allocated, distributed and managed at local level. Second, to provide more insight in the dynamics between the different types of legal systems: customary law and governmental law. Access is seen as being able to benefit from natural resources. By combining these different theories it becomes clear that institutional arrangements are used to constitute access, and by which property rights are temporarily exchanged. The institutional arrangements are derived from the institutional environment, both customary and governmental law systems. The question is to what extent each rule system contributes to the constitution of access at local level. While studying these concepts it is interesting to look at the power differences inherent in the institutional arrangements, based on scarcity and dependency, which reflects incentives and interests. The rules of the game will be studied, making use of the processes 'to gain, to maintain and to control'.

3 The environment: physical features and legal regulations

The institutional environment, which has effects on the land and water management practices, is constituted from both the legal rules and the customary system. This chapter will provide an outline of the institutional environment in Gujarat containing the legal rules and policies provided by the Federal Government and Gujarat state. The chapter starts with a brief technical introduction, explaining the groundwater situation in Gujarat in general (sections 3.1.1 and 3.1.2). This background information is needed to understand the dynamic, interrelated and complex web of groundwater related to agricultural processes, as well as its impact on these agricultural processes. The remaining part of section 3.1 focuses on groundwater legislation as set up by the Indian and Gujarati government. Political and technical developments are elaborated upon, as well as their impacts and consequences. Thereafter, the situation of land in Gujarat will be described in more detail from a political perspective (section 3.2). Laws on both land and water are presented in order to shed a light on the policies and legislation, which aim to regulate the allocation and proper use of the natural resources. The results suggests that to curtail water extraction solely electricity supply policies will have impact; and policies meant to equalize land distribution seem to have had hardly any impact.

3.1 Groundwater in Gujarat

Gujarat has a population of 50.6 million (est. in 2001³) people in an area of about 195,984 km². It is situated in the semi-arid region of India, boarding with Pakistan and the Arabian Sea in the west (Figure 3.1). It is stated that 27 percent of the total area of Gujarat is drought prone. In addition, 37 percent of the population lives in urban areas, which comes down to 63 percent of the population living in rural villages and towns. Major works once provided by the British government include concrete roads and electricity connections, linked to rural areas.



Figure 3.1 Gujarat, India
Source: World Land Trust February 2008

Gujarat is one of the most developed states⁴ in the secondary sector since industrialization in India, with high proportions of chemicals, fertilizers, textiles and dairy. As a result of the industry-boom, agricultural growth has been on the decline since the 1980s -although there was an increase during 1960-1970. Furthermore, Gujarat's agricultural share in GDP (2002-

³ Official Portal of Gujarat Government <http://www.gujaratindia.com/stateprofile/profile1.htm>

⁴ Since Indian independency (1947), the Provinces are renamed to States. This paper will use the word 'state' to indicate the Indian provinces

2003) was 13.6 percent whilst it displayed 19.9 percent during 1993-1994. This decline in share of GDP and the decline in growth-rate are problematic since agriculture provides employment for more than half of the population of Gujarat. Any decline in the sector affects the rural people. This decline is caused by several factors such as the contested water situation- due to both ecological and socio-economic and political factors influencing agricultural development (Prakash, 2005).

3.1.1 Agro-ecology

The State of Gujarat is considerable in size, therefore the area has a diverse bio-climate and droughts affect each region differently. As mentioned by Prakash (2005), Gujarat is divided in eight major eco-regions⁵, marked by their rainfall patterns- uneven and heavy. Gujarat is characterized by one monsoon period between June-July and September-October, which is critically divided in 1000-2000 mm in the southern part to 240-400 mm in the northern regions and Kutch. 70 percent of Gujarat is arid or semi-arid, of which the north-western part contributes the most. This area is short in surface water but rich in groundwater, unlike the central and southern part where most of the surface water is concentrated. However, the necessary recharge for the groundwater reserve in the northern dry parts of Gujarat take place in other locations⁶ where Gujarat can take less benefit out of it. Still, *'More than 70 per cent of the State's water need is met through groundwater'* (Prakash 2005:47).

Nature determines agricultural practices, hence the term agro-ecological zone. Gujarat is divided into four agro-ecological regions: the water-abundant south; the central alluvial⁷ plane; the semi-arid northern alluvial plane; the peninsular area of Gujarat- Kutch and Saurashtra. The south is more afforested and hilly, whilst the north is plain and is characterised by fertile soils. The north-west and Saurashtra are semi-arid and rocky; the greater arid zone of Gujarat is Kutch (Prakash, 2005). The north is typified by low rainfall and surface water, but a high potential in groundwater extraction and recharge; and the southern areas are good locations for surface water storage facilities such as dams and tanks. The central plain has established an extensive canal network, and the south is naturally endowed with water. Thus, each region seems to have specific water resources available. However, as from the last twenty years, Gujarat has been in the picture when debating about water scarcity. Severe crises relating to water scarcity relating to considerable decreases of groundwater level occurred in almost all regions, especially in northern Gujarat (Prakash, 2005).

Due to a lack of surface water in the north, great dependency on groundwater extraction is created. As Prakash states, *'Around 80 percent of Gujarat's irrigated agriculture is dependent on groundwater'* (2005:48). Hence, groundwater overdraft is common practice nowadays. Overexploitation of groundwater resulted in lowering of the groundwater level. Technological innovations provided opportunities to change the water use pattern from supply-determined surface water to electric pumps. A side-effect of these agricultural innovations was the increased need for external inputs. *'The increase in water demand has led to changes in the configuration of water utilisation in three spheres: technological, institutional and*

⁵ According to the National Bureau of Soil Survey and Planning, these eco-regions are based on variability in rainfall, potential and actual evapotranspiration (and other ecological factors)

⁶ They fall in neighbouring Rajasthan and the Arawali forest, at the border of Gujarat and Rajasthan (Prakash 2005: 45)

⁷ The alluvial plane is the area where the sediment of the river is deposited. At non-clay soils, water seeps easily through and by doing so, adds to the groundwater reserve. These soils are mostly very fertile

distributional' (Prakash 2005:50). These changes have effect on the users as well as on the resource itself.

3.1.2 Green Revolution, tubewell technologies and groundwater overdraft

Agricultural development in Gujarat led to high agricultural production of mainly cash crops and high yield varieties. These technologies were introduced in the 1960s as a response to the Green Revolution, and have induced growth of input needs such as fertilizers, pesticides, seeds⁸ and water. Surface irrigation was insignificant in Gujarat: tubewells accounted for 83 percent of the irrigated area, whilst 9.5 percent of irrigated area was covered by canal irrigation or tanks. This groundwater based agrarian boom created dependency on the use of groundwater. Groundwater extraction was made available due to innovations such as tubewells and rural electrification. Investments in deeper tubewells and a higher pumping capacity enabled drawing water from deeper aquifers. Groundwater was considered by farmers '*as an extremely cheap and efficient alternative to surface irrigation networks that were non-dependable*' (Prakash 2005: 51).

These tubewells were installed under private ownership or by governmental sponsored schemes. The private tubewells were installed by farmers groups and water companies. The surplus was sold to other farmers, which led to water markets. Financial assistance was provided to groups that wanted to install tubewells. Furthermore, about 2800 public tubewells were established with support of the state⁹. These public tubewells suffered from malfunctioning due to lack of financial investments for repair and maintenance. As a result, the management of the tubewells was transferred from the government to farmers' organizations and cooperatives in order to decrease state spending and improve utilization (Prakash, 2005). These tubewells also entered the water markets. Since economic resources were necessary in order to invest in tubewells –'*or [in addition] social networks to access institutional finance*' (Prakash 2005: 60), the water markets were mainly controlled by the village's rich and elite. On top of this, the government introduced a flat-rate electricity price and enough supply. The exploitation of groundwater grew considerably, increasing the dependency on controlling cooperatives and water selling farmers for most small and marginal farmers (Prakash, 2005).

The risk of having insufficient water supplies is transferred towards the more vulnerable. In Gujarat, these vulnerable became landless: production failures disabled them to pay the rent or tax due to lack of access to input resources, resulting in handing over land to big landowners. These landless people are relying upon the resources via others in exchange of their labour, as this is the only remaining asset they possess. In these cases, sharecropping can be a beneficial arrangement for both a landholder and a landless farmer. '*Sharecropping links the land rental and water markets with the labour market to share the increasing irrigation costs*' (Prakash 2005:139). Furthermore, the large farmers can afford to migrate out of agriculture whilst the sharecroppers have '*to bear the consequences of declining productivity in agriculture due to their inability to seek employment outside the village*' (ibid:139). The situation of poor and marginalized farmers is induced by social differentiation in India. The

⁸ In order to control the seed-market, several large companies have introduced the genetically modified "Terminator Seed". The farmers have to sign a licensing agreement which included the prohibition on the reuse of seeds. The seed is modified in such a way that reuse becomes almost impossible. The seeds should bring higher yield per harvest. For corn, cotton and oilseeds, these GM's are highly common.

⁹ The Gujarat Water Resource Development Cooperatio (GWRDC), a state-owned company established in 1975 in order to install and manage tubewells, financed by the State

long history in recognized class division, the so-called caste-system, has resulted in the social exclusion of the lower castes. Although this system is legally forbidden, many actions in real life are still created by the constraints and benefits derived from this social differentiation. In the distribution of land and water among village members, class and caste might be of importance due to discrimination and the differences in resource base between different groups of people. The resource base for the rural poor includes a lack of capital, knowledge technology and especially land, which is coupled with water. This combined makes it increasingly difficult to have access to and control over resources (Hanstad, 2005). As a result, the rural poor are marginal or landless farmers, frequently involved in sharecropping arrangements.

Changes in cropping pattern, the availability of electricity, the introduction of high yield varieties coinciding with increasing needs for other external inputs, and the creation of new technologies led to a groundwater-dependent agriculture in the state of Gujarat. In addition, due to the policy providing cheap electricity, and the privatization of water and tubewell digging, the number of tubewells rose rapidly. This in turn, led to tremendous drop of the groundwater table. As Prakash (2005) states: ‘Today, around 50 percent of Gujarat’s aquifer falls in the overexploited category’ (60) (Figure 3.2). It can be stated that the Green Revolution led to increased scarcity.

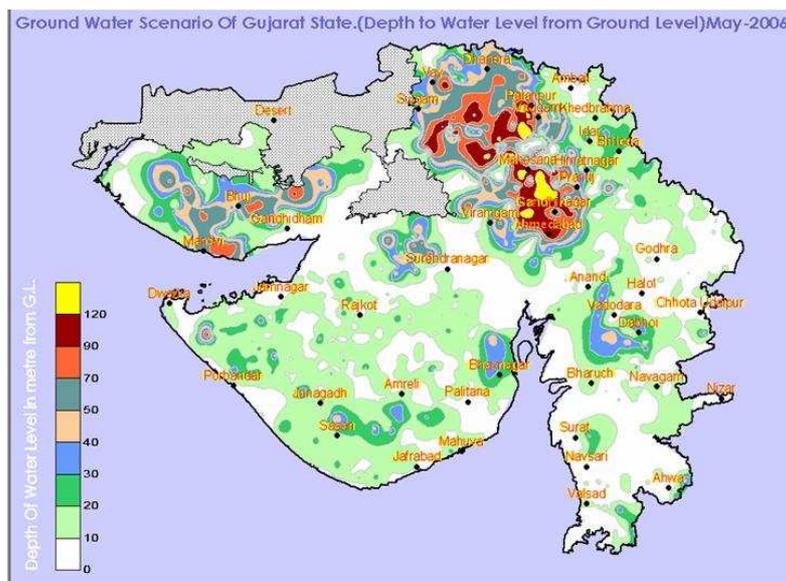


Figure 3.2 Depth groundwater from water level Source: GWRDC

Hence nowadays, uncertainty in the supply chain of water is rising due to the lowering of the water level and increased electricity prices. This induced farmers to other mechanisms to secure access to the means of production. The dependency on groundwater, the groundwater markets, the released risk in water scarcity to the small and marginal farmers, and the new governmental restrictions in groundwater extraction are shaped and embedded in the context of governmental policies for the management and regulation of natural resources, and groundwater in specific. Several laws, Bills and Amendments have passed trying to stimulate and confine the extensive use of groundwater. The following provides an overview of these laws and regulations which contributed to the current pattern of groundwater use in Gujarat.

3.1.3 Government of India: institutional responses

The government of India has interfered in the management of groundwater use. This started when the British were still in power. The British introduced water and electricity tax exemptions to promote the use of tubewells. This exemption was *'either for a specified period of between two and eight years or for as long as it took to repay the cost of construction'* of a tubewell reach a dept of eight meters or more (Prakash 2005: 53). Hence, the government provided tax relief to deepen the tubewells and paved the way for well irrigation. In addition, the British passed the 'The Indian Easement Acts of 1882' including *'the right to appropriate water beneath the land of the landowner'* (ibid:54) as well as *'the right to every owner of land abutting a natural stream, lake or pond to use and consume its water for domestic and irrigation purposes. It gives the right to every owner of the land to dispose of all water under the land within his (her) own limits'* (ibid:61). Private user-rights to groundwater were introduced, inseparably connected to land. These property rights constrained every landless individual who did not have private ownership over a piece of land. For India, this is the one and the foremost of acts recounting upon private 'property' concerning water, and land, since all other acts concerning water-based resources *'implicitly presumed the absolute rights of the state'* (Saleth 1994: 60). The consequence is that landlords can become waterlords.

As the first signs of groundwater depletion became visible, both the Federal Government of India and the individual groundwater-dependent states started to shift somewhat in groundwater regulation. Although the central state still controlled water according to such acts as enforced by the British, attempts have been made to create something like a water rights systems. The water right system provided for a legal framework on the regulation of groundwater and provision of rights at the more individual level. As such, the Model Groundwater Bills of 1970 and 1992 were introduced, including a permit and licensing method relating to groundwater use. These Bills were phrased by the central government, and had to be acknowledged and enacted at state-level. The enactments have not taken place in most states, although Gujarat pronounced to be one of the first states enacting the Bill. Enacting entails that the state should come up with groundwater legislations based on the suggestions made in the Model Bill (Saleth, 1994).

In 1976 the National Commission on Agriculture (NCA) prompted the idea to introduce individual rights on water based on quantitative physical criteria, besides a monitoring system in order to enforce these rights. These quantitative physical criteria were based upon the proportion of ownership in land. The water had to be distributed, according to the NCA, following a farmer-managed Warabandi¹⁰ system, which is thought to minimize depletion since all the farmers collect water simultaneously and it enables groundwater recharge (Saleth, 1994).

On the one hand, an individual right is created in order to increase access to natural resources. However, since this right to water is exclusively for those who already own a piece of land, this implies that the transfer of the water right from the state to the individual is more related to increasing production than to guarantee equitable distribution. The equity-aspect of introducing private rights to water only benefits those who have land: the water is proportionally divided between the landholders. As a result, they end up with one asset more. Yet, it has to be questioned to what extend these water rights can and will be enforced. Moreover, by policy-makers in India it is often thought that introducing water rights will not

¹⁰Warabandi is a system of rules on equitable allocation of available water, based on rotation schemes. The terms are fixed based upon a schedule, including day-time-duration to each irrigator. The Warabandi system has been used in Northern India for over 125 years (Bandaragoda, 1998)

only contribute to a more equal and equitable water distribution, it will also induce farmers to be more efficient in the use of the groundwater, as it introduces a new incentive in the use and management of groundwater (Saleth, 1994). Although the debate continues relating ownership with positive incentives, without any enforcement system the notion of rights remains superficial.

In addition to the creation of laws and legal frameworks to limit the use of groundwater, several boards and authorities have been established by the Government of India. In 1996 the Ministry of Environment and Forests was told by the Supreme Court to form a Central Ground Water Board (CGWB). The Board is *'an Authority and exercises power under section 5 of the Environment (Protection) Act, 1986 for regulating the overexploitation of groundwater resources'* (Prakash 2005: 62). This Central Board is responsible for the Indian Union in general. For each individual state, State Ground Water Authorities were created. They have the authority to act at state level with regard to the protection of groundwater. These state authorities come together in the Central Ground Water Authority (CGWA). However, they both act according to different protection laws. For example, the CWGB imposed *'Environment Protection Rules for Development and Protection of Ground Water'* to all states since the environment is a central subject. However, the immense bureaucracy of these environmental rules (in addition to disputes over authority since water is officially a state-subject) prevented adoption of these rules by any state (Prakash, 2005).

The Government of India has tried to both stimulate and curtail groundwater use. The policies which might have had the most impact were the introduction of private ownership rights to land, coupled with the right to extract all the water beneath this limited area of private owned land; large-scale electricity provision; and subsidies on tubewell instalments. This induced many landowners to dig wells and start extracting water, although even more water was exploited than these landowners needed themselves. Groundwater markets popped up which made it possible to sell the water to those who could not afford to buy a tubewell themselves. The right to water, as introduced by the Model Bill and further worked upon by the NCA, hardly impinged upon the distribution regulation of groundwater, as water markets stand in the shadows of legality. In addition, a lack of implementation and enforcement made the Model Bill 1992 a weak amendment to groundwater regulation. The laws and policies made by the Indian Government were hard to implement.

3.1.4 State of Gujarat: institutional responses

Each individual state has authority regarding water since the Government of India devolved this issue to the lower level of the state. On land issues too, each state could plead for its own regulation concerning tenure systems, tax revenue and landholding control. Therefore, after independence, Gujarat decided to abolish completely the land tenure-system by implementing the Tenancy Act in 1951 (see next section for further explanation). However, according to Prakash (2005), the abolishing of the system hardly changed the social structure in the rural area, as some more powerful classes took advantage of the Act: *'The land reform accelerated the process of commercialization and economic development especially in central and south Gujarat'* (55). In addition, reforms of the high taxation, as considered by the Taxation Enquiry Commission, of the agricultural production were made. The Land Revenue Code by the Amendment Act XXVII was introduced by the Bombay Government in 1956 which decreased the proportion of produce subject to taxation. During this period, new technologies in agriculture became available, and because of tax relief, the adoption of these technologies

became even easier. As it noted by Prakash, mainly those farmers who could benefit were large landholders producing cash crops.

The Gujarat Water Resource Development Corporation (GWRDC) entered in the scene of Gujarati government in 1975. The company was owned by the state and its tasks were to establish and manage public irrigation tubewells, financially supported by the state. In about twenty years the GWRDC had installed 2.800 public tubewells, with the idea to *'increase the area under irrigation by using groundwater'* (Prakash 2005:59). The government stimulated access to irrigation by groundwater use. Although it resulted in access to irrigation for many farmers, the program was not self-sustaining on the long term as it was based on subsidies. The company ended in losses, and the tubewells did not work anymore due to failures in reparation and maintenance. As a result, the government handed the management activities over to farmer organizations and cooperatives. It was argued that this transition would improve the use and management of the tubewells.

Furthermore, the Gujarat government created the Gujarat Water Resources Council (GWRC) in 2003. This council became the main authority regarding water issues. The council is not solely directed to investigate the increased groundwater extraction, but to set a tariff for the water supplied by dams to the sectors including agriculture, industries, and drinking water for cities and towns as well. In addition, according to Prakash (2005): *'It is also anticipated that the council will form legislation to curb the increased pumping of fast depleting groundwater, mainly in north Gujarat region'* (63).

Further the Government of Gujarat prohibited drilling of new tubes, unless allowed by the Gujarat Electricity Board (GEB). Since the Government of Gujarat in collaboration with the GEB have strong control on electricity, the drilling of new tubewells is especially limited through the control of the construction of new connections. Since the implementation of the Jyotigram Scheme (see next section), new connections are solely offered by the GEB. Every year it is decided by the government how many new connections can be provided in the entire state. Advertisements are placed in the newspapers at local level, enabling applicants to apply for these new connections. Based on a first-come-first-serve approach the new connections are handed out. The GEB gained control on the groundwater withdrawal by making use of their electricity control. As increasing tariffs did not result in the desired outcome, electricity supply itself got altered.

3.1.5 Groundwater and electricity supply

As a result of increased diesel prices, electricity demand rose. A shift from diesel pumps towards submersible electric pumps occurred, induced by the lowering of the groundwater level -as diesel pumps are not strong enough to reach high depths. The increase in electricity use resulted in declining groundwater levels, and led to failures of the electricity network. Therefore, the State of Gujarat and the GEB started to reduce electricity provision.

To explain the interrelated problem of groundwater exploitation and electricity supply in more detail, a short history on electricity pricing to tubewell owners in Gujarat will be provided. Up to 1989 electricity use was metered per tubewell owner, charging per used unit. However, this led to time-consuming reading of meters impossible to be accomplished by the GEB since there were so many tubewells. This lack of monitoring induced corruption, malfunction of staff of the GEB, bribes and manipulated meters. As a result, the GEB changed the method

of electricity charge from metering to flat-rate tariffs¹¹ in 1989. According to Shah et.al. (2008) this flat-rate system produced many positive impacts on smallholder irrigation: it induced tubewell owners to sell the water to other farmers and sharecroppers, who were unable to invest in a tubewell them self. Competition arose because of increased use of tubewells, which reduced the price for water to the marginal farmers. This, in turn, increased groundwater irrigation (Shah et.al., 2008).

Several negative impacts of this new flat-rate policy were detected. Because of the flat-rate tariff system, the tubewell owners had to pay an electricity-bill each month including the monsoon, when the tubewells are hardly used. On top of this, the GEB had up-rated the flat-rate tariff in order to cover their expenses, and tried to decrease the power supply at the same time. Strong opposition of the farmer lobby fought against these changes. As Shah et.al. (2008) mention, this led to the vicious cycle of electricity supply and groundwater over-exploitation: the strong farmer lobby resisted any changes to the electricity tariff which would go hand in hand with the reduction of groundwater use.

The groundwater level depleted even more and the GEB had difficulties meeting the electricity demand, resulting in deterioration of electricity provision. *'Three-phase power supply came with low voltage, often during the nights and with frequent trips – all of which damaged motors and added to farmers' repair and maintenance costs of tubewells'* (Shah et.al. 2008:5). Normally electricity was rationed in such a way that single-phase and two-phase power, used for domestic purposes, were supplied 24 hours a day whilst three-phase high voltage, necessary for tubewells and grain mills, was supplied ten to twelve hours a day¹². But *To evade this system of rationing, farmers everywhere in Gujarat began using phase-splitting capacitors¹³ [...] to convert two – or, sometimes, even single-phase power – into three-phase power to run their irrigation pumps'* (Shah et.al. 2008:5). The single phase could be transformed to three phase in order to make it usable for pumping groundwater.

Therefore, the Government of Gujarat and the GEB, inspired by Shah et.al. (2008), decided to separate electricity provision to be able to curtail the supply of the three-phase power supply while not limiting the amount of electricity provided for domestic appliance. Named 'Jyotigram Scheme' (JGS), the new policy of separating the three phases of electricity by installing separated electricity wires got implemented by the Government of Gujarat in 2003. The program induced the construction of a parallel rural transmission network, covering the complete Gujarat state: high tension lines, low tension lines and meters were installed all over the rural areas. The scheme included a clear 24 hours daily single-phase supply of power to domestic and village appliances; and an eight hours daily power supply to tubewell owners in three-phase and high voltage. This is supplied in pre-announced schemes: tubewell owners receive agricultural power each week during the day or night alternately. The three-phase network is cut-off the rest of the time.

According to Shah et.al. (2008) the Jyotigram Scheme had many positive effects. First and foremost, the GEB emerged as one of the best electricity boards in India for the management

¹¹ Flat-rate tariff means that, independent of the amount of electricity used, a fixed price has to be paid. The electricity can be used unlimited

¹² The difference between single-phase, two-phase and three-phase electricity has to do with the accompanying electrical potential. Single-phase has the lowest electrical potential whilst three-phase has the highest electrical potential

¹³ A capacitor is an mechanic instrument which transforms single- and two-phase electricity into three-phase electricity in order to increase the supply of three-phase electricity

of their power sector, and improved its financial situation positively. Nowadays the government has control over the amount of electricity used by the tubewell owners. Although the groundwater extraction cannot be measured, 70% of groundwater irrigation in Gujarat occurs by electrical pumps. Hence, the consumption of agricultural electricity provides a baseline for estimating groundwater extraction. And, according to the Government of Gujarat, within five years data suggested that agricultural power use decreased with 37%. This might partly be explained by the decrease of irrigated area, in addition to two subsequent good monsoons.

The tubewell owners in general were content with the continuous power supply; the power at full voltage; the reliability and predictability of the power supply; and the imposed restriction of disabling the use of capacitors. Fewer problems such as power-cuts occurred, resulting in fewer defects with the motors. Because of the scheme the farmers and tubewell owners felt more secure, *'making irrigation scheduling easier for tubewell owners and their customers'* (Shah et.al. 2008:8). Some farmers noted that the night provision in the alternate weeks is inconvenient since irrigation at night is difficult and a moment when it is hard to find labour. Dissatisfaction occurred in central and south Gujarat where water is more abundant, but where the farmers had to adjust to an eight hour electricity supply as well (Shah et.al., 2008).

The previous section described the current groundwater situation in Gujarat. It shows that as a result of the technological developments and the Green Revolution the demand for cash crops with a high need for irrigation rose. Since in the north of Gujarat is semi-arid -where hardly any surface water can be discovered during the winter and where the farmers are waiting each year optimistically for the monsoon- groundwater became an important water source to fulfill the high need. This led to the immense decrease in groundwater level and salinization. Water became 'scarce' -whether perceived or real- making people dependent upon each other and making water an even more valued natural resource.

3.2 The path of land in India and Gujarat

Land plays a central role for people in the world; economically, politically and socio-culturally land is an important resource. Land is necessary for the production of crops in order to sustain a livelihood as well as for export and market selling. Land has a high socio-cultural value, when combined with marriage or someone's status in the community. Here the political aspect comes to the fore, implying that to have land increases one's social status and economic status. What is more is the individual importance of land, implying that land adds to a person's identity. Ranging from the production of a crop on your own land to the independency land ownership can bring along. It might be suggested that land and the relation people have with it interrelates the social, cultural, political and economical in daily agricultural live. Land can be an asset in several ways, from usufruct right, to tiller, to land controller, proprietor and owner. There are many ways to explain these variable types of landownership and their related political and socio-cultural context. However, for centuries as well, land policies have played a crucial role in the allocation and distribution of land, adjusting the relations of people with land into a more structured and planned manner.

Next, the pattern of land and water use practices in India with a focus on the State of Gujarat will be described. Three important phases in Indian history with regard to agriculture will be explored: the pre-colonial phase (up to 1757), coupled with the colonial phase (EIC¹⁴: 1757-

¹⁴ East India Company

1858 and British Crown¹⁵: 1858-1947), and the recent past and present will worked out including the post-colonial phase (1947 onwards) which is marked by the Green Revolution and the liberalization of the agricultural sector. This policy context in historical perspective enables the comparison with land in the village. An historical perspective has been used since the policies and practices of yesterday set the course for the policies and practices of today.

3.2.1 Land, property and revenue

During the colonization of the British, a focus on the development of agriculture was pushed forwards mainly because of British interest in cotton to trade. To control Indian agriculture, the British transformed several economic and political features in favour of the British rulers. For landholding tax-revenue, the British followed the pre-colonial tax-systems of Ryotwari or Zamindari, categorized as land tenure forms in relation to tax-revenue (Sivaswamy, 1950). In the Zamindari system, the zamindar owns the land of which he has to pay tax. Yet, the zamindar gathers taxes himself from the ryots¹⁶, of which he retains a share of 10 to 33 percent. The tax included a fixed amount of the agricultural produce of the ryot. The Ryotwari system on the other hand was not based on private tax-collectors, but government revenue agents who had to collect the tax from the land-tillers directly. The amount of tax depended upon whether the ryot was a landholder or a tenant of some kind¹⁷. These tax systems existed already in pre-colonized India (Babu Bose, 2007).

Before 1200 AD, land belonged to the King and tax had to be paid to him. If cultivators were not able to pay the rent, they would be replaced. Tax consisted out of two kinds: tax over land and tax over the produce. In this period, landlords had control over peasant labour. Landless people gave their labour to cultivate landowner's holdings, primarily lower castes. Later on, during the Sultanate and Mughal period, hardly any changes had been made with regard to the relation between king-land and cultivator-land, except that focus of the king was first of all given to state's share in revenue of the agricultural produce. Hereditary and alienation rights on land were embedded in the tiller himself. In this era, tax-collectors were named Jagirdars. They had no permanent rights since they were replaced each three to four years. This resulted in the fact that their main occupation was tax collection, and not the appropriation of the lands under their administration. The tax-collection activities described above can be categorized as Ryotwari (Babu Bose, 2007).

The British followed on Zamindari or Ryotwari, depending on the location in British India, as it was thought that it would create loyalty amongst the Indians towards the British, and so to stabilize and consolidate the empire. In addition, when the British entered, a sense of ownership over land was created '*based on the western concept of property and proprietary rights*' (Babu Bose, 2007: 19). Before colonization, '*occupation and use were the only attributes of property which really concerned people*' (ibid: 16). These activities resulted in rights to the land and production, which were hereditary. Conditions for these usufruct rights existed out of paying a share of the produce to the Indian Union. The only reason for farmers to be banished from 'their' field occurred when they resisted in cultivating the land. The property in land did not exist in India, not individually nor communal. Hence, sale of land did not take place (ibid).

¹⁵ In 1858, the British Crown took over British India from the East India Company after the Indian Rebellion, and India became a Crown colony (Lal, unknown)

¹⁶ The term ryot refers to '*a person who is recorded as having a title to land and as being entitled to pay the land tax to the zamindar or to the government.*' (Sivaswamy 1950: 358)

¹⁷ Forms of tenancy can be: fixed-rate tenant; occupancy-tenant, hereditary-tenant (Sivaswamy, 1950)

Still, the zamindar was entitled by the British as the landowner who had in some regions permanent settlement rights and in other regions temporarily settlement rights (Babu Bose, 2007). Since the zamindars were not tillers of the land themselves, they were hardly present in the rural area. This led to a system of manifold intermediaries, who all wanted to gain as much as possible from the ryot. This soon created *'feudalism at the top and serfdom at the bottom'* (ibid: 18). The zamindars becoming richer lived their lives in the city, whilst the ryots, as is argued, had no incentive to improve the land since fears to get expelled from their landholdings due to failure in paying, were constantly there. By the acknowledging of property rights to the zamindars, the ownership rights of the ryots were totally alienated. However, the zamindars disguised a share of the agricultural revenue by underreporting of existing landholdings. And so in regions where the British had followed the Zamindari-system, Ryotwari was introduced which was based less on the mediation of specific people, but on a more bureaucratic method including a *'full survey and assessment of the cultivable land'* (Prakash 2005: 53). This change towards Ryotwari occurred in Gujarat likewise as in all British administered districts (Mosse, 2003). In the end, 52 percent of the area under cultivation was under account of the Ryotwari system (Babu Bose, 2007).

Nonetheless, both the Ryotwari and Zamindari systems promoted one way or the other the exploitation of the tillers of the land, and landlordism had become the main feature in both tenure systems by the 1920s. Due to debts, money-lenders entered the scene, lending money both to the ryots and to the zamindars. As a result, large-scale debts were created and money-lenders even became landlords. The outcome of these changes in agrarian life was that *'by 1931, one-third of the rural population was landless and of the remaining two-thirds, most were tenants-at-will, sharecroppers and dwarf holders'* (Babu Bose 2007: 18). The tenants, after tax-collection, had hardly anything left over. They were totally dependent for their inputs on the landlords. Land improvements were hardly made and indebtedness grew to a percentage of above 50 percent, either in cash or kind. And so, it can be concluded that the impact of British colonialism was grievous in rural life, especially concerning rights related to land and the tax-revenue system. Other agrarian relations and distinctive classes, such as agricultural labourers, moneylenders and sharecroppers emerged induced by the newly British policies (ibid:).

As a result of these developments on the account of British taxation and property-introduction, the government proclaimed certain measurements in order to do away with the land concentration and indebtedness. Four features in favour of this can be mentioned: (i) *regulation of the money-lending business*; (ii) *restraints on the transfer of agricultural property into the hands of the non-agriculturalist*; (iii) *arrangement and contract laws between creditor and debtor in order to make the relation more equitable*; and (iv) *the acknowledgement of the need to reform the land revenue system* (Babu Bose 2007: 20). Several legislative measures¹⁸ were put in place, however hardly with any result in favour of the indebted and landless peasants. The Zamindari and Ryotwari systems were still active. Including many peasant struggles and movements, this situation endured up to the point when the British left India: *'Of the total population of India in 1951, 70% were agriculturalists. The*

¹⁸ The Deccan Agriculturalists Relief Act, 1879
The Punjab Land Alienation Act of 1901
The Bundelkhand Land Alienation Act of 1903
The North-West Frontier Province Land Alienation Act of 1904
The Central Provinces Land Alienation Act of 1916

number of landless labourers was rising still, from 7.5 million in 1882 to 21.5 million in 1921, 33 million in 1931 to 44.8 million in 1951' (ibid: 30).

3.2.2 Land policy and the Government of Gujarat

The aforementioned Zamindari and Ryotwari agricultural tax systems have determined to a large extent the land relations between farmers, land labourers, tenants and landlords. The same systems had ruled over Gujarat for decades and influenced the land relations over here. Therefore, in order to reallocate the land Gujarat needed to change its own policy in order to accomplish this. This had become possible since the State of Gujarat is in the end the owner of all land, based on the doctrine of 'eminent domain': *'the right of the state to its property is absolute while that of the citizen to this property is subject always to the right to take it for public purpose'* (Sud 2007:2). In comparison with India as federal state, whose role is not to be the absolute owner of land; the state as entity is the main decision maker concerning land. As has been stated before, each state could plead for its own regulation concerning tenure systems, tax revenue and landholding control (Prakash, 2005). The following exposes the political and legislative trials of Gujarat with regard to this, and shows in how far these policies have taken shape in the reality of land reallocation.

3.2.2.1 Yamin maalik

Already before independence, Gujarat introduced land policy changes towards the abolishment of the Zamindari system, reduction of rents, and to do away with the intermediaries between the state and the farmers. In this period, the main focus was given to economic growth and efficiency whilst hardly any notion was given towards land redistribution and equity (Sud, 2007). Nevertheless, after independence Gujarat introduced land reforms in three phases: between 1940-50, the aim was to abolish intermediaries and the Zamindari system; phase two focused on eradicating tenancy, especially sharecropping; the third phase prioritized the regulation of the size of individual holdings *'through land ceiling legislation, and then distribute among landless labourers and marginal farmers the surplus land generated'* (Sud 2007:4).

The abolishment of the Zamindari system met with several difficulties: zamindars and other intermediaries started to throw out the tenants from their lands so that the land could not be allocated to them. To stop this, Saurashtra¹⁹ issued the Saurashtra Protection of Tenants of Agricultural Lands Ordinance in 1948. An additional ordinance got implemented, the Saurashtra Protection of Tenants Ordinance to *'fix rent from tenants to landlords based on an agreement between the intermediary and his tenant and regulated by the government. This rent was not to exceed 1/3rd of the summer crop and 1/4th of the winter crop'* (Sud 2007:5). In the same line, more amendments and acts followed in order to secure the redistribution of land towards the tenants and the reduction of rents in the region of Saurashtra. It is worth noting that the Saurashtran Bank and the Reserve Bank of India produced a loan scheme in order to enable farmers to buy land. In addition a Land Mortgage Bank was created, where *'the legal titles of the lands of tenant-occupants were mortgaged with the Bank till they had paid the full amount required for ownership'* (Sud 2007:6-7). In the Saurashtran region these implemented policies and legislation had the desired effect for the former tenants and

¹⁹ Saurashtra is a region within the State of Gujarat. Before 1960, Gujarat was divided into three provinces. Saurashtra, region of numerous Princely States was the peninsular area of present Gujarat with its own government; Mainland Gujarat was part of the Bombay province; and the north-western part including the desert of Kutch came under administrative control of the Indian union (Sud, 2007:4)

intermediaries, who became *'occupants of the land of the state'* (Sud 2007:7). Yet as the author notes, the land reform policies introduced in Saurashtra were partly backed-up by and important social classes having good ties with the Congress, as they became beneficiaries of the program. As Sud (2007) mentions, *'the land reform implementation was embedded in a conducive socio-political context'* (Sud 2007:7).

Such a conducive environment was less existent in mainland Gujarat during the reform implementations. According to Sud (2007) this has a lot to do with the historical roots of land distribution in the region. The mainland of Gujarat was mainly part of British India²⁰ where the Ryotwari system had ruled considerably. Ryotwari, *'where revenue was collected by the colonial state directly from the cultivating peasant and not through an intermediary zamindar'* (Sud 2007:7) incorporated large parcels of land where upon tenancy arrangements to cultivate the land was a common phenomenon. Mainland of Gujarat, as part of the Bombay province, fell under the Bombay Tenancy and Agricultural Lands Act 1948 as compared to the individual Saurashtran policies. Yet just as like the land policy in Saurashtra, the purpose of the Bombay Act was to secure land to the tillers and reduce rents (Sud, 2007). This act led to increased individual owned plots, the abolishment of the exploitative revenue systems and the emergence of efficient and local-based reallocation systems.

In both Saurashtra and mainland Gujarat, a government machinery was installed including officials as Mamlatdars²¹, Collectors and Inspectors at different levels. Advised and directed by the Chief Minister of the State the apparatus was meant to indicate the seriousness of the policy implementation. Nevertheless in mainland Gujarat even with this strong machinery *'the landowners [...] declared only half of the area held under tenancy open to potential ownership by the cultivating lower caste tenants'* (Sud 2007:8). The tenants were rejected the rights to own lands and protests and official dispute settlements could hardly be fruitful since the tenants were kept at a distance from the tribunals. As Sud (2007) states: *'This is because unlike Saurashtra, caste configurations and political considerations aligned the Brahmin, Baniya and Kanbi-Patidar bureaucratic and political machinery with the landowners. [...] political will to push through tenancy reforms was found lacking in mainland Gujarat'* (8).

However, time passed and after the implementation attempt of the first two phases -the abolition of the Zamindari and Ryotwari system and the eradication of tenancy and sharecropping arrangements- the moment came to implement the third phase of the land reform policy: redistribution of 'land to the tiller'²². It implied that the former tenants would become owners of land owned in surplus by so-called landlords. This policy was implemented by way of allowing the ownership of a limited amount of land, and got applied to the united Gujarat State²³. The Land Ceiling Act of 1961 made a difference in limitation on amount of acres allowed to be owned based on land occupation and whether the land was irrigated or not: the limit for ownership of irrigated land varied from 19 to 56 acres; the limit for dry lands amounted from 56 to 132 acres. Any surplus owned had to be announced to the local Agricultural Land Tribunals who allocated these surpluses to specific beneficiaries including the Scheduled Caste and Scheduled Caste. This policy was not conceived positively by the landowning groups of the Gujarat society, leading to delaying the legal processes as well as illegally dividing the land to other family members (Sud, 2007).

²⁰ British India refers to those regions which were directly administered by the British Government before 1947. It did not include the Princely States

²¹ Block Revenue Officers

²² *Khedut ni yamin*: land to the tiller

²³ Since 1960 Kutch, mainland Gujarat and Saurashtra had been united

As Sud mentions this resistance led to less impact of the land reforms, and many cases show that the surplus land ownership was solely declared on paper and no redistribution had taken place at all: *'The original owner continued to till the land, with village officials completely indifferent to the case'* (Iyer 2002 as cited by Sud 2007:9). And so, *'less than half the land declared surplus has actually been taken over by the government'* (9). The government of Gujarat adjusted the Act several times, including one change which actually turned out to be of benefit to the landowning class since it allowed the 'illegal' transfer of land to a 'dependent male descendent'. Enabling the landowner to nominate even his infant son as a person to transfer land to, so that the landowner had no surplus of land anymore. Furthermore, the Chief Minister imposed a ban on non-farmers living outside a radius of 15 kilometers to own or purchase land, speculated by Sud (2007) for the reason to diminish the competition of other non-farmers to enter the land market.

3.2.2.2 Pro-poor government in a liberalized context

As a result of these socio-political incidents *'The groups that benefitted from the abolition of Zamindari and tenancy reform in the 1950s and 60s, i.e., mostly Patidars, were gaining further economic strength by the early 70s due to the thriving white/dairy cooperative revolution and the successful launch of the green revolution'* (Sud 2007:11). According to Sud, the actual tillers who were supposed to become beneficiaries of the land reform Acts were not reached. Those who could -benefiting from the ban on land purchases for outsiders-bought the land and became the new middle class. As Sud states: *'It seemed to come from a state keen to protect tillers from losing their land assets to high bidders from the cities'* (12). Capital was accumulated by means of sending the young sons to cities in order to specialize in agricultural industry and trade. This money got reinvested for the agricultural lands and they came to dominate the rural economy. These agricultural ties with the cities were strong.

From now on Gujarat saw a shift in land policy from the more social approach of 'land to the tiller' to the shaping of a class-dominated land market. Due to many political changes in a short period the 'land to the tiller' program lost priority. Political instability was related to opposition-government named KHAM²⁴ in 1980, fighting for the proletariat which included the issue of land. They reopened cases of land ceilings and wanted to reverse the opportunity given by the Act that young sons could transfer land to. 25000 cases have been opened since this new government however soon enough protests emerged. Landowning Patels and some middle/upper class organizations²⁵ sent petitions to the High Court in order to prevent the implementation against these 25.000 cases and the land initiative in general. To cite Sud (2007): *'The agro-industrial elite of Gujarat was revolting against the KHAM government'* (14). They achieved the withdrawal of all cases in 1983. *'Given the hostile political climate, the government made no further open attempts at challenging, on a large scale, upper and middle caste dominance in land'* (15).

And so, the government had to think of something else. They came with the idea to lease out government land to the poor on a temporary basis. The government had surplus land because of dried-up water sources: *'... the cultivation of fertile pond and river-beds for 9 months in the year would benefit 300.000 landless labourers'* (Sud 2007:16). For example, several areas had

²⁴ A political alliance of Kshatriyas (upper case Rajputs and strong backward caste), Harijans (Scheduled Castes), Adivasis (Scheduled Tribes) and Muslims led by Chief Minister. Solanki (Sud, 2007)

²⁵ The Gujarat Chamber of Commerce and Industry, the Gujarat Chamber of Agriculture, and the Khedut Samaj (Farmers Society)

been submerged completely by damming. The people cultivating in these areas were promised governmental land²⁶. The excess available land could be tilled by the landless labourers, since they could not be compensated in any other way as they did not own any parcel of land. Yet it turned out that these landless people were not able to receive any plot of land since the original landowners occupied more than awarded to them. A stronger program to allocate 1750 acres to the Adivasis and Dalits did work out, yet again high resistance of the upper class and High Court made the KHAM to sidestep from its own land policy (Sud, 2007).

3.2.2.3 Liberalization of land

In 1985 after the elections the KHAM government resigned which meant the end of the so-called pro-poor government of Gujarat –although it has to be said that the land policy of this government was somewhat paralyzed over time. Furthermore, an important fact considering Gujarat is its focus on the development of industry, with textile as most important product. In Gujarat however the legislation discouraged the industrial takeover of agricultural land. Strict rules came into being for the conversion of the purpose of a specific plot from agriculture to industry –yet creating a sphere of bribing to go against this rule. Nonetheless, in 1995 the land got more liberalized to formalize and ease the process, and for which there was a high demand. This demand had risen as a result of the agro-industrial economy connecting agriculture with the emerging industry. Those who migrated to the cities still had the need to control land, whether for the conversion to industry or just for their identity –as being former agriculturalists. And even the aforementioned Bombay Tenancy Act including the eight kilometers rule²⁷ for the landowner got adjusted in 1988 for drought-prone areas in specific, backed up by the argument that the poor farmers living in these areas can now more easily sell their land to whomever and purchase better irrigated land elsewhere. The concessions on the eight kilometer rule were not formally adapted to all the lands in Gujarat (Sud, 2007).

The poor and most affected farmers, the backward caste, Scheduled Caste and Scheduled Tribe, did not protest although it was thought that they would suffer the most. Some organizations did protest against these concessions of the land law, stating that it *‘enables rich farmers to take advantage of the desperate condition of poor drought-affected farmers and buy off their land cheaply. Instead of buying land in other parts of Gujarat, the newly landless farmers would enter the growing pool of landless labour’* (Sud 2007:21). Nevertheless, this protest seemed to be too weak above the fact that other farmer organizations supported the change in land law. Because of this, the change gained legitimacy because the farmer organization stands to represent the farmers (Sud, 2007).

Add to this the governmental changes, which was mainly in hands of the landed elite supporting land liberalization. A tumultuous period emerged with Hindu nationalist movements and anti-Christian and –Muslim activities. New policies were developed taking hardly any notion of the landless poor farmers with regard to the low castes and classes: *‘The politico-economic slant of the Hindu nationalist movement and of its various constituent organizations is quite openly pro-rich’* (Sud 2007:24). Furthermore, the industrialization and economic progress got boosted by the *‘economic liberalization all over India from 1991. [...] But with the adoption of the New Economic Policy, States like Maharashtra and Gujarat have used Delhi’s support as a key for withdrawing what many elites in these states consider*

²⁶ Conditional of the owners tilling the land themselves, earning livelihood from agriculture, living within 15 kilometers of the dam and not already possessing more than 16 acres of land

²⁷ The eight kilometer rule entails that a landowner has to live within a radius of eight kilometer from the land he owns

stifling state controls.' (Sud 2007:24-25). The New Delhi policy could be used to convert traditional agricultural lands even more easily towards industrial land, leaving the idea of 'land to the tiller' far behind (Sud, 2007).

The lifting of the eight kilometer rule, which solely applied for drought-affected areas in 1988, was pushed to be introduced all over Gujarat. It resulted in a great increase of buying lands, especially those who were cheap but soon would rise in price because of the construction of the Narmada dam and its canals. Besides, the adjustment of the rule would not only support agro-industrialists because the land got attractive for commercial and residential investments as well, on national and international scale. Still, officially the rule of eight kilometers was still at work. Finally when in 1995 the first Bhartiya Janata Party (BJP) came to rule in Gujarat they managed to lift the eight kilometers officially without much protest, as has been seen previously rejecting the amendment (Sud, 2007).

However, this BJP government was aware that a large percentage of their 'electoral constituency' consisted out of the rural poor, which stimulated the government to initiate programs for them as well. Again, governmental wasteland was provided to 26.000.000 of the rural poor living below the poverty line for agricultural purposes. Yet as commented by the author, the local politicians have no other interests than the state-bureaucracies and so such policies will never be implemented. Hence the announcements are in fact never really enacted as opposed to the plans and schemes to boost industries which receive the least constraints from the local and state-level bureaucracies. Land ceiling laws were circumvented and although bribing is common, to convert land for non-agricultural purposes goes rather smooth compared to scheduled land to the rural poor.

3.3 Concluding remarks

The physical environment of North Gujarat is dry with insecure monsoons, coming in floods or droughts. This resulted in a shortage of water, driving the farmers to look for alternatives. Combined with agricultural innovations and technological improvements, opportunities grew to exploit groundwater. Due to electricity policies spreading the ease of electricity use and governmental subsidies to install tubewells, groundwater exploitation rose rapidly. On top of this the need for inputs such as land and water increased as a result of the Green Revolution: production rose, as did the need for land and water in order to maintain the same level of productive capacity. Even more, the groundwater use increased by reducing the groundwater level. To curtail this development, the Indian and Gujarati government created and implemented policies and legislations. These were difficult to implement and hardly saw changes in groundwater use, as many farmers were able to continue their customary activities. A policy which did curtail groundwater exploitation included the reduction of energy supply by creating a complete new electricity provision system. For farmers with capital, agricultural policies did not reduce their living standards. However, poor farmers became dependent upon water provision from others. They became more vulnerable and prone to risks, and were put at a disadvantage even more by the governmental policies.

Concerning land, exploitation occurred as well: land needed extra fertilizer in order to keep the soils fertile and productive. In addition the need for land rose due to population growth without a growth in off-farm labour opportunities. Wastelands were altered to be used for agricultural production. Due to the Tenancy Act many farmers were entitled a plot for themselves enabling the tenants to become farmer and to create another more efficient and less exploitative system of land reallocation. It changed the structure of agriculture to a large

extend, although the small and marginal farmers still had to bear the costs of productivity losses. Major reform policies are provided to change the difficult situation for the landless poor. However, as a result of the liberalized approach used within the policies, those who benefited were not the real rural poor but the middle class people. Those who had limited access to land and water became tenants, who frequently were low caste people. Thus, increased production led to risks and vulnerability, scarce resources such as water, land and electricity. This finally led to the reallocation of property through sharecropping.

4 Research sites

This descriptive chapter presents an introduction to the research area, the two villages New Najupura and Rangpura²⁸. First the geological and administrative information will be provided, followed by a more detailed description of the climatic conditions and background information on the agricultural situation and water supply methods. Thereafter the villages will be described in more detail separately. As the discussion on water extraction remains the main focus of this thesis, a short section on previous water harvesting techniques is given. The chapter offers a stepping stone to understanding the circumstances the villagers live in, and to clarify the agricultural situation of water shortages. This creates a specific system of agriculture which will be elaborated further upon in Chapter five. Chapter four mainly focuses on the informative aspects with regard to the research area, to provide for context.

Important differences between the two villages are: Rangpura has water supply systems within the village where New Najupura is mainly dependent upon the neighbouring village; and the caste composition within the villages vary substantially. Access to water for the winter season enables for a winter crop. There are more villagers in Rangpura who can make use of irrigation water during the winter, increasing the amount of production. In New Najupura only a small number of villagers can make use of irrigation water; namely those who are connected with the neighbouring village Old Najupura. Regarding the social composition, in Rangpura two different caste-families live: Thakor and Rabari while in New Najupura mainly Thakor, Prajapati and Neershit live. Hence, this chapter provides the institutional environment where water allocation and land distribution take place. This institutional environment is constituted from social composition as well as the physical and political fields. Chapter five will finally analyze these two main issues (social composition and access to water) and their consequences in relation to the institutional arrangements they create.

4.1 Radhanpur *Taluka*

Figures 4.1 and 4.2 indicate the research area. The research focused on two villages in Radhanpur *Taluka*, Patan district. New Najupura, the village located near by the Banas River and Rangpura have a distance of about twenty kilometers from each other. The main economic activity in both villages is agriculture, although several off-farm activities occur. The villages differ in social composition, location with regard to Radhanpur, *Gram Panchayat* and irrigation facilities.

²⁸ All information presented in this chapter and parts of the following chapter (chapter five) is based on field research. For this part of the research interviews were held mainly with key-informants, organizations were visited and additional documents collected.

will visit the *Talathi*-office and make the payment. If they fail, they will get a notice. The tax is the income of the Panchayat whilst the *Talathi* gets paid by the government (pers.com. *Talathi* Old Najupura, March 27 2008).

As indicated on Figure 4.2, both the research sites New Najupura and Rangpura are located in Patan district where 7 *Taluka*'s are located. New Najupura and Rangpura come under the Radhanpur *Taluka*. The *Gram Panchayat* of Najupura contains Old Najupura and New Najupura, whilst Rangpura is part of the Santhali Group *Gram Panchayat* which contains the three villages of Santhali, Rangpura and Limburka.

4.1.2 Climate

The Radhanpur *Taluka* knows a dry climate, and the year is structured by three seasons: the winter, without any precipitation, from the 15th of October to the 15th of February; the summer from the 16th of February until the 15th of June; the monsoon of which it is expected to start the 16th of June until 15th of October. Dependent upon the year, the monsoon can last two weeks up to two months, containing heavy floods and rainfall in some years or hardly any rain in others. The last seven years, the average rainfall in the *Taluka* Radhanpur reached 421 mm. The distribution of rainfall in 2006 was as follows: June 59 mm; July 297 mm; August 676 mm; and September 75 mm. According to the standards, the months July and August knew irregular rainfall since normally about 150 mm and 200 mm rain falls respectively in July and August (normal standard according to R. Thakor). Over the years from 1995 to 2006, the following monthly average rainfall in Radhanpur *Taluka* was: June 69 mm; July 181 mm; August 206 mm; September 33 mm; October 10 mm (Model Action Plan for Agriculture, 2007-2008). After the monsoon, temperature decreases again until the end of the winter. The maximum temperature is 45° Celsius; the minimum temperature is 25° Celsius (pers.com. Rasid Khan May 16 2008).

4.1.3 Agriculture

The agricultural sector is of main importance for the economy of the Radhanpur *Taluka*: 75% of the households are dependent upon agriculture. Radhanpur is the center for most farming villagers in the vicinity to sell their products at the auction (agriculture producing marketing committee). Seeds can be bought in Radhanpur, as well as other consumption products for the farmers (Model Action Plan for Agriculture, 2007-2008).

The crops produced in the rural areas of Radhanpur *Taluka* are: cotton, castor, *bajri*, *mug*, *mud*, wheat, sesame seeds, rapeseed, cumin, *juwar* and *rajko*. Agricultural activities are based on climatic conditions. For agriculture there are three seasons as well: monsoon season, winter season and summer season and have the same interval as described above. The crops growing during the monsoon season are: castor, cotton, *bajri* and *juwar*. In winter season wheat, rapeseed, cumin, sesame seed, *mug* and *mud* grow. In summer season, crops are not grown except for *rajkot*, which mainly occurs at the land of the tubewell owners since they can apply some water to the crop. *Rajkot* is a feedstock.

4.1.3.1 Land

The total cultivated land area of the Radhanpur *Taluka* is 44.391 ha; out of this, 13.000 ha is irrigated (and so 31.391 ha is not irrigated); 8.669 ha belongs to the wasteland area, which is government property so that the Panchayat is responsible for the management of the area;

3.507 ha land is used as graze land for cattle; and in the Radhanpur *Taluka* no forestry land can be found. See Table 4.1.

Table 4.1 Land use and area in Radhanpur *Taluka*

Type of land	Area (ha)	Percentage of total (%)
Total cultivated land	44.391	43,97
Irrigated land	13.000	12,88
Non-irrigated land	31.391	31,1
Wasteland	8.669	8,6
Graze land	3.507	3,5
Forestry	-	-
<i>Total</i>	<i>100.958</i>	<i>100</i>

Source: Agricultural Office Radhanpur

Four types of soils, *goradu* (mixed soil between black and sandy), *retal* (sandy), *lampi* (crusty, granulated), and salty soils, can be found in the Radhanpur *Taluka*: 12.500 ha is classified as *goradu*; 12.500 ha as *retal* and 31.891 ha as salty. There are no black soils in the Radhanpur *Taluka*. The soils are medium fertilized. On the sandy soil, *dahl* (green mung, lentils, *channa*) and *mud* (yellow mung) is grown. On the *goradu* soil cotton, cumin and wheat are cultivated. *Bajri*, *juwar* and castor grow mainly on *lampi* soils (pers.com. Hamir Thakor, March 19 2008. See also Annex 3).

In the Radhanpur *Taluka* 12.730 farmers are landowners. Out of them 6.940 own a plot smaller than 2 ha, classified as *simanth* farmers which stands for a farmer 'smaller than small'; 4.871 farmers own a field between two and five hectares, classified as small farmers; and 919 farmers own 5 ha or more, classified as big farmers. This is the official Gujarati division of farmer classification (pers.com. Sayad Nagori, March 27 2008). The Agricultural Office of Radhanpur uses another classification system than the official Gujarati division³⁰, where a *simanth* farmer is classified as owning 1 ha or less. As can be seen in Table 4.2 based on the Agricultural Office classification system, it shows the allocation of land amongst farmers. If the classification system for *simanth* farmers would include all farmers who own less than two hectares instead of one hectare, the percentage of *simanth* farmers would be 92.8 (the number of both *simanth* and small farmers). Hence, the classification system used by the Agricultural Office provides a different image on the number of *simanth* and small farmers living in the *Taluka*.

Table 4.2 Distribution of land amongst farmers in Radhanpur *Taluka*

Farmer classification	Number (farmers)	Percentage of total (%)
<i>Simanth</i>	6.940	54.5
Small	4.871	38.3
Big	919	7.2
<i>Total</i>	<i>12.730</i>	<i>100</i>

Source: Agricultural Office Radhanpur

4.1.4 Irrigation and water supply

³⁰ The Agricultural Office of Radhanpur uses another classification for *simanth* farmers: here, a simant farmer owns less than 1 ha whilst a small farmer owns between 1-2 ha and big farmers include all those who own land sized larger than 2 ha.

Water is the most important resource for the production of agricultural crops in the dry region. First of all, the soil should be a little wet before the seeds are sown. Secondly, water is necessary during their initial growth period, as well as further in the growing process. Hence, sufficient and regular water application during the season is necessary to fulfill the cropping pattern and to reach a high yield. The irrigation facilities provide for the production of a winter crop.

Table 4.3 Water sources in use in Radhanpur Taluka

Source	Number	Area irrigated
Well	800	4.300 ha
Gov. Tubewell	11	200 ha
Personal tubewell	170	5100 ha
Canal	-	
Pond		200 ha

Source: Agricultural Office Radhanpur

The area knows a monsoon period of about four months when the total amount of rain for the full crop-season falls. In order to make use of this water the other eight months, the water has to be stored so that the water supply is secured in the dry period. Table 4.3 shows the indirect water sources. These sources enable irrigation for the dry period. The wells are used to extract groundwater to the surface. The pond, constructed by the government and meant to serve drinking water needed for the animals of the villages, stores the rain-water in a recharge area. Besides, there are other surface storage areas where monsoon water is collected, stored and used during the winter season for irrigation. For villagers located near the Banas River, there is one more water source: the Banas River (groundwater). This will be explained more detailed in the next section.

A tubewell has to be constructed at a higher point in an area so that the extracted water can flow easily through the irrigation channels to the fields, and no extra pump is needed for the transport of the water. The extracted water can flow through surface irrigation channels, through underground pipelines or PVC pipelines. The underground pipeline reaches the farmlands through means of a *kundi*. A *kundi* is a concrete construction which allows the water from the underground pipeline to reach the surface. The water will flow out of the *kundi* and directed into *dahlia*'s. A *dahlia* is an earthen canal which transports the water on the surface.

The rules for water and water supply for the tubewell owners –which vary for governmental and private water sources-, are given by the Water Supply Office in Radhanpur. For government-owned water sources, the Office mediates in conflict and is accountable for the repairing of the system. The role of the Panchayat in water is only the collection of water tax, which accounts for both private and governmental tubewells. Nowadays the government has prohibited the installation of new tubewells. It is not allowed to drill new holes while it is allowed to re-dig old holes in the case of failed tubewells (make them wider or deeper). On top of this, the government reduced the amount of electricity supply in order to curtail groundwater pumping during the night. A few years ago, the government supplied electricity connections. Nowadays the farmer will have to invest for the connection himself.

4.1.4.1 Water supply Banas River

The Banas River is an important river for northern Gujarat. It originates from the Siranva hill in Sirohi, Rajasthan, and flows through the Arivalli hills to the Rann of Kutch while passing the Patan and Banaskantha districts in Gujarat. The Banas River is seasonal as in the summer the riverbed is dry (NWRWS, 2008). A big problem the Banas River encounters is the refilling of the groundwater and the river itself during the monsoon period. This due to the Dantiwada storage dam completed in 1965, a government constructed major irrigation project about 86 km upstream in the Banaskantha district meant for irrigation, drinking water, fishing, washing and animal drinking. The dam has several spillways which can be opened individually, and so the amount of water let through can be managed. For the downstream villages this resulted in a lack of water reaching them as the river is often dry here. This drought induces salinization of the water further downstream as well (NWRWS, 2008; pers.com. Rasid Kahn May 16 2008).

And so, several projects were initiated in order to be able to extract water from the Banas River. About 25 years ago a sand-dam was constructed nearby the village of New Najupura. This made it possible for more villagers to use their own pump to use surface water from the Banas River. Furthermore, surrounding villages receive water for irrigation out of the Banas River by pumping the water which infiltrates in the subsoil during and after the monsoon and the stored surface water (Figure 4.3 and 4.4).



Figure 4.3 Banas River: water storage behind underground dam



Figure 4.4 Tubewell in riverbed of Banas River

The water in the storage pond and the stored water in the subsoil is sweet water since it is not derived from the deep layers where salinization takes place. A pump located in the storage pond extracts the water and transports it via PVC pipelines to the surrounding fields or irrigation systems. Although the water is extracted from the pond, it gets refilled due to the law of communicating vessels, and so groundwater from the surrounding areas seeps through. This water is sweet as well since it is coming from the more upper soil. Geologically, the soil where this water originates from is not saline yet.

The water in the subsoil is pumped up, as can be seen in Figure 4.4. For this purpose, the government³¹ invested in ‘underground dams’ about 20 years ago: first, a deep hole is dug to a depth reaching the crust soil; the sand is stored and the hole is covered with an impenetrable plastic layer; the deep hole will be refilled with the sand again and an underground dam is created. This underground dam will prevent the water from flowing through, and is stored. At every 5 km in the riverbed, such an underground dam is constructed to retain the sweet upper-groundwater. The minimum depth of this underground dam depends upon the impenetrable layer at the specific location. When this point is reached by drilling, the dam will be

³¹ The government contracted out the job of construction to local NGO’s

constructed from that point. However, when this point is not reached by drilling as far as 15-20 ft, a dam will be constructed up to 15-20 ft, or as far as the budget can manage. The underground dam consists out of sand rolled up in a plastic sheet, which is then placed into the ground. During floods, the sweet groundwater which arrives in front of the dam will be stored. Some water will flow over the underground dam and downstream it will fill the groundwater level only in the top layers. Deep infiltration hardly takes place behind the underground dam.

The underground dams were mainly constructed to increase water use out of the riverbed for irrigation, yet the water is used for both men and animal drinking purposes. As a result of storing water in underground layers of the riverbed, several wells with a depth of 15-25 ft are installed around the dam and are owned by villagers from Sabtalpura, Shergod and Old Najupura. These villages are located at three, two and three kilometers respectively from the Banas River. Farmers might choose to dig for groundwater in their farmlands, however this water is saline and so sweet water of the Banas River is preferred. About 40 wells are installed in the riverbed of Banas, individually owned or under partnership constructions. The construction, maintenance and pipelines of a tubewell cost about 50.000 Rs, thus four to five people are willing to make a group to collectively contribute an amount to construct a well. These wells are not tubewells because the level of the water in the river embankments is not that deep (pers.com. Rasid Khan May 16 2008).

The tubewells cannot be dug everywhere due to the variation in the geological subsoil: once the impenetrable layer is reached by digging, the tubewell cannot go further. By means of trial and error the point is found where a well can be dug and water will be reached. The water is transported to the surrounding fields or irrigation systems. The tubewell owner of Figure 4.4 supplies water for 15 hectares to several farmers in return for one-third of these farmers' crop produce.

4.1.4.2 Other water harvesting techniques

Some farmers, due to extension services provided by the Agricultural Office or because of own inventiveness, invested in several types of water storage devices. In the villages in Radhanpur *Taluka* water storage takes place by means of: constructing leveled farm boundaries; constructing a farm pond; and recharging wells with rainwater. Farm bounding entails the elevation of the boundaries of a field to a height of 1-1.5 m with surplus soil. Rainwater will not run off the field but instead infiltrate in the soil. The farm pond is a part of the field which is made deeper and with surplus soil the specific area is bounded, to reach a depth of about 2 m. A small retention basin is created which will store the rainwater and make it useful for irrigation. Furthermore, the water will recharge the groundwater level below the field. The latter, recharging of wells with rainwater is the mechanism by which the extraction-area of a tubewell will be recharged with water in order to prevent the well to dry up. Both a tubewell and a shallow well can be made rechargeable during their construction, due to the installment of percolation holes surrounding the bore. The rainwater can easily infiltrate into the soil which will keep the well in use.

Water resources are important for agricultural production since rainfall is irregular, resulting in an unpredictable cropping pattern. Water in Radhanpur *Taluka* is mainly used to irrigate cumin and wheat. However, the quality of the water in the region of Radhanpur varies between medium and low: salts and acids make the water less usable for irrigation as it affects the crop. At the same time the soil becomes hard and solid due to the salt, which has effects

on future production. As a result, change of crop has to take place since the farmlands cannot be irrigated in subsequent seasons.

4.1.4.3 Traditional water harvesting techniques

The appearance of deep boreholes and tubewells started about thirty years ago. Before drilling and extracting groundwater, the farmers used shallow wells constructed in their own fields. In Radhanpur *Taluka*, three different types of shallow wells were brought into use, all designed and running differently: the *Kosh* system; the *Rahent* system and the *Dhenkwa* system. All these wells were dug in the fields of the farmers themselves and for private use only. *Kosh* was in use until about twenty years ago, before the engines entered the scene. *Kosh* is a mechanism of ropes, a leather bucket and two oxen. The oxen are connected to several ropes; by walking back and forth the water is collected in the bucket and spilled over into a big bucket where it retains until use. *Rahent* on the other hand is a mechanism with a bullock, in use in 1950-60. The bullock is connected with a shaft to a waterwheel; the bullock walks in rounds and in the meanwhile the buckets on the waterwheel will be filled with water. Originally this system is derived from Pakistan. Such wells were mostly used in villages where Neerashrit lived. *Dhenkwa* is a water collecting system which makes use of leverage points and stone-weights. The vegetable growers of Patan district still use *Dhenkwa* as the mechanism to pull up the water from shallow wells.

4.1.5 Agricultural problems

The main problems the farmers in Radhanpur *Taluka* encounter are: decreasing fertility of the soil because of crop production and salinization; irregularity of the rainfall; low quality of water for irrigation in addition to high costs of tubewell water due to high electricity price and installation of a tubewell; the intrusion of pigs and wild cows who eat the crops from the fields; lack of knowledge on the farmers' side; irregularity of irrigation water supply (social difficulties); and lack of introduction of new seed varieties in the villages (Model Action Plan for Agriculture, 2007-2008). In 2001 an earthquake hit the North of Gujarat affecting several areas greatly by demolishing houses and causing crop failures. An important agricultural constraint is water, as came about in the three consequent drought periods of 1986, 1987 and 1988 and the droughts of the year 2000 and 2002. These droughts affected many farmers in the north of Gujarat and Radhanpur *Taluka*. However, too much rain is affecting the farmlands in the area as well. Both droughts and floods negatively influenced the agricultural output on the affected lands.

4.2 New Najupura

4.2.1 Village history

New Najupura was founded in 1945 by five Thakor families of which Motibhai Thakor was the oldest. About 35 to 40 other families of Thakor, Luhar, Brahman, Thakkr, Neerashrit and Sathwara came to live in the village. In 1973 the Banas river flooded and New Najupura, located nearby the river was flooded as well. Due to the flood, the flow of the river was reallocated. Farmlands became useless due to crustification and salinization of the soils. The water remained in the village for eight to ten days. The shelters made of mud were destroyed. However, during the flood the Prajapati and Thakor families constructed a wall around their

houses in order to prevent the water destroying their houses and for seven days they locked out the water. Since there was no food in the village the villagers cooked the left-over of *bajra* which would normally be given to the animals. As a result of the flood, one-third of the people of New Najupura migrated to Radhanpur where they were given food and shelter in schools and houses of the rich people in the city. Furthermore, a number of Neerashrit families left New Najupura and built a new village, Rawinagar, between New Najupura and Kamalpur. The Luhar and Sathwara families migrated to Radhanpur and Meshana in order to work in the cities and none of these families can be found in New Najupura nowadays. During periods of drought several families left to Saurashtra, Meshana and Ghandidam for animal husbandry or wage labour. Today, the village includes Thakor, Prajapati, Brahman, Sadhu, Bangi and Neerashrit families (SEWA Giwika, 2001).

4.2.2 Village profile of New Najupura

4.2.2.1 Agriculture

The population number of New Najupura is 730, containing 390 males and 340 females all housed in 133 households. The total amount of farmlands owned by the households of New Najupura, complemented by government owned property, constitutes 405 ha. Out of this the wasteland, which is governmental property, is 10 ha including the land not for agriculture (the village); land with irrigation is 20-25 ha; and so land without irrigation is 370-375 ha. See Table 4.4.

Table 4.4 Distribution of land use in New Najupura

Type of land	Area (ha)
Total cultivated land	400
Irrigated land	20-25
Non-irrigated land	370-375
Wasteland	10
Land not for agriculture (pond, checkdam)	Included in wasteland
Graze land	-
<i>Total</i>	<i>405</i>

Source: Agricultural Office Radhanpur

Out of the 133 households, 75 households are the actual owners of the land. Out of these 75 households, 25 households are classified as *simanth* farmers; 45 households are classified as small farmers; 5 households can be classified as big farmers. Table 4.5 shows the distribution of land among landowners.

Table 4.5 Distribution of land among farmers in New Najupura

Farmer classification	Number (farmers)	Percentage of total (%)
<i>Simanth</i>	25	33,3
Small	45	60
Big	5	6,7
<i>Total</i>	<i>75</i>	<i>100</i>

Source: SEWA Giwika Project

In New Najupura cows, buffalo's, oxes, sheep and goats are owned by several households. The animals are used either for assisting in the production process of crops on the land or for dairy production, to sell to the Banas Dairy Cooperation or for personal consumption.

New Najupura is located 4 km from the Banas River. About fifteen to twenty years ago several farmers from New Najupura were able to receive irrigation water from the Banas River. Villagers from Old Najupura who are located 3 km from the Banas River and who are wealthier compared to the villagers in New Najupura, were able to invest in tubewells to extract groundwater from the Banas River. They constructed pipelines from Old Najupura to New Najupura and provided them with water, which was sufficient for the time being. About ten to twelve tubewells were placed. In Old Najupura these owners were from Patel and Desai castes. However, after the tubewells had worked for about three years the extracted water became saline and not usable for irrigation anymore. The supply from Old Najupura to New Najupura stopped for the greatest part, leaving two or three farmers still receiving water. The usable water mainly remained at the farmers in Old Najupura to apply on their own fields. This opened up room for sharecropping, as will be elaborated further upon in Chapter five.

4.2.2.2 Social organization

The village is divided in several sections, called *vaas*. The name of each *vaas* is derived from the caste-system: it can be seen as a street name, named after the persons living in this street. In the Thakor-*vaas*, mostly Thakor people live. Six *vaas* can be observed in New Najupura: Thakor-*vaas*, Neerashrit-*vaas*, Prajapati-*vaas*, Soneth-*vaas*, Babria-*vaas* and the Warda-*vaas*. In New Najupura the *vaas* are mixed, that means that in Thakor-*vaas* also Prajapati and Neerashrit live (SEWA giwika, 2001). The Neerashrit caste needs some more explanation. In 1951 when the Partition of Pakistan took place, Pakistan separated from India and many Hindu families fled to India. They were thrown out of Pakistan by their Muslim counterparts. They became refugees in India, which means *Neerashrit* in Gujarati. The Indian government provided land to these families who fled from Pakistan to India. The Neerashrit-families in New Najupura are the Thakor's of Pakistan. Thakor, Prajapati and Neerashrit are part of the *Baxi Panj*, Other Backward Class as classified by the Central Government of India. This is based on their social and economic condition.

The houses the people live in can be divided in three types: a *Paka* house, a *Katcha* house and a *Chapera* house. A *Paka* house is constructed out of cement, bricks, sand and roofing tiles; *Katcha* is a house constructed out of dried mud and dung; and a *Chapera* house is made of branches, the roof of grass; and walls made of cotton rests and bamboo. The Thakor and Prajapati-*vaas* mainly consist out of *Paka* houses, including bricken walls which surround patio's, even though the Thakor-*vaas* includes some *Chapera* houses. The Neerashrit-*vaas* and the Warda-*vaas* consist primarily out of *Chapera* houses. Only several *Katcha* houses can be spotted, which is related to the fact that the *Katcha* house maker left the village some years ago and so there are more *Paka* and *Chapera* (pers.com. Saiyad Nagori, March 28 2008).

4.3 Rangpura

4.3.1 Village history

The history of Rangpura starts in 1932. At the time a Nawab, the Muslim king Jalla Luddin Khan Babi Bahadur ruled over the Radhanpur-region including 292 villages. Some Lolwadia (Thakor) families from Shergod and Radhanpur, who were gaining their income from labour

work in Pakistan demanded land from the Nawab in order to farm for themselves. The Lolwadia went to Santhali where mister Bhuramiya was living who was the deputy of the Nawab. The Lolwadia's were friends with Bhuramiya. Three Lolwadia families (Rawat, Ghanesh and Dehla) went there to ask for land; the families were allowed to utilize the area now covered by Rangpura.

When the families came to live in Rangpura they called themselves Radhanpura, a subdivision of the Thakor-caste. When they entered Rangpura the land was not ready for cultivation yet. Big trees and uneven soils hampered the development of agriculture. The families removed the trees and leveled the soils so that land would become available for cultivation. They did not prepare more land than necessary because they feared high land taxes from the Nawab. During those days if a farmer was not able to pay his taxes in time, he would be punished by the Nawab or the Karbhari³² by grinding wheat with the stone by hand for one day. The families started farming on the cleared lands. During periods of droughts (one between 1932-48 and one in 1956) they left Rangpura for Sindh, Pakistan to do labour work on irrigated farms. Here, more labour opportunities were available as well as water from the Sindh canal.

Since Indian independence in 1947 the Nawab-system was discarded. All the land became Indian government property: the farmers had to pay taxes, but as users and not as owners. The villagers of Rangpura, which had increased in numbers due to family expansion and the settling of a Rabari family, demanded their own land from the government. In 1971 the government granted them their land legally and the farmers became owners. Migration for labour stopped because they had to spend a lot of time for the cultivation of their own lands. Yet in drought periods the farmers left to Rajkot, Mesana and Deesa to apply for labour.

In 1982 and three subsequent years four private tubewells of a depth of 900 ft were constructed by partnerships, as a single farmer could not manage the payment himself. These tubewells made that 70% of the farmlands could be irrigated. Nowadays, three are still operational. After 1984, the rain became less and it was not sufficient for the crops. The general conditions of the village people became bad. Three years of droughts followed in 1986, 1987 and 1988. The government provided four months relief work for the farmers in the summertime, as in constructing roads and building a checkdam. The reward was given half in grain and half in cash. The work stopped when the monsoon arrived. In the first year, the road was completed. In the second year they deepened the pond of Santali and in the third year the checkdam was constructed. During the winter villagers migrated to cities in order to do labour, or to other places in order to do farm labour in partnerships.

Currently, only Thakors and Rabari are living in Rangpura. According to the respondent there are two Sadhu's and one Bangi living in the village temporarily. The Sadhu's are occupied with the holy occasions in the temple whilst the Bangi is making music and asks for food in return (pers.com. Hamir Thakor, April 8 2008 and April 15 2008).

4.3.2 Village profile of Rangpura

4.3.2.1 Agriculture

576 people inhabit the village of Rangpura with men and women homogenously divided. Rangpura covers an area of 400 ha, out of which 343 ha is cultivated. 100 ha are irrigated

³² The Kahbhari is the collector of taxes, who was only responsible for the area given to him by the Nawab

while 243 ha are not irrigated and are dependent upon the monsoon rain only (pers.com. Hamir Thakor, April 15 2008). See Table 4.6.

Table 4.6 Distribution of land use in Rangpura

Type of land	Area (ha)
Total cultivated land	342,8
Irrigated land	100
Non-irrigated land	242,8
Wasteland	47,19
Land not for agriculture	10
Graze land	-
<i>Total</i>	<i>400</i>

Source: Agricultural Office Radhanpur

Rangpura has a community of the Rabari-caste who were previously full-time pastoralists herding sheep and goats, producing dairy products. Almost all the members of this community still own some sheep and goats that graze wastelands and cotton and castor leaves after the winter season. In addition, there are cows, buffaloes, oxes and tractors which are used for agricultural practices.

Table 4.7 indicates the distribution of land among farmers in Rangpura both in hectares and in percentage to give a clear picture of land allocation. Again most of the farmers are classified as small and *simanth*, meaning that land concentration of big land parcels only occurs for several people. On top of this, Rangpura has approximately 60 ha of land which is used by farmers but which is still governmental property: *Old Sarkat* lands. The difference with *New Sarkat* land is that *Old Sarkat* land cannot officially be sold nor mortgaged. The farmer is an official tenant of his land. The next chapter will show that even though these data on land distribution exists, many alterations and shifting with regard to the use of the land were made possible without registration at the *Talathi* office.

Table 4.7 Distribution of land among farmers in Rangpura

Farmer classification	Number (farmers)	Percentage of total (%)
<i>Simanth</i>	30	39,5
Small	32	42,1
Big	14	18,4
<i>Total</i>	<i>76</i>	<i>100</i>

Source: Agricultural Office Radhanpur

4.3.2.2 Social organization

In Rangpura a member of the Rabari-caste is the village leader. He is selected and not elected by the other villagers because over the last eight years a member of the Thakor-caste had been the village leader. The villagers decided that a member of the Rabari-caste should have the opportunity. The village consists mainly of Thakor families, consisting of three Thakor sub-castes. Further, there are various Rabari families. Compared to New Najupura, Rangpura is not that divided into *vaas*, even though the castes and sub-castes of the village more or less do live in each others vicinity.

4.4 Concluding remarks

This chapter provided a detailed description of the village environment. It showed that the research area is highly dependent upon rainfall, making the farmers extremely vulnerable to droughts. This vulnerability however is not the same for the two villages, since location varies as well as the number of tubewells within the village, creating alternative ways to store and reach groundwater. The state-driven institutional environment shows that groundwater extraction is solely curtailed by prohibition of drilling new tubewells in addition to increased electricity costs. Furthermore, the customary institutional environment is shortly touched upon by introducing caste-differences and social organization related to caste. Chapter five will describe and analyze how the given circumstances as provided in this chapter lead to various mechanisms and strategies to create access to land and water.

5 Land allocation and water distribution

5.1 Introduction

Chapter three provided the governmental institutional environment to land and water management processes, focusing on to laws and policies, taken the Gujarati and Indian government laws and policies as units of analysis. These policies are set to change the rules. Nevertheless, local realities differ substantially from the perception of the policy makers, including the actions and interactions around land and water. Local practice has its own dynamic. It will react upon the legislation and implemented policies in its own way, as the people adjust state law to the local practice fitting them best.

Land, water and labour are the major factors for the villagers in New Najupura and Rangpura needed to produce a crop. These resources have to be brought together for production, or at least land and labour and in the best case water. This chapter will show the way in which land, water and labour are allocated, exchanged and distributed. Various factors exert influence on this distribution process; factors which are based upon customary rules and principles as well as on governmental policies and regulations. These two regulation systems are of importance in the creation of the rules and principles at work, which influence the allocation and distribution process. It turns out that the institutional environment provided by the government does not form the basis for the distribution practices. The customary principles which are reflected in the social relations, acceptations, actions and reactions seem to be of more importance in the allocation and distribution of land, labour and water. Only in some cases it seems to be that the governmental regulation system is of use: when it provides the best option for a farmer to do so. This discrepancy within the institutional environment –the state laws and regulations as provided in chapter three and the customary regulations as given in this chapter- will be outlined.

The chapter will start discussing land and the process of acquiring land, where the official system is taken into account. These are, however, bypassed by the local practices of land distribution through heritage or institutional arrangements –including land and labour³³. The institutional arrangements will be described elaborately, followed by an analysis of the relation these institutional arrangements create between the parties involved including trust, power and dependency. Above these arrangements and accompanying social relations where labour and land is involved, comes water. Water is an important resource during the dry winter season, and hence becomes a source of arrangements itself. Many land arrangements are connected with water arrangements, even though it occurs that people have solely a water arrangement as well. Therefore the distribution of water will be raised and again the relations created by the water arrangements will be discussed. These portrayals of land and water define the institutional arrangements and institutional environment created within the village, which constitute the distribution process of land and water. In the course of the chapter, institutional arrangements will be sketched as the unit of analysis.

³³ All information presented in this chapter referring to institutional arrangements and the rules of the game is based on field research in the research villages (as described in chapter four). Some sources are mentioned explicitly even though the scope of this thesis is not to pinpoint specific people, but rather to identify the key mechanisms, structures, rules and regulations in land and water distribution and allocation. The interviews are provided in Annex 4. The respondents in this chapter are referred to as NN# (when concerned a villager from New Najupura) and R# (when concerned a villager from Rangpura)

5.2 To obtain land

Both research villages acquired land about seventy years ago. The villagers gained waste land, removed the vegetation and started practicing agriculture on the fields. After Independence this process was legitimized by the state: those who were using the waste land for agriculture were registered as landowners. This state law, enhancing private property of land, was introduced in the villages alongside the customary rules on land ownership. Therefore, when changes occur with regard to land, such as partial transfer, temporal transfer, sale and inheritance, the customary and legal systems are both put into practice.

5.2.1 Inheritance

To act according to tradition, a farmer subdivides his field to his sons. This results in immense fragmentation of land holdings. This inheritance and subdivision among offspring occurs within the various casts in the villages: Thakor, Prajapati, Neerashrit and Rabari. This division among the sons occurs differently in each situation: the father decides whom to give how much land, a process according to customary rules. A general rule concerns the amount of land to the youngest son: he will receive the biggest share compared to his brothers. This rule is related to the common practice that parents in their old age live with the youngest son and his wife. Mostly, the land is divided when the father is still alive. The father clarifies how much land each son will receive. This is a process of ownership transition from father to son. Inheritance occurs when the farmer cannot fulfill agricultural labour anymore; when the farmer earns enough money and there is no need to cultivate the field for his income and has sons who can work the land for him (out of which he earns a share as well); or when the farmer passes away.

When the official landowner passes away, on paper the sons and daughters all have equal rights to claim the land. The *Gram Panchayat* is informed about the situation and the *Talathi* will register all the names of the sons and daughters as claimants. The Panchayat is responsible for the final decision concerning the land, inspired by the wishes of the father (his will is command) as clarified by the relatives. The *Talathi* has to divide the land among the offspring and this occurs by consultation of the family and the near society. According to social tradition no land is granted to the daughters, because they receive jewellery for their marriage as well as pots, pans and jars for the entrance in their husbands' houses. Even though all the sons and daughters officially have an equal claim, they will not apply for this claim since this would be socially unacceptable. They respect their father's decision, and the society enforces them to do so. If the father passes away and his children are still under eighteen the land will be registered on the name of his wife. When they have become eighteen, the relatives, the community, mother and the eldest son will decide together whom to give what amount of land to. The *Talathi* will make the decision official in the end. Furthermore, a father might have made explicit his ideas and preferences of shares on the land for his sons when he was still alive. It might be that one son is chosen to receive most or even all the land, although the latter is a rare case. There are many cases in which the land is unequally divided among the sons. Women cannot inherit land if their husband passes away. In rare cases the farmer might legally transfer part of his land to his wife while he is still alive. It is assumed that this kind of gift entails a form to show off someone's wealth.

Official land registration at the *Talathi* office is obligatory: a fee has to be paid to the *Talathi* office. Farmers are not yet very familiar with the registration system and hardly feel the need to change the name at the register. This creates confusion and results in the fact that the land is officially registered on the name of the eldest son, which was common practice before the

government introduced the new rule. Due to lack of information and high fees to change the name of registration at the *Talathi* office, many registrations are not complete. This might give conflicts later on, especially when the sons find it difficult to cooperate together. However, some farmers are highly aware of the usefulness of the registration process. Then, registration at the *Talathi* office is used when farmers themselves do not trust the customary regulation of land: if a farmer is insecure of access to land which is 'his' according to him, it might help for him to secure access to the land by official registration at the *Talathi* office.

5.2.2 Land transfer

The common source for acquiring land is the father. In the villages land sales hardly occur. This might be due to several reasons: the process is difficult, time consuming and costly; farmers do not want to offer their land for sale because they want to retain control over the land; if a farmer's land is sold he cannot offer it to his sons anymore; or even that the sale of land is a taboo. These factors together form the reason for the absence of a land market. Still there is the possibility to purchase land. There are several ways to buy land, of which wasteland is the land which is most in common to purchase. This land is not owned by any family so it can be easily bought from the *Gram Panchayat*.

The process of land purchase in the village occurs as follows: a farmer has to offer his land for sale. This does not occur very openly with signs and announcements, but through spread of the word. Therefore it is highly probable that acquaintances of the farmer, or even relatives, will buy the land. When the process starts, the land concerned is still registered at the *Talathi* office on the name of the landowner who wants to sell his land. In order to transfer the legal ownership at the *Talathi* office an application has to be made. The *Talathi* in his turn informs the Collector (at Patan district level), who assesses the land value. For legal transfer of land a tax has to be paid: if the value of the land is estimated to be 1 *lakh* (100.000) Rs, the tax will amount to 150.00 Rs. The tax is 15% of the land value, which has to be paid to the *Talathi*. Dependent upon the relation between the seller and buyer, these costs will be shared or paid for by only one party. Land offered for legal transfer of ownership can only be *Old Sarkat* land.

Hence, the purchase of land hardly occurs since the land market is absent or not working properly for several reasons: land is not given for sale since the land mostly is kept in the family for inheritance; the transaction costs for the transition of land are too high; land is kept since it provides a last back-up because farmers prefer not to give up their holdings. Besides these socio-economical reasons for not giving a part of land for sale there are the socio-economical arguments for the farmer who does not have a part of land yet to not being able to purchase land, even if the market would have made it easier. In other words, the farmer looking for land in many cases does not have enough capital to purchase land.

5.3 Land arrangements

Official land acquisition occurs for a large part on the basis of inheritance. Land is transferred from father to son and registered at the *Talathi* office. Even though the purchase of land would be another legal way of land transfer this barely can be observed in the research sites. Transaction costs for the transition of land in accordance with the legal processes are too high. But, what if the inherited land is not enough for a farmer to make a living for him and his family? Or what if a father did not subdivide his land yet while the sons already have their own family and wish to make a living? For these circumstances in which land acquisition is

almost solely based on subdivision after subdivision –and decreasing the plots- and the economic situation does not allow for a strong land market in addition to the absence of a labour market, temporary solutions have been brought up. The solution would be the emergence of institutional arrangements where natural resources are reallocated in a more efficient way.

5.3.1 *Baghewi*

The *baghewi*³⁴ system, or sharecropping in English, can be defined as the one-third system: the arrangement includes land, water and labour each representing one-third. This system is related to irrigated crops, hence most of the time the arrangement lasts only for the winter as winter crops have to be irrigated. The terms of contract are: land, labour and water. Who provides an input will receive one-third of the total agricultural production. In most cases the input costs such as seeds, fertilizer and pesticides are shared between the landlord and the tenant. There are many of these *baghewi*-cases in Rangpura since this is the village where the water sources are ‘abundant’, or at least compared to New Najupura. *Baghewi* includes the arrangement where three people are involved each representing an input. Nevertheless, in some cases the respondents referred to *baghewi* although the contract included just two people: this is the case when the landlord is the owner of the water as well; hence he receives two-thirds of the total agricultural production. Some do not refer to the term *baghewi* when a farmer owns the land and provides for the labour himself while receiving water during the winter to irrigate his crops. In exchange for the water the farmer has to give one-third of his total crop produce. Although this can be seen as the exchange rate of water and not as sharecropping, still the crop is shared and the terms of contract in such an arrangement are the elaborated forms derived from the more traditional *baghewi* where land, water and labour are three separate units provided by three separate farmers.

In the case where the three units of production are brought together by separate providers the main decision makers are the water and land providers. The water provider sets the conditions for the provision of water to a farmer, including: location, crop, type of land and amount of land. The landlord determines the limits concerning amount of land to be worked on, as well as the share in input from the labourer. The labourer has to work the land for which he is completely responsible. Furthermore, in most cases the tenant and the landlord share the input costs, which is paid in cash or kind. Initially these costs are born by the landlord who will receive the payment from the tenant after the harvest.

Since the institutional arrangement of sharecropping is so embedded in the way the arrangements in the villages take shape, many new institutions are built upon the old institutions. Changes of the arrangements reflect changes of environmental, social-political and economical circumstances. A good example is the one-fifth *baghewi* system. It is the case where a farmer from New Najupura (NN4) has an arrangement with G. Patel from Old Najupura. Patel is the owner of a tubewell which formerly ran to New Najupura to provide irrigation water as well. Yet, due to insufficient water supply (as pumped out of the Banas River bed) the water does not reach New Najupura anymore. Nevertheless, the owner has his three hectares of land located nearby the river so that at this location still enough water for irrigation can be provided. On this land the farmer from New Najupura entered an arrangement to work the land, together with his wife and children. In winter season the family receives one-fifth of the total return from the land (cotton and castor) in cash; Patel gets four-

³⁴ Bagh: Gujarati for part or share

fifth. Only labour is provided by the tenant, the landowner provides for all the primary inputs as seeds, water, fertilizer and machinery. The landowner decides what to grow on the land as well. The farm is rather sandy but Patel adds a lot of fertilizer and manure to maintain the level of fertility. During the monsoon period, the farmer receives one-fourth of the total return of the crop in cash. Five years ago they received one-third share in cash in the monsoon period. However, according to the farmer due to an increase in inputs made by Patel such as fertilizer, pesticides, diesel and machinery, the share of the tenant decreased.

5.3.2 fifty-fifty and derivatives

* The fifty-fifty system, a version of *baghewi*, entails the arrangement between two farmers: one landowner and one labourer (tenant). The landowner provides land, the tenant provides labour. The land is not irrigated. Input costs like seeds, fertilizer and pesticides as well as process costs such as hired labour and hired tractor are initially paid for by the landowner. The total crop produce is divided equally between the tenant and the landowner, however from the tenant's share the value of the production costs is deducted, since everything is shared fifty-fifty. The landowner decides which crop is grown. The tenant is responsible for providing the labour which most of the time is provided in collaboration with his family. Depending on the situation, the farmer will go to the landowner and apply for an arrangement concerning land and labour. In some cases however, the landowner requests a specific farmer to step into an arrangement with him. In many cases the arrangement lasted for several years successively, where the landowner trusts the tenant to do the labour well. In this case, the tenant felt quite sure that he would be the one working on this field in the same arrangement next season as well. The same counts for the landowner, if he is satisfied with the outcome he is more willing to go into an arrangement with the same farmer. There are no signed contracts involved; every year the arrangement has to be determined and the terms of contract are again discussed. Since the land is not irrigated, this type of arrangement regards a monsoon crop. Hence, depending on the crop choice the labourer has activities up to when the winter season starts.

* The 'Pancha' system³⁵, derived from the fifty-fifty system and named after the respondent (Panchabhai Rabari, see table 5.1) who is in such an arrangement twice. The respondent is engaged in two arrangements both based on the same terms of contract. Here it concerns a contract about land which is not irrigated. Pancha has to provide the labour while the other contractors provide for land, one hectare each. All the inputs such as fertilizers, pesticides and agricultural tools and instruments have to be provided for by Pancha himself. After harvesting Pancha has to hand in half of the total agricultural production to the contractors, of which half of the seed costs will be deducted. Both the agricultural production and the seed costs are shared. An interesting note is that both contractors are family: an uncle and his father since both preferred to offer the partnership opportunity to a family member. The arrangements are running for the first year, and according to Pancha it depends on experience of both sides whether the arrangement will be continued for the following years.

In both cases the landowner decides what crop is grown on the land. Pancha will work on the fields in the monsoon period if there was sufficient rain and in winter if he receives irrigation water. This is mentioned since the possibilities are there to irrigate when enough water is available in Tubewell 1 (see Annex 4), in the sense that the facilities of a *kundi* and underground pipeline reach the fields from his father. His uncle's field is covered by

³⁵ A concept only used for this thesis

Tubewell 3, however, due to the destructions caused by the earthquake in 2001, the underground pipeline was broken and the water cannot reach this field anymore. If Pancha wants to irrigate the land he will have to make the arrangement with the water providers himself; this is not carried out by the landowners. However interesting to mention is that Pancha prefers to wait what the monsoon will bring before any arrangement with a water provider is made. When the land is irrigated, the probability is high that the water provider wants to receive one-third of the crop produce. The other terms of contract between the landowner and Pancha will preferably stay the same, meaning that the seed costs will be divided and that Pancha will have to provide for the labour. Above all, Pancha and the landowner both will receive one-third of the total crop produce as well. For a general oversight of the Pancha-system see Table 5.1.

* The one-fifth system. The same farmer (see table 5.1) as mentioned above was included in an arrangement where the share to the tenant was limited to one-fifth of the total crop produce of cumin, yet he did not have to share in the input costs. This involved two pieces of land: two hectares and one and a half hectare. Again the landowner was the uncle of the tenant. The lands were not irrigated although irrigation facilities were there. Some years before, the land was irrigated and Pancha was able to work two seasons on the fields. However, Pancha stopped with this arrangement to enter the arrangement with his father and his uncle, which even enabled him to live in his own village. For a more general view, see Table 5.1.

5.3.3 Mortgage

There are many cases in which a farmer requires money and for this end he negotiates to mortgage his land. This entails that officially the status of landowner does not change: he remains the owner. But it includes a transfer of management and decision making rights concerning the farmland. The official landowner receives an amount of money from the person who accepted the mortgage. This person will become the main decision maker on the land. Mortgage is a kind of loan on a farmers' own land. A landowner can ask a total amount of money for his land, which is not 100% the selling price of the land. The one who pays this sum, the mortgager, can choose if he will occupy the land himself and do the farming, or decide to let the actual landowner farm the field in exchange for a share of the crop given to the mortgager. This share in crop does not change the sum of the debt to the mortgager. Another option for the mortgager might be to make the actual landowner a labourer. Whenever the actual landowner wants to get back his land, he has to pay the mortgage price back to the landowner. The mortgage can be officially recognized, which means that Radhanpur-block places a valued stamp on an official document that the land has been given on mortgage. The mortgager has to pay the land taxes.

However, unofficial mortgage occurs frequently. In such cases, the actual landowner has to pay the land tax and depending on the arrangement he will receive this back from the mortgager or not. The mortgage price is dependent upon the location of the land, the quality of the land, but the necessity of the farmer's need for money as well. The mortgage, which often occurs unofficial, resembles official mortgage: the mortgage sum is less than the price of the land would be if it was sold. However, the farmer ends in a huge debt with the mortgager. This makes the dependency tie between the two even stronger, makes the mortgager even more powerful and the dependency of the farmer to the mortgager even bigger. The mortgager will almost be sure for the rest of his lifetime that he will receive fifty percent share of the land, as the official landowner will never be able to pay back the mortgage sum taken into mind the fact that he hands over all the time fifty percent of the

harvest. Finally, the land will go for a fairly cheap price to the mortgager. In this case, the official landowner is even worse off, seen the inflation occurring in the region. The previous set mortgage price won't change, but the value of the money does change.

In the villages, several types of mortgage arrangements were observed:

- One type of mortgage arrangement includes a derivative of the baghewi-system. Here, the land is leased out for a specific sum of money. As a result, the farmer who is still working on his own land has to hand over half of his total crop produce each season to his investor as a form of interest. The official landowner himself still makes the main decisions concerning the cultivation of the land. In some cases the official landowner has to pay for the input costs; yet in other cases where the person who took the land in mortgage is economic feasible and willing to invest, they will share in the expenses fifty-fifty. This arrangement applies for non-irrigated lands and monsoon-arrangements. This option will be applied when the mortgager knows that the farmer is a good farmer, making the good decisions at the right time and is known for cultivating good crops.
- Another type of mortgage arrangement distinguishes itself by not being a sharecrop derivative. Here, the official landowner becomes labourer on his own field and receives a daily salary of 50-60 Rs plus lunch and cigarettes.
- A third type of a mortgage arrangement might include that the official landowner gets completely disconnected from his land. Here, the person who took the land in mortgage will organize all the labour on the land himself. The third option is chosen by the mortgager when he perceives the farmer to be not capable of properly cultivating the land himself.

There are different types of farmers who take land in mortgage. In some cases, as Lakhdhir Thakor (NN2), who is a *simanth* farmer: he saved from crops produced on his acre of land, and was able to mortgage the plot of his uncle. It concerns non-irrigated land of 2 ha for the mortgage sum of 50.000 Rs. The uncle became labourer on his own field, though the mortgager Lakhdhir is working the field as well. The arrangement persists for about five to ten years now, and will be 'valid' until the official landowner wants the land back. At that time, his uncle will have to pay back the mortgage price. Since the arrangement is not an official contract, the uncle as official landowner will have to pay for the land tax which is paid back by Lakhdhir.

Hamir Thakor (R10) and Mumji Thakor (R15) have become landlords over time by investing in mortgaging lands. Hamir has mortgaged-in lands of eight other farmers, reaching a total of 50 *vikas* for the sum of 4.5 *lakh* Rs. These mortgage arrangements are not legally official. However, Hamir introduced the 'non-judicial court stamp-paper'. This is a semi-official form for private uses, and valued in a range of 20 to 100 Rs. These stamp-papers are signed by both parties and held by Hamir for his administration. Hamir mainly decided to work the mortgaged fields himself, since Hamir prefers to have no partnership with the official landowners: '*Only my Misses is my partner*'. Still, one partnership exists for which he receives a fifty percent share of the total crop produce when the land is not irrigated and in the monsoon period; if this land is irrigated Hamir will receive one-third share of the total crop produce. Hamir decides what to grow on the field and has to share the input costs, and the official landowner himself has to make the water arrangement with the water provider. The taxes are paid for by the official landowners, and Hamir will not retribute this. According to Hamir the arrangements will stop the moment the official landowner has enough money to

restitute the mortgage sum, and if Hamir agrees upon closing the arrangement. Then, the official landowner will not have to pay any interest rate to Hamir for the mortgage sum, and Hamir will not pay for the reduction of the soil quality due to the use over the years of the continued arrangement.

Mumji (R15) leased-in land from 6 other farmers, reaching a total of twelve hectares mortgaged by a sum of 5 *lakh* Rs. Mumji prefers to let the official landowners do the labour. Here, the arrangement follows the first type of the mortgage arrangements: Mumji receives fifty percent of the total crop produce, and he shares fifty-fifty in the input costs. Initially, Mumji pays for the input costs because, as he argues, *'if you do good expenses in the beginning, the earnings will become good'*. Mumji made the mortgage arrangements semi-official by the use of 'non-judicial court stamp-papers'. As stated before, those are forms for private use and the mortgage will not be registered at the Registration Office, which solely applies for the selling and buying of land. Although the official landowner receives the tax bill, Mumji pays the land tax of all the mortgaged lands. The mortgage arrangement can be brought to an end if the official land owner brought together enough money, and if both parties agree to do so. Mumji underlines that ending the mortgage is only possible after the crop is harvested.

Official registration of a mortgage is possible in Radhanpur. Then, the farmer who wants to give his land for mortgage will have to go to a bank where a loan is obtained. The land value has to be assessed, since it is not allowed to receive a mortgage price for more than 90% of the total land value. The Registration Office will be notified of the new situation concerning the land. Administrative expenses will have to be paid for by the farmer, which is one percent of the loan received by the Collector³⁶. Furthermore, a rather high interest rate per year or even per month is included (Revenue Department), from 12-20%. However, in Rangpura and New Najapura no official mortgage arrangements were observed.

5.4 Land relations

Sharecropping and other arrangements including land and labour seem to increase in occurrence over the last decades (Prakash, 2005). These arrangements encompass such terms that the incentives of both parties are created, to avoid leaving the arrangement. Risks are shared, and opportunities are provided for both parties. The next section will go deeper into these incentives and motives for the labour-providing and land-providing farmers.

5.4.1 Tenants rationale

It might be that a young farmer who did not inherit a part of the land from his father yet, wants to cultivate a plot for production himself. To purchase land is not an option, because there is no land market. The labour market is of influence on a farmers' decision on how to make a living. The labour market is perceived to consist of farm-labour, paying 50 to 80 Rs a day (plus lunch and two times tea), available in the vicinity of the farmer's village. Such labour is paid on a daily basis. The off-farm employment is paid on a daily basis as well, and it is often far away in bigger cities (Meshana or in the Desert of Kutch) where industry is located. These labour opportunities are season-based and available in summer season when no irrigation takes place in the villages. The farmer will have to migrate to the region. The terms of (off-) farm labour are weighed: the daily payments; the daily opportunity of a job; the

³⁶ Collector is the collector of land taxes at work in Patan District

location; and the type of job. The farmer will make a decision: to practice off-farm labour; to practice farm-labour; or to enter into an arrangement with another farmer. There is the option to do both, off-farm labour and sharecropping although tenancy will occupy a farmer fulltime especially during the irrigation season. The trade-off between labour and sharecropping by which one is preferred over the other is of greater importance than livelihood decisions. For more on this topic, see also Drost (2008).

Farmers from New Najupura and Rangpura have good reasons to enter into an arrangement. It is mentioned that migrating for labour is complicated. This decision is made as last possibility. Then, the farmers can choose between day-to-day labour opportunities as farm labourer, in which payments occur on a daily basis. Yet many farmers have chosen to enter into an arrangement instead of farm labour. A Rabari farmer preferred to enter into a fifty-fifty sharecropping arrangement as this would provide him the opportunity to save over the cropping season instead of being paid on a daily basis. In addition, the same farmer explained that because of sharecropping he can bring his share at home all at once, and show his family what he had worked for the complete season. Another respondent, previously migrated for off-farm labour, argued that he preferred a sharecropping arrangement above off-farm labour because of the opportunity staying together as a family in the village. Hence, feelings of self-satisfaction as well as the role of the family in making the decision is important in the occupancy and decisions for what type of livelihood a farmer is engaged in. Hence, an arrangement offers more secure and sustainable income as compared to farm or off-farm labour which is regulated on a daily basis and where it seems to be easier to become unemployed again. And, although the arrangement is normally on a temporary basis, there is a chance that the landlord will offer to engage into the same arrangement the year after.

Financial arguments are put forward by other farmers who are engaged into an arrangement: capital is needed to make investments in the field such as fertilizers and seeds. The landowner has more capital than the person who enters into the arrangement as tenant. The terms of arrangement are such that all the initial investment costs will be paid for by the landowner, and shared after harvesting. Thus, the land arrangement is a means to have access to land and it provides access to capital for investments. In many cases an arrangement might offer more than just access to land or access to land and water. Several landowners, those who offer their land for cultivation, provide extra services such as loans in cash or in kind which are highly needed by some farmers. Above all, '*Poor farmers also prefer it [sharecropping arrangements] because it provides food security*' (Prakash 2005:155). To conclude, the institutional arrangement of sharecropping poses less risk to the farmers.

The other option to sustaining a livelihood, mortgage, often results in a sharecropping arrangement between the mortgager and the official landowner. Mortgage mainly exists because farmers are in need of money, but do not want to sell their land. The mortgage is to a high extent related to marriage and dowry, which is explained in more detail by Drost (2008). The mortgage is as such that the mortgager has control over the land but the legal exclusive ownership is still in hands of the official land owner. When applying mortgage, a farmer does not decide to sell his land: the farmer maintains a sort of 'last recourse'. It shows that the farmers, although they need a lot of money and therefore mortgage their land, still have positive thoughts to save enough money in the near future to pay back the mortgage sum. The provisional characteristic of the arrangement is constructed to create incentives for the farmer to pay off the mortgage; and for the mortgager to retain control over the official owner. The latter is in debt with the former and a high level of dependency is created where the mortgager has the power. If the official landowner is not able to pay off the mortgage sum, he will have

to sell the land to the mortgager. It will be impossible for the landowner to sell the land to another person than the mortgager. This makes the land price rather low for the mortgager: the unofficial mortgage sum is lower than an official one; and the final price (about ten percent more than the mortgage sum) will not include the inflation rate over the years when the land was under mortgage. On top of this, the sale process has to pass the official land transfer regulation at the *Talathi* office, where fees have to be paid for the transaction process.

5.4.2 Landowner's rationale

The reasoning behind the decision of a landowner to lease out his land to a (landless) farmer will be discussed. Before discussing this rationale, a distinction has to be made between the sharecropping arrangement where the landowner leases out his land willingly and the mortgage arrangement where the landowner is not leasing out his land willingly.

5.4.2.1 Leasing out own land for tenancy

The reasons for a landowner to lease out his land are manifold. As has been described above, the leasing out of land within an arrangement involved many important inputs for production, including labour, water, fertilizers and seeds. The terms of contract within these production factor arrangements include loans in kind or cash and a share in investment. A distinction has to be made between land offered for sharecropping without water supply and land offered for sharecropping with water supply.

Land offered for sharecropping with water supply takes notice of the season. In other words, this land is mostly not offered for sharecropping during the complete production year because the sharecropping of land with water supply is preferred. Again two options emerge: the water supply is provided by the landowner himself. In this case, it is highly profitable to lease out the land for sharecropping. The land and water supplier will receive two-third of the total crop production which is when related to the amount of investment made in time and cash, a rather high profit (Prakash, 2005). This baghewi occurs most often near the river (New Najupura) or in the neighbouring villages (both Rangpura and New Najupura). The tubewell owners and water providers living in Rangpura do not lease out their land for sharecropping. The other option, which occurs occasionally in New Najupura and Rangpura, is the baghewi system where the landowner is a different person than the water provider. Again, the investments made in time and cash are outweighed by the amount of profit made with the one-third share. The reason for offering the land when it receives irrigation water is related to the work associated to irrigating a crop: there is a lot of labour necessary in order to prepare the field for irrigation and to supply irrigation water. In the monsoon season the landowner will do the work himself, as no irrigation water is applied.

Other farmers lease out land which does not receive water. The landowner who leases out his land can be in shortage of money necessary to purchase the inputs such as fertilizer and seeds, and wants to share the burden of risk: a poor farmer might not be willing to take the risk of investing a large amount of cash into a crop when the environmental circumstances, including droughts and floods, may lead to crop failure. Hand in hand with the changing agricultural economy, where the prices for fertilizers, seeds, machinery and power (diesel and electricity) are increasing, risk increases. Therefore, leasing out land for sharecropping where the input costs are shared makes the farmer less vulnerable.

5.4.2.2 Leasing out mortgaged land

A mortgager makes three decisions on what to do with the land and the landowner. The fifty-fifty arrangement concerning a mortgaged land occurs in most of the cases. The input costs are initially paid for by the mortgager who will receive these costs back after harvest. The land is cultivated by the official landowner and half of the production is handed over to the mortgager. The decision to handle the mortgaged land with the fifty-fifty system goes hand in hand with the economic situation of the mortgage-holder: he has enough money to take the mortgage, to invest in the land and to let the official landowner cultivate the land himself and he receives half of the total crop production. Furthermore, there has to be a level of trust towards the official landowner otherwise the mortgager would not allow him to manage and decide about the production processes on the field. There are no management costs involved to monitor a trusted tenant. If only part of the land is given for mortgage it becomes more plausible to enter into a fifty-fifty arrangement. This will not give control over the complete field out of hands towards the mortgager. And the mortgager will not lose time in managing and supervising this plot, by entering into the fifty-fifty arrangement which allows him to make easily extra income.

If the mortgager decides to make the official landowner a land labourer on his own field, this might be based on a variety of arguments. Firstly, the mortgager made a lot of effort to complete the mortgage sum. He was in high need of extra land and for this purpose he saved some money. Although to mortgage a field unofficially is relatively low as compared to official bureaucratic processes. The mortgager will not lease out the land for a fifty-fifty arrangement because then he will lose too much of the harvest. Secondly, and important for the official landowner, if the mortgager trusts the official landowner and knows that he is capable of good farming he will be invited to work the land himself as labourer, in exchange for a daily wage. The mortgager takes the risk of crop production fully for himself. This type of mortgage resembles to the purchase of land. It might be that the official landowner and mortgager are relatives or close family. In this case it occurs more often that the official landowner will not be excluded from his own land.

If the official landowner declared his land for mortgage because he has managed his affairs badly it becomes unlikely that the mortgager will request him to either agree on an arrangement or to hire him as a land labourer. In this case the official landowner is totally excluded from his own land and the mortgager has the complete decision making power over the land. He might decide to hire other labourers or lease the land out by entering into a fifty-fifty arrangement for example. However, it is probable that a different mortgager makes different decisions: as can be seen when comparing Mumji (who leaves the official landowner to work the land) and Hamir (who wants to do all the farming work himself on the mortgaged lands). Hamir is an individual-driven farmer who wants to accumulate capital and land, and who dislikes to give land out of control once it is in his control. He is a person proud of his wealth and willing to show his wealth.

5.4.3 Sharecropping rationale

Leasing out mortgage land is related to a different rationale than leasing out individually owned land. Mortgaging land has the purpose of creating extra income for the mortgager. Still, decisions are made which include the same profit-maximizing behaviour: the mortgager will lease out the land when he has enough money and land; when he does not need the extra income; or when he does not want to spend too much time and effort on the land, as he can make a profit on a much easier way. Another similarity is that in all types of sharecropping

arrangements preference is given to a tenancy arrangement above hiring labour. This has a lot to do with repetition of the arrangement, trust, risk, transaction costs, efficiency, reciprocity and patronage.

The reasons for sharecropping are manifold. First, the purchase of land is uncommon since no farmer prefers to offer his land for sale. Land is family property; by offering the land for sale a farmer sells the future of his sons, since they cannot inherit land anymore. Secondly, there is no other option than farming available for the farmers. The off-farm labour market is absent, hidden, far away or unavailable to farmers. In other words, it is not easy for a farmer to change to any other type of subsistence. The issue of rural credit can be added: credit is offered in cash or kind by a landowner to his tenant, and seems to be the only available credit system without such high interest rates. The institutional arrangement of sharecropping is established in order to overcome these imperfections in off-farm employment chances and credit markets; high transaction costs involved with seeking labour; a lack of land purchase possibilities; increasing prices of production costs in addition to social costs (marriages and diseases); and a perceived level of risk given by droughts and floods which makes any farmer vulnerable. Furthermore, the institutional arrangement provides an efficient alternative to official land and water transactions.

Sharecropping allows for the temporary exchange of production inputs without losing the control over these inputs. However, the term 'temporary' is relative since many sharecropping arrangements last for a long period, due to increased indebtedness by the tenant. This indebtedness establishes a relation of dependency and makes it increasingly difficult for the tenant to get released from the sharecropping arrangement and for the official landowner in the case of mortgage to release the mortgage sum. This, however, is beneficial for the landowner or the mortgager for whom the continuity of the same arrangement increases his feeling of trust towards the tenant which reduced supervision and monitoring costs as well as the need to search for or labour or a new tenant. For the mortgager the dependency is even more beneficial since it assures him the control over extra land in addition to the income derived from its production. Still, the landowner might stop the arrangement whenever he wants to stop the arrangement. The dependency created is unequal on the side of the tenant. This dependency is profitable for the tenant because: he is sure of having a livelihood; receives in terms of crops which poor farmers prefer because they can eat with their family from it; and the dependency assures having a job for the future. The sharecropping arrangement is a tool to decrease transaction costs for both parties.

The share is not based on a fixed rent but a share of the total crop production. This is a result of a farmer's need for food (if the crop produced is a staple crop). But even more important, the landowners are not willing to pay the tenant on a previously agreed upon and fixed charge: if the crop would fail due to any type of hazard the landowner still had to provide for the agreed amount. In this situation, the risk of crop failure is shared between the landowner and the tenant, as the share to the tenant reduces when the total crop produce reduces. In addition, it will make the tenant aware that he has to produce as usual. The sharecropping arrangement is a way to share risks.

It can be concluded that the exploitative nature of sharecropping is still dominant. The description of the arrangements denotes that each sharer receives an equal part. Still, the preferences of the landowner are decisive in the terms of arrangement, and the share of the tenant is very low in comparison to the labour work he delivered. The landowner is stronger. In addition, the fact that the labour market does not offer an abundance of labour

opportunities, result in low shares to the tenants because the landowners do not have to buy the tenants away from the labour market. The landowner is the patron and the tenant is the client. Even though the relationship is based on mutual dependency, the tenant will be worse off than the landowner or mortgager.

Concluding remarks

A complex system of institutional arrangements has evolved in the research villages. Sharecropping is the leading system of reallocation land after it has been distributed by heritage. A land market is absent which paves the way for mortgaging land, another means to acquire money in exchange for land but without complete transfer of the land. The official system introduced and used by the government has no leading role within the villages concerning land allocation and registration. In some cases farmers make use of the official governmental system, occurring when the farmers can make benefit of the official system more than relying upon the unofficial arrangements. Furthermore, institutional arrangements provide for a more secure and long-lasting income over the period of the season with a future perspective, can provide for the capital to invest in the primary inputs, and even provides for extra services. Arrangements offer the opportunity for a farmer who has no land or who has land but no facilities or enough capital to invest in irrigation and irrigated crops, to produce an irrigated crop. Access to land –and sometimes water- is enabled by an arrangement: access to irrigated crops is possible even without a land holding.

5.5 Water supply

In the previous section it was discussed what arrangements occur in the research sites in order to adapt to the local situation of land scarcity; the local traditional heritage system of acquiring land; a lack of a land market and a lack of money in order to complete large investments such as a wedding. Together these issues create a complete local system of allocating land, parallel to the existing system of land titles and official notices carried out by the governmental services. Even though these services are utilized to a certain extent, they do not determine the allocation of land in the village. Above these arrangements with regard to land are the arrangements where water is involved. In order to understand the even more complex system of arrangements in the villages, more insight will be provided by discussing the process of water allocation and distribution where sharecropping again seems to be the solution.

This section is structured so, that the flow of water can be followed: the water is stored or withdrawn from the ground; then the water is divided and allocated by means of agreements and irrigation canals. And finally, the water is irrigated at the land in order to reach a proper production. Yet the arrangements necessary in order to receive water have to be agreed upon each season again, implying negotiation, agreement, and mutual dependency. The arrangement is dependent upon a large variety of factors. Further, this section is divided in three parts: gaining strategies; maintaining strategies; and controlling strategies. The rules and principles derived from the gaining, maintaining and controlling strategies constitute the customary institutional environment.

5.5.1 Water sources

The farmers of Rangpura are foremost dependent on the monsoon rain. Additional water for irrigation originates from five different sources: three tubewells, further referred to as

Tubewell 1, Tubewell 2 and Tubewell 3, a Checkdam and the Santhali Pond, a village pond. The latter two are completely dependent upon rainfall while the three tubewells extract groundwater, replenished by rainfall. The Checkdam and village pond are perceived to be more dependent upon the weather compared to the tubewells. Furthermore, the tubewells are connected with the lands through means of underground canals made of cement. These canals are not flexible in the sense that they flow the way the flow which cannot be altered in between the irrigation seasons. This is the main difference between the other two surface water sources: this water is transported through PVC pipelines which enable the water controllers to shift since these pipelines are moveable. This results in a more flexible way of allocating water, where more farmers are able to make use of the same water source. In other words, the command area is wider for the flexible water sources. About ten to fifteen farmers are included each season within the reach of the tubewells and the Checkdam while the Santhali is able to provide water to about 75 farmers. All the water sources are privately owned: the tubewells by individual farmers within the village, the Checkdam by four farmers who alternately manage the water supply, and the Santhali Pond by a group of investors. These water supply systems allow for irrigation, entailing a second crop during the winter period. Not all the farmers can make use of the irrigation facilities, due to location, sequence or other reasons. The techniques, locations, owners and beneficiary farmers related to these water sources vary, shaping different relations and conditions. Tables 5.1 and 5.2 recollect the information gathered and provides for an oversight on water allocation. Table 5.1 focuses on the water receiving farmers, and associated topics. Table 5.2 focuses on the water supplying farmers, and their means of control.

5.5.2 To gain

The majority of the farmers in the two villages do not have control over a water source themselves: they need the water supply from a water provider. To be able to receive this water, the water controllers shape conditions. In all cases the agreement to provide water is one-third of the crop produce in exchange. The next condition is the type of crop: cumin. Cumin is a cash-crop and needs only three turns of water, meaning that is cost less water and it gives high rates of return. A differentiation between the types of water sources can be made. Those in charge of the surface-waters –the Checkdam and Santhali Pond- make no exemptions on the cumin rule: they provide water for cumin only. The tubewell owners are more flexible as they provide from time to time water to other crops such as cotton and castor (four turns), or *rajko*. Wheat hardly ever receives irrigation water since this crop needs eight turns. The willingness of the tubewell owners might be explained by the fact that the tubewell owners are part of the village; they have a house and a history in the village, including family and other relatives. These social relations ‘force’ them to make the exemptions, which cannot be requested from the other water controllers since they are outsiders. Fertility of the soil is an important criterion for a water supplier to provide water: fields of which the soil is not salty and sufficiently fertile. These two conditions of good soil quality and the production of cumin cannot be met without the input of seeds and fertilizer. Since cumin seeds are expensive in comparison to other available seeds, and because the use of fertilizer requires investment as well, a farmer willing to be able to irrigate his field needs to have some capital to invest.

A farmer’s knowledge and capability of farming for example are other factors based on which a water supplier makes decisions. However, a water controller might impose more weight on certain conditions to some farmers than he does with other farmers. This because water suppliers make a difference between the types of farmer they supply with the water. The farmer provided water to has to have enough skills in order to do ‘good farming’, meaning

proper timing of field preparations; being able to engage in hard work; he has to be able to apply the water properly to the field in order to avoid spilling. These conditions can be defined as the farmer's knowledge in agricultural performance. The water suppliers base their knowledge of farmers on information from other villagers. When a farmer's capacities are known by the water suppliers, they are willingly to provide water to him, and even might take the step towards the farmer himself in order to inquire whether he would like to receive water.

Respondents receiving water from:	Relation with water provider	# land own; # land irrigated	Arrangement	Location field and technology	Conditions to gain	Regularity	Conflicts	Maintain	Trust	Herit age	Transfer
Tubewell 1 1)Chella Thakor 2)Pancha Rabari 3)Hamir Thakor	Owner asked him	Own: 40 acres Irr.: 5 acres	1/3 rd	Kundi next to field		Last 20 years: alternately; owner first himself.			No. Owner first irrigates his own field		
		Baghwi on land of Father, 1 hectare; previous 1.5 hectares of Uncle		F: Kundi-facilities nearby field (connection with transfer)					F: Depends on owner: if he has enough and own plus near field priority. U: last season not suff. water to get for winter crop		Pancha has to make the arrangement himself with the owner.
	Same village, but owner calls Hamir <i>kaka</i>	Own: Irr.: 2 hectares	1/3 rd	Land next to tubewell	Soil quality; good farmer; good worker and efficient with water to his crop. Based on previous crop: good/bad			Good fertilizer supply, crop seeds and pesticides plans.	If the Narmada is finished he won't need the tubewell anymore (2010). He got the best cumin and owner calls him <i>kaka</i>		
Tubewell 2 1)Rukna Thakor	Far family. Rukna demanded owner. Not good anymore	Own: 5.5 hectares Irr.: 1.5 hectares. Goradu, medium	1/3 rd			For 10 years. Last season only two turns due to conflict. Will not take next year anymore	Rukna: social problem. Intermediate persons from the village interfere			Son inherits the conflicting situation	

Table 5.1 Overview of water receiving farmers and their characteristics

Respondents receiving water from: Tubewell 3	Relation with water provider	# land own; # land irrigated	Arrangement	Location field and technology	Conditions to gain	Regularity	Conflicts	Maintain	Trust	Heritage	Transfer
1) Govind Rabari	Good friends. Owner asked Govind. Prefer to give him water first	Own: 8 hectares (4-4) Irr.: 2 hectares alternately. Black and stoney, good	1/3 rd	Underground pipeline not reaching anymore since earthquake. PVC flex pipe used	Cumin	Two seasons. Other seasons from checkdam because closer by	Never		Full trust in his friends and their water supply	Sons have to work hard themselves	
2) Pancha Rabari		Baghwi on land of uncle, 1 hectare				Received water until pipeline was broken		If pipeline repaired: 'if you want your share, then repair'. Dpndnt on owner if he reaches limit and gains enough share	Depends on monsoon: if Pancha needs, then he will request.		Pancha has to make the arrangement himself with the owner.
3) Soma Thakor	Owner is uncle. Owner inquired if he wanted to irrigate	Own: 2 hectares. Good quality	1/3 rd	Broken down pipeline from tubewell 3 (<i>kundi</i> reaches his field). 1 st (15yrs ago) pipe did not reach his field; rebuild and now it did reach his field but pipe again broken	Not enough electricity; location; no facilities near the field (<i>kundi</i>)	Before water from tubewell for three years but pipeline broken. Tubewell was regular water		He prefers water from the tubewell because the owner is his uncle	From tubewell he will always get, if facilities. Pond dpntn on rain; tube regular		

Respondents receiving water from: Checkdam	Relation with water provider	# land own; # land irrigated	Arrangement	Location field and technology	Conditions to gain	Regularity	Conflicts	Maintain	Trust	Heritage	Transfer
1) Kanu Thakor	Family. Kanu went to owner	Own: 7 vikas Irr.: 7 vikas Good quality	1/3 rd	PVC flex reach field. Checkam 1km away.	Soil quality; family relation; cumin	Last three sequential years. Received according to his need. Three turns (??)		Doing labour good; fulfil water to crop at right amount and right time; not let fail cumin	Yes. But no need because no cumin every sequential year		
2) Govind Rabari	Good friends. Prefer to give him water first	Own: 8 hectares (4-4) Irr.: 2 hectares alternately. Black and stoney, good	1/3 rd	PVC flex reach field	If the owner likes to give to a farmer, he will ask this farmer (the conditions are included). He is a hard worker	6 yrs. Last season only two turns. Extra water from tubewell. If no water from checkdam, then he will request from tubewell	Never		Full trust in his friends and their water supply. Govind told the owner that if he gives three turns, he will irrigate. If rain is good, otherwise he will take from tube		

Water controllers inquire with other farmers and villagers whether a farmer is a) a good farmer, b) efficient worker with water and land, c) a good labourer d) good to his crop
If a tubewell-owner says 'I give water' then they give water: no system of contracts and formal agreements

Respondents receiving water from: Santali pond	Relation with water provider	# land own; # land irrigated	Arrangement	Location field and technology	Conditions to gain	Regularity	Conflicts	Maintain	Trust	Heritage	Transfer
1) Chella Thakor		Own: 40 acres Irr.:2 acres (of 15 acres)	1/3 rd	PVC flex reach field					No. Not made an agreement for the coming years	Not. Only if son works hard as well	
2) Soma Thakor	Went to the owner of the engine	Own: 2 hectares. Good quality	1/3 rd	PVC flex reach field.		First year from pond.		He prefers water from the tubewell because the owner is his uncle	If an engine he will take.		
3) Dana Thakor	Every new year other owner. Not specific. 1 st time owner to farmer. Then farmer to owner	Own: 3 hectares Irr.: 2 hectares. Good quality <i>goradu</i>	1/3 rd	PVC flex reach field. Land located near the pond	Quality of soil; farmers capability; financial capability; location; cumin	Three years, alternately	Quarrels happen: intermediate used to interfere between the owner and farmer to pursuit water supply	Do hard work; not cumin every sequential year	Yes. The information of his good work will be passed on to the new owners; location		If the landowner changes due to arrangements but if the quality of the soil is good, the farmer changes but the land irrigated not.
4) Karsan Rabari		Own: 1 hectare. Very low quality	1/3 rd	PVC flex reach field.		First season. Only two turns. Extra water from tubewell too late	No. What can the owner do about it? "Water is nature"	Next year he will not take water from the pond anymore.			

A limiting factor on water supply is presented by technology. Since the tubewells are connected with the fields by underground constructed concrete pipelines it becomes difficult to alter the direction in which these canals flow. The farmers who want to receive water have to be located within the command area of the tubewell, and a *kundi* has to be located near the field. This *kundi* enables to lift the water to the surface in order to direct it through *dahlia's* to the final location. Yet, when the field of a farmer cannot be reached by these technological necessities the farmer cannot receive water. Location coupled with technology pose constraints to the farmers for the possibility to receive water for irrigation. To overcome this, two of the three tubewells in Rangpura have purchased PVC flexible pipelines making it possible to reach even the fields outside the former command area -which is the case for water provision from the Santhali Pond and Checkdam as well. As a result, location forms less of a limitation in the supply of water.

Since water transport from the Checkdam and Santhali Pond occurs through PVC pipelines, it is easier for these water suppliers to adjust the direction of the water. A proper decision based on land quality can be made since they are not dependent and limited on the location of the field. Both the Santhali Pond and the Checkdam are located far away from some fields which are irrigated from these sources. The main reason for this is the quality of the land and the willingness of the water suppliers to invest in long PVC pipelines in order to reach these good quality fields. However, a member of the Rabari caste who has a small field of bad quality received irrigation water from the PVC pipeline coming from the Santhali Pond. It seemed rather unnatural for the water suppliers of the Santhali Pond to supply water to this farmer, seen the quality and size of his land. However, the farmer explained that he requested to receive some water as the pipeline crossed his field on its way to other fields anyway. It was unproblematic to provide some water to him as well. This implies that in some cases the water suppliers might step from the main conditions as quality and location when it does not contain extra input in time and costs.

Water suppliers gain background information on a farmer by inquiring with other villagers. This implies that the image other villagers have of a farmer is important for access to water, since these images are shared and form a basis for the water supplier to provide water. The villages Rangpura and New Najupura are both straightforward in social differentiation and stratification according to caste and sub caste. Nevertheless, as turns out in Rangpura, identity does play a minor role in water allocation decisions compared to the previous described conditions a farmer has to comply with. In all but one cases the farmers were saying: '*all what the water supplier want is his one-third share*'. Hence, it is more important for him to have a good farmer whom has the knowledge and skills of producing a good crop than to provide water first to members of his own caste and after that to members of other castes. In Rangpura the tubewell owners all are from the Thakor-caste and most of the villagers are Thakor as well. The water providers provide water to Rabari's and to Thakor. Yet one member of the Rabari caste mentioned that he has difficulties with the water supplier –member of the Thakor caste- in providing enough water during a season. According to him this happened because the water supplier is a Thakor while the farmer is a Rabari. Identity emerges as an explanation of a conflicting situation between two separate castes. It shows that the people are highly aware of their own identity, and the identity of others. It does not have to mean that the main reason is caste difference. Yet, it might be framed and perceived as such by one of the parties as explanation of the conflicting situation. Here, identity is used to cover other issues.

Identity and social relations take another important role within the allocation of water. This is illustrated when farmers prefer to receive water from only one tubewell owner while the farmer's land is located within the command area of two tubewells or the Santhali Pond/Checkdam as second water source possibility. Here, the reason for a farmer to prefer to take water from just this one tubewell is based on the fact that the tubewell owner is close family. This became apparent when a farmer made the decision to prefer the water from his brother's tubewell above the water from the Santhali Pond even though the water from the Santhali Pond was of better quality. Hence social relations are a consideration in water supply decisions, not necessarily from the supply side, but rather from the demand side. Another case demonstrates the farmer preferred to receive water from a specific tubewell because the owner was his relative, where the farmer had the choice because his field is located within the command area of two tubewells. Again, it shows that it is highly important for the farmers to make the decision in line with social relations. On the other hand, if a farmer's field is located within the command area of two different water sources but has no specific relation with both of the water suppliers, the farmer can freely choose from which source he would like to receive water. Then water quality is the decisive factor.

The tubewell and the Checkdam owners are more obliged to provide water to their close family relatives. Several farmers mentioned as if it is very normal that a tubewell owner, when registering the beneficiary farmers, begin with allocating water to his brothers and after that provide water to the other farmers. However this has to be placed in perspective since the land of brothers is normally located beside each other; this because of inheritance of the land from father. In some cases land of brothers is not located next to each other since the father had generated several plots apart. Then it is assumed that the tubewell owner prefers to provide water to the nearest located land. The condition of location becomes of higher importance, simply because it is easier and the brother's land might be located within the command area of another tubewell. For the water providers of the Santhali Pond this rationale is completely different: the water providers of the Santhali Pond are not part of the village life. They are outsiders. Besides, the water providers change every year, which makes it hard to shape a strong social relation with that person. Still, these water providers might base their decision on representation. But the main reason for decisions to provide water to a farmer is based on the farming capacities of a farmer.

Both in Rangpura and New Najupura status appears to be connected to the ability to benefit from land and water. Indirectly, this has to do with the road towards status. In both villages, the persons with the highest status gained this higher position. They have received education, enabled by the financial status of their parents. Knowledge and skills are accumulated which is not so common for most people in the villages. Moreover, this person needs to have knowledge on farming practices. Often status is related to capital which is reached by production: in both villages it turned out that the persons with the highest status were those who were very well in producing good crops, enabling the accumulation of capital. With capital, one can save and invest in his land, or even purchase more fields (in arrangements). Finally, since these persons of status are known of their financial capabilities, their knowledge and practical skills on farming, water providers will be increasingly willing to supply water to these lands. As farmer and main person in Rangpura, Hamir, explains when talking about his relation with the water supplier: *'he even calls me kaka [uncle]'* (R10). The water supplier is providing water with pleasure to Hamir. This example emphasizes that status in the village is highly related to the productive capacity of a farmer.

The status of Arjen, the main person of New Najupura, is more dependent upon his knowledge and political position. Here, the road towards status is important since Arjen, the Panj-member and village leader of New Najupura, experienced education: his status is merely based on his social and political skills within the village. Arjen did not gain his (unpaid) position by being a good farmer per se: he was elected by the other villagers to become the legitimate main person of the village. The connection this type of status brings with respect to access to natural resources seems to be weaker than the previous described case, because production is not directly associated. Nevertheless, Arjen has enough land to produce and to accumulate capital; to invest in a flour mill allowing him to make money with off-farm activities. As a result, Arjen has his own water pump in the riverbed of the Banas River enabling him to irrigate his fields. Indirectly, education, capacities, capital and status are linked, which make it easier to have access to natural resources.

In addition to the arrangement between a farmer and the water provider, there are other arrangements available which allow the provision of other inputs. If a farmer himself cannot fulfill such conditions as good quality of land located nearby a tubewell, and enough capital in order to invest in good seeds, fertilizers and pesticides, then he might enter into an arrangement with a farmer who is able to provide for these. Several different sharecropping arrangements exist with including various terms of contract each enabling for inputs necessary for both parties to engage in such an arrangement.

5.5.3 To maintain

Most farmers who irrigate prefer to have access to water for the coming seasons. However, because the water is requested by a number of farmers, they are not secure of their position the next season. A physical limit is posed which constrains the farmers to irrigate their field in two subsequent years has already been mentioned: land which receives irrigation water in two following years will become saline and crusty and cumin cannot be cultivated two years in a row. On the other hand, the irrigation facilities which are made of concrete including the underground pipeline and the *kundi*'s pose the opposite of constrains to the farmers who had access to irrigation water already: once the facilities are there the location and technological instruments do not pose a limit on the ability to derive benefit to water for a farmer. This does not go for the flexible transportation technologies as the PVC pipeline which is used by Tubewell 2 and Tubewell 3 as extra transportation method, and by the Checkdam and the Santhali pond as main method.

However, access to technological facilities such as land located next to an underground pipeline and connected to a *kundi* does not necessarily lead to secure access of irrigation water. It is mentioned before that many conditions have to be met, and for a farmer willing to receive irrigation water these conditions have to be met, again. It counts for all the water sources that each year the farmer has to show his capabilities, by which he will be rewarded: the water suppliers will be eager to supply water to this 'good' farmer again. The water suppliers can check whether the farmer did a good job because he receives a one-third share of the crop. By complying, the farmer creates a sense of trust and reliability with the water supplier which increases the chance to receive irrigation water from this supplier again. The image a water supplier has of a good farmer has to be maintained in order to maintain access to irrigation water. Conflicts will be avoided as much as possible. The water supplier has the command over the farmers, i.o.w. the balance of power is with the water suppliers.

There are situations where a farmer does not want to maintain the water receiving relationship with the water supplier, due to water quality and insecurity of supply. A farmer from Rangpura mentioned that he had a conflict with a water supplier. This made him not willing to receive any water from this source again and tried for another source. Another example shows that a farmer preferred to receive water from the Santhali Pond or Checkdam because this surface water is less saline compared to the tubewells which are refilled with groundwater. If a farmer who receives water from a tubewell has a close relation with the tubewell owner (a brother, cousin-brother e.a.) he has to maintain the water relation with the water supplier, even though the water from the other sources are in reach. For them, it is easier to maintain access to water and difficult or even impossible to switch between water sources since strong social ties restrict flexibility.

5.5.4 To control

The water providers are the farmers who have the ability to make the decision to whom to supply water to. They control the water source and are sure of access to water for their own crop. However, their control is restricted with regard to the ownership of the tubewell. In the cases of Tubewell 1, 2 and 3 (the Checkdam and Santhali Pond are other cases) the water controllers are, or at least were, in none of the cases complete owners of the tubewell.

Tubewell 1 is managed by Savsi Mala Thakor (see also Table 5.2). The tubewell is located on land which was owned by Savsi Mala³⁷. Savsi Mala once owned twelve hectares of land. The land is officially transferred to his sons, registered at the *Talathi* office. The tubewell is a reconstructed version, the fourth in a row. The three previous tubewells stopped working due to groundwater depletion and salinization. The fourth is running from 2001 onwards. The tubewell is 740 ft deep and runs on electricity. Savsi provides water to irrigate about seventeen or eighteen hectares. The tubewell is connected with about eleven *kundi*'s. For the investment in the third and fourth tubewells, Savsi entered into an agreement with N. Patel. For the third tubewell endeavor, N. Patel and Savsi made a 50-50 arrangement: the complete costs would reach 4 *lakh* Rs of which Savsi had to pay 2 *lakh* Rs. At the time, both N. Patel and Savsi shared ownership. However, at the time when this third tubewell stopped working Savsi was not able to pay off these two *lakh* completely, and he mortgaged of 2.5 ha to N. Patel in liability for 1 *lakh* Rs. The terms of contract considering the mortgage arrangement were that Savsi would work on the land himself and give half of the yield to Patel until Savsi was able to pay off the other 1 *lakh* Rs. However, Savsi considered it a waste of previous investments in the underground pipeline and electricity connection so he convinced N. Patel to invest once more in the drilling of a tubewell. The costs amounted to 3 *lakh* Rs. As Savsi was not able to make any investments, N. Patel provided the money which made him the full owner of the fourth tubewell. Above this, he made a labourer of Savsi by paying him a 25,000 Rs salary a year for managing the tubewell and the water supply process. Included tasks are starting the engine, distributing the water and deciding to whom supply the water. N. Patel pays the electricity bill and receives the complete one-third share of the crop produce of the farmers who have received irrigation water. Savsi mentions that last year he had to provide two-third of his total crop produce derived from his 2.5 ha field to Patel: one-third for the irrigation water and one-third for the mortgaged land.

³⁷ According to the tubewell owner the water is of good quality both for irrigation and drinking purposes. Sometimes when the pipeline originating from Siruhi does not supply any drinking water the villagers (women) will go to the tubewell with their pots and pans to collect water; other villagers (men) visit the tubewell to take a bath.

Rama Daha Thakor is the owner of tubewell 2 (see also Table 5.2). The tubewell has a depth 710 ft and a width of 10 inches. The owner provides irrigation water to 50-60 ha which includes 22 farmers, if the electricity provision is regular and the pump is running well. This tubewell is running for eight months now; the one before had been active for fourteen years however due to acidity the pipe had broken. The former tubewell pumped at a depth of 200 ft where no water could be extracted anymore. The new tubewell is constructed at exactly the same location as the old one since it is prohibited to dig new holes: only existing holes can be dug deeper and renovated. This tubewell is connected with two underground pipelines, in two different directions. This is necessary to prevent overflowing of the pipeline since the tubewell has a width of 10 inches. The water can be divided over two pipelines and the command area for irrigation water supply is increased. Through *kundi's* and *dahlia's* the farmlands can be reached. The tubewell owner has a PVC pipeline as well, which can be used to reach fields located outside the coverage area of the underground pipeline.

The costs of the first tubewell amounted to 6 *lakh* Rs including the tubewell drilling, the pump and electricity connection. All this was initially paid for by Fazel. At the starting time, Rama Daha was able to pay 20,000 Rs out of the yield rewards. Furthermore, in the fourteen years of running Rama Daha was able to pay off 3 *lakh* Rs. They both owned the tubewell 50-50 and there was no need for Rama to pay off the complete costs. However, the tubewell stopped working and at the time Fazel was not capable of investing. For the construction of the newly built tubewell Rama Daha went into a partnership with Fazel again who financed for the drilling of the tube, the construction of the extra underground pipeline and other instruments necessary for running a tubewell properly. The costs of 4 *lakh* Rs are initially paid for by Fazel, yet they made the agreement that when Rama Daha is able to pay 2 *lakh* Rs he has to. The one-third share in crop produce given by the farmers who receive irrigation water from the tubewell is shared 50-50 between Rama and Fazel. Rama Daha pays the electricity bill as the connection is registered on his name, however the cost is shared 50-50 with Fazel. Hence, the tubewell is owned both by Rama Daha and Fazel; Rama is not intending to pay off Fazel. He is content with the current situation.

The owner of tubewell 3 is Rama Talsi Thakor (see also Table 5.2). The tubewell has been reconstructed five years ago, has a depth of 700ft and is 8inch wide. About ten to fifteen hectares are irrigated which stands for about five (big) farmers. Sometimes it is more, sometimes it is less. In winter season the pump is running at full capacity, limited by the hours of electricity supply. According to Rama Talsi the water level has not decreased over the last two years, it even increased due to heavy rains. The tubewell which was constructed at first started about fifteen years ago. Rama entered into arrangement to construct that tubewell at the time with Kudidan Jula, the former Gujarat minister of Water Supply. The total costs were made by Jula; the one-third share in crop produce was divided by one-fourth to Rama and three-fourth to Jula and it was Rama's intention to pay off the complete costs. Yet this could not be entirely done due to the earthquake which stopped water supply for a large part as the underground pipelines were halfway broken. As a result, they agreed upon the pay-off of 1 *lakh* Rs (out of the total 4 *lakh* Rs) for the electricity connection which had not been broken. Rama had chosen the partner himself, because he new that Jula had enough capital to invest. It had been running for eight years before stopped by the earthquake that hit the area in 2001. Rama only repaired those parts which were accessible due to cracks in the soil.

The tubewell of Rama Talsi is nowadays completely owned by himself. For the construction of the new tubewell five years ago, Rama entered into an arrangement with Ganapeth Ratia Shah. The price of drilling the tube amounted to 4 *lakh* Rs, paid by Ganapeth. Other costs

such as the construction of the underground pipeline and the pump were paid for by Rama before, since this was a renewed tubewell. The agreement was composed as such: Ganapeth received three-fourth of the one-third share of the crop from the farmers who received water, while Rama received one-fourth. Within five years the partnership was closed as Rama had paid back the costs to Ganapeth. In order to pay back Ganapeth as soon as possible Rama used to save his one-fourth of the one-third share in crop, he went into a partnership as labourer at someone else's land, and he took a mortgage on his land at the Banas Bank. Here, he mortgaged 4 hectares and received 2 *lakh* Rs for it. Immediately he paid off Ganapeth. Now, he is still the owner of the 4 hectares of land, he receives the complete one-third share of the crop produce and his share as labourer in the other partnership. This will be used to pay off the mortgage at the Bank, who demands a 12% interest per year. Rama wants to pay back the mortgage as soon as possible, with a limit of seven years (for more information on the status of the water suppliers, see Annex 6).

Hence, the water controllers are trapped in a patron-client relation with their financial investors. They are dependent upon financial partners who gain more than the water providers. This principal-agent relation between the water provider and the financial partners is created so, that the financial partner cannot be released out of the arrangement: the terms of contract make it almost impossible to pay off the financial partners with the received revenues. Other forms of dependencies are created such as the mortgage of land to the same financial partner. In this sense the choice of Rama Talsi to take a mortgage by an outsider, the Banas Bank, was a very independent decision as it did not connect Rama's land with the financial partner (by not taking a mortgage with him). Rama intended to leave no chance to get even more indebted with the same person. Compared to Rama is Savsi Mala, who ended up in complete dependency with his financial partner by mortgaging his land to him (and not being the owner of the tubewell anymore). Rama even has to give a one-third share for irrigation water from the tubewell on his land to N. Patel.

	<i>Structure</i>	<i>Arrange ment</i>	<i>Conditions</i>	<i>Land irrigated (ha.)</i>	<i>Land owned (ha.)</i>	<i>Acquired</i>	<i>Reach of control</i>	<i>Monitor and control</i>	<i>Failures</i>	<i>Heritage</i>	<i>Conflict</i>
<u>Tubewell 1</u>	2001 Fixed	1/3rd	Location;	17-18 (10 farmers)	2 (father 8)	Financial partner with Patel, Mesana. Rich and motor company	Only cumin (acc to respondents); first himself (Chella Mana)	System; if water waste; if sufficient water for crop		From father to son, but in huge debts	
<u>Tubewell 2</u>	1989 & 2007; 10 inch; 710ft; two fixed pipes; flex pvc	1/3rd	Cumin; soil quality; labour capability; location	50-60 (20-22 farmers)	5.5	Financial partner Fazel, Radhanpur. Merchant. Partner in both tubewells	Cumin; location		(S: irregular; problems with tube 2yrs ago stopped)		Respondent: due to quarrels between their children
<u>Tubewell 3</u>	8 inch; 700ft; 1993 & 2003; two fixed pipes; flex pvc	1/3rd	Himself first then relatives; cumin; soil quality; labour capability	10-15 (5 farmers)	4	Financial partner Ganapeth Shah. Merchant. First tubewell partner Kudidan Jula, Mnstr of Water Supply	Decides when goes to whom; cumin; brothers and relatives; sets the limit amnt of land for irr.		Pipeline broken down due to earthquake (S: irregular; only twice; new pipe)	Son will inherit management of tubewell	Never
<u>Checkdam</u>	Flex pvc	1/3rd	Poor people priority; soil quality; labour capability; family and friends	20 (if suff. Range to about 15 farmers); 2-5 (if not suff.); (6-7 poor farmers)	2 (in checkdam); 3 (elsewhere)	Illegally appropriated land 25 yrs ago for grazing	Location; cumin; sets the limit amnt of land for irr.		Last year only two turns. Water from tubewell	Land in checkdam is inherited	
<u>Santali pond</u>	30 yrs ago; Flex pvc	1/3rd	Cumin; labour capability; location			Auction 30 yrs ago started			Last year only two turns. Water from tubewell	No	

Table 5.2 Water sources in Rangpura

Two aspects: no regular irrigation wanted by farmers due to soil exhaustion; location of land and water source is a decisive factor to get water; water controllers inquire with other farmers and villagers whether a farmer is a) a good farmer, b) efficient worker with water and land, c) a good labourer d) good to his crop

However, even though the control of tubewell owners is restricted with regard to their financial investors, this is not so regarding the farmers receiving water from the tubewell owners. The conditions to be met have already been mentioned: location, technological facilities, crop, type of land, type of farmer, farmer's financial capabilities, relation between farmer and water supplier (see also Table 5.2). This is the range of control in hands of the water suppliers; when farmers do not comply with the aforementioned conditions they won't receive water. If the water supplier is not satisfied with the production capacities of the specific farmer, he will decide to stop providing water the following year. The reach of control of the water provider goes somewhat further. First, the water provider will set the limit of land the farmer is allowed to irrigate. A farmer might be willing to receive enough water in order to irrigate 2 ha. Yet the water provider might disagree and allows him to irrigate only 1 ha. There are two reasons for a water supplier to do so: one, less hectares to be irrigated will result in a higher yield on that limited plot of land; and two, by doing so the water provider can include more farmers in the irrigation scheme. Secondly, the water provider is checking the farmers and the irrigation system when irrigation takes place. The water provider will open and close the *kundi's* himself; he will see if no seepage or obstructions occur within the system; he will see if the right sequence of irrigated lands is employed so that no one will push in; and, since most of the time irrigation of the fields takes place in the night, he will check whether the farmer will not fall asleep and letting overflow his *dahlia's*, leading to crop losses. Thirdly, because the water provider has primary control over the water he will most of the time irrigate his own land first. Then, he will divide the rest and according to some farmers this goes in sequence in which location and relatives are most important.

Location is an important factor in relation to the control of water as well, not only on the side of the supplying farmer but also on the side of the receiving farmer. The influence of location works in two ways: the farmers who are located nearby the tubewell are given most often priority in receiving water. Even though the quality of land is an important factor for a water provider to supply water to a farmer's field, location seems to be the decisive factor for the tubewell owners. This is not the case for the water suppliers of the Santhali Pond and Checkdam where water supply occurs by means of PVC pipelines which can be altered. They allow for making land quality the decisive factor in the allocation of irrigation water. Cheating in Rangpura seems to consist out of pushing the line, taking water out of one's turn, when the water flows along a farmers field towards another field; or opening *dahlia's* which should not yet be opened. Other types of stealing water are far too difficult seen the fact that the canal is underground and the monitoring is done quite well since many farmers are outside to check the irrigation practices. A good moment for stealing water is when the *kundi*-outlets are opened and closed. Therefore the tubewell owners open and close the *kundi's*, except in special cases when they can trust the farmers to carry out this task properly. The tubewell owner is the one who decides to give water to at which moment and in which sequence. By controlling the physical path of water, he can also control the farmers.

In some cases water is used within a conflict, or even water is the cause of a conflict. The first occurred in Rangpura, where a conflict between the water supplier's son and a water receiving farmer's son –about a totally different reason- resulted in a stop of water supply to the farmer, who had grown cumin and had received two turns of water already. This example shows that water is used by the tubewell owner to intervene in a conflict wherein his close family is involved. It was mentioned that the elderly of the village involved themselves to resolve the conflict. Still, water was used primarily as a means to deal with the situation. The ability to do so provides the water supplier with a lot of power, as the type of sanctioning –to stop the supply of water- is very harsh for a farmer who has a small plot of land and invested in the

growing of cumin. The control over water enables the control over people up to a large extent. This type of control is related to the fact that water to irrigate cumin has to be supplied three times. During the complete season the farmers are dependent upon their water supplier and have to behave correctly.

Concluding remarks

To control water can be divided in three types of control: technical control, organizational control and socio-economic control (see also Annex 1). Technically, the water suppliers have complete control: they are the ones who manage the process of water extraction, they are the owners of the underground and PVC pipelines (and also have to maintain them), they are the one who decide who can open and close the *kundi*'s. Technical control is established by the financial investment the water suppliers made. Organizationally, again the water suppliers have complete control: they are the one who decide whom to give water, based on what conditions, in which interval and in which amount per interval. Furthermore, they set the type of crop and amount of hectares for irrigation. Agreements are made in order to secure compliance with the conditions. Finally, socio-economic control is executed by the water suppliers, however, to a lesser degree compared to the other areas of control. Socio-economic control has to do with the power executed by the water suppliers. They have control over water which is used to dominate other people, to regulate their behaviour and to control other processes. This level of control is limited by the social relations and associated pressure occurring in the village, where tubewell owners are influenced because they are villagers themselves. Still, the power balance is with the water suppliers.

5.5.5 Relation between water provider and water receiver

Although the water provider is directing in many ways the activities of a farmer around irrigation and the production of the crop which leads to a principal-agent relation, there is a matter of mutual dependency within the arrangement. The water provider is eager to supply these three turns since his income has to be derived out of the cumin he will receive. The better the crop, the higher his one-third share will be (and the earlier he will be able to pay off his financial partner). This dependency from the perspective of the water provider creates the incentive for him to supply the water properly and engage in a cumin seed-arrangement: a farmer will receive 20 kg cumin seeds this season and will return 30 kg cumin seeds next season.

A water provider and farmer have a reciprocal relationship. Yet the influencing role the farmer has is hardly perceived by the farmers, especially in the case of the Santhali Pond and Checkdam. They see these water providers as actors who are dependent upon the rain. The farmers will not blame them for not having enough water to provide (as occurred in dry periods that the three turns for cumin could not be fulfilled, even though it was common knowledge that the water provider added too many farmers into the irrigation scheme for that season). The water providers of the Santhali Pond and Checkdam are trusted to do what they can. If they fail, they will not be blamed: Baghwan (Indian God) will be. For the tubewells the connection between rainwater and Baghwan is not being made, resulting in a higher possibility of conflict once the tubewell is running out of water during the season. In this case, farmers state that the tubewell owners keep the water for themselves and family only. Besides, as the tubewell owners are villagers, the social ties become stronger making them more prone to social conflicts as compared to the water suppliers from the Santhali Pond.

If trust and reliability are created between the water provider and the receiving farmer, it appears to be that the same farmer receives regular water for years (see also Table 5.1). There are cases where the relation between the water provider and the farmer are not that good. This might go from two sides as it happens both that the water provider does not trust the farmer, and that the farmer does not trust the water provider. Several reasons might explain such a situation: the farmer argued that he received low quality water (saline); that he did not receive enough water (only two turns); that other farmers received water even though the sequence of the scheme said differently; and that he had to wait too long and the crop had been dried out.

A water provider not trusting the farmer is brought about by the farmer's ill competencies. It occurs that a farmer falls asleep during an irrigation turn. In addition, a farmer would not be seen as reliable if a farmer does not time his activities properly and treats the soil and crops in a proper manner. A conflict of total different reason might lead to a conflict in which water is used as a tool to show power. This can occur during the season, or as penalty for the next season: the farmer might make the decision to stop receiving water and the water provider might decide to supplying water. When the latter want to be really harsh, he can even stop providing water during the season. Even though it is a relation of reciprocity and mutual dependency, the dependency on the side of the farmer is higher.

5.5.6 Irrigation and sharecropped land

The next section will explain the situation in which a field subjected to any type of institutional arrangement receives irrigation water. The main question to answer is the impact the institutional arrangement has on access to water. It will be reconstructed in what way access to water on sharecropped land is constituted. The situation in which land and labour are combined with an institutional arrangement will be discussed first. After that, the case for mortgaged land and water supply will be described. A difference between the two situations is made mainly because the idea of sharecropping is not only derived from the need to land but from the need to water as well. Hence, water is part of the deal in many sharecropping arrangements. For mortgaging this is totally different since the reason for mortgaging a field is need of money.

5.5.6.1 Land, labour, and water

Sharecropping occurs because landowners do not want to spend time on the irrigation practices, who want to have trustful labourers working on their field and who want to have a production as high as possible. In other words, the landowners want to keep the transaction costs as low as possible. In New Najupura and Rangpura, most respondents who have entered into a baghewi arrangement are working on lands of landowners located nearby a water source in another village. Hence, the initial arrangement involves water by which the landowner is the owner of a tubewell or water source. In this case, neither the tenant nor the landowner has to make a water arrangement with a third water supplying party.

In other cases, where the landowner is not a water supplier, a third party has to enter the arrangement. The arrangement can be made both by the tenant and by the landowner. When the water source is fixed as is the case with a tubewell, the relation the landowner and the water supplier have is important for having access to water. The water supplier assumes that the landowner will provide for proper inputs in the land to increase the production. If the relation is good and the landowner is trusted by the water supplier, it is for the water supplier a habit to provide for water also to the tenant. In this case, even the tenant might request for

irrigation water, as the water supplier will know that the tenant (working on the land of a landowner he trusts) is a trustable farmer as well. Hence, in most cases the tenant has to make the arrangement with the water supplier unless the water supplier needs the extra push which can be given by the status of the landowner.

For other water sources with a more flexible transport system such as the Santhali Pond - where the water suppliers vary each year- the role of the tenant becomes even more important. This is especially so when the tenant has been working on the land as a tenant for more years. These water suppliers mainly focus on the farming capacities of the specific farmer on the land, whether it is a tenant or the landowner himself. However, even for these suppliers it makes a difference if the landowner himself is able to provide for proper fertilizer and pesticides on the land. The tenant has to make the arrangement with the water supplier, being backed up by the financial capacity of the landowner, as far as the landowner supports in the primary inputs. In cases where the tenant has to pay for the entire initial inputs it might become more difficult for him to succeed in receiving water for irrigation since there is no landowner backing up for these costs. A water supplier knows this and can be less willing to supply water as he considers the chance lower that the tenant is able to provide for proper land investments.

5.5.6.2 Mortgaged land and irrigation

Mortgaged lands are irrigated in some cases, depending on the crop and amount of rainfall. The farmers might irrigate half of their lands when the available water is not sufficient. If a mortgaged land is irrigated and the official landowner is working the field as sharecropper, then the share of the irrigated land for each will be one-third: the labourer (or official landowner), the mortgager, and the water provider. In the case of Mumji, where the official landowners are cultivating the lands, first one-third of the total crop produce is given to the water supplier. Out of the other two-third the previous made input costs are divided and subtracted from the share of the official landowner. Then, both Mumji and the official landowner receive their share.

The person who makes the arrangement with the water supplier on the mortgaged land varies: in some cases the official landowner will make the arrangement, but in other cases the mortgager has to do it. This is totally dependent upon the capabilities of the official landowner in the view of the mortgager. As Mumji noted, *'it is a sort of social tradition to mother these farmers who cannot take care of themselves'*. According to him, if the official landowner requests for irrigation water, the water supplier will know that his land is mortgaged by Mumji. The water supplier will preferably provide water to hardworking farmers who are capable of investing in the field, who have enough tools and equipment to cultivate their land properly and who are well-scheduled and have a proper idea of timing for the necessary activities on the land. Thus, the water suppliers have trust in the fact that Mumji is the mortgager. Because of the status of Mumji in the village, the water suppliers are eager to give water to landowners who have mortgaged their land to Mumji. As mortgager, Mumji takes good care of the mortgaged lands and provides for proper application of pesticides and fertilizer.

5.6 Concluding remarks

This chapter described in great detail the mechanisms and strategies used by the farmers, water providers and landowners. It provided more insight in the way land is reallocated in

between the farmers based on informal arrangements, as land sales do not occur. In order to deal with transaction costs, scarcity, increasing prices and a lack of a land market a complete different system of land allocation has been created. Sharecropping is the driving factor behind the existing institutional arrangements, where institutional innovation and adaptation constantly take place in order to adjust to the changing circumstances with regard to decreasing land quality, increasing diesel and machinery prices e.a. The same counts for the supply of water, which makes many institutional arrangements around land even more complex. Many factors have added to this: high transaction costs associated with irrigating cumin; uncertain climate (spreading the risk of crop failure); scarcity of land and scarcity of water. These conditions together make that sharecropping becomes an outstanding option dealing with all these problems jointly. Risk and efficiency are the main concepts which direct the institutional arrangements to their current content.

For being able to enter into an arrangement with regard to land and/or water, many rules and conditions have to be met, which is seen as being the institutional environment based on which the institutional arrangements are created. Institutional arrangements are to a large extent subjected to changes of the social and institutional environment, where a complete set of social relations including trust, identity and farming capacities play a major role. It shows that once a field is sharecropped, the ease to receive water changes. In some cases the status of the landlord is the most important while in other cases the working capabilities of the tenant himself are decisive for a water supplier. Additionally it is stressed that power differences, created through means of control over natural resources, are highly present in the research villages. This is reflected within conflicts where water suppliers use their power over others by using water as intervening object in the conflict. Such a deed reinforces the power of the water controllers. On their turn, water controllers are highly dependent upon financial investors living in the cities nearby. They are also subjected to limits and constraints. Furthermore, the outcome of entering an institutional arrangement always leads to dependency relations wherein the one who does not control a resource is worse off than he who has the control over a resource.

6 Property transfer and institutional arrangements

6.1 Introduction

In Chapter five, institutional arrangements for exchanging land, labour and water have been extensively described: the arrangements are designed in order to solve problems related to scarcities, risks, transaction costs and lack of employment opportunities. It also showed the organization of water distribution -both of groundwater tubewells and of water stored during the monsoon. Several key-actors are the main holders of these water sources, and divide it among the other farmers in the village who need it to irrigate their land. As a result of various motives, processes, reasons and environmental factors, a rather complex form of organization has been developed that allocates land and water. The variety in the arrangements demonstrate this, showing that any arrangement differs depending on the season, the amount of water available, the price of input products, the type of land, the location of land and the interrelation between the two farmers who entered into such an arrangement with each other.

Institutional arrangements change the structure of property of land and water: land and water are transferred from owner to user. The transfers are associated with rights and obligations, which together form the institutional arrangement. Property rights over water are based on state law that determines that water beneath owned land belongs to the landowner. Opposed to this, land has a more fixed property base as prescribed by the state. Confronted with production constraints, the disability to purchase more land and the continuing fragmentation of land in addition to a lack of off-farm employment opportunities lead to increased use of customary institutional arrangements which restructure property in an efficient way without using state regulations. The 'bundle of rights to property' approach, including user rights, rights to exclude others, rights to manage and the rights to sell, will be used in order to shed light on the processes occurring when property is reallocated as happens in the villages. Thus, the divisional approach on property is used to analyze the transfer of natural resources through institutional arrangements.

The goal of this chapter is to analyse the information presented in Chapter five with support of the theoretical framework. This chapter will elaborate on the institutional arrangements and institutional environment by using the concepts of property and access. The concept property will be used as a right denoting the customary view on property associated with bundle of rights, which is useful to analyse the dynamics and divisional character of property transfer. Access is constituted by redistributing a portion of the complete bundle of right. This means that even without having the complete bundle of property (indivisible, as state law prescribes) one can benefit from a resource, and thus having access. This is enabled by entering an institutional arrangement.

6.2 Transfer of property rights

6.2.1 Property and land

A landowner offering his land for sharecropping transfers the right to use the land. These user rights become the tenant's rights, who has created access to land and in some cases this even includes irrigated land. The institutional arrangement between the tenant and the landowner is based on reciprocity and mutual dependency. Therefore, the tenant has the right to exclude others since the institutional arrangement is entered by solely by two parties: the tenant and the landowner. No other person except for a water provider is allowed to intervene in the

institutional arrangement. The arrangement is enforced by the repetition of the arrangement between the two parties. Hence, access to the land for the tenant is secured. This is beneficial for both parties since the landowner needs a tenant who is secure of having access to the land: this will increase the productivity of the tenant. Thus, the right to exclude others goes hand in hand with the right to manage the land, since this is handed over to the tenant. However there are issues beyond the reach of the tenant: the landowner will decide what crop to be grown and whether irrigation takes place.

The right to sell the land remains in the hands of the landowner. In other words, overall control remains on the side of the landowner. The tenant is considerably more dependent upon the landowner than the other way around. Besides these rights, a tenant has obligation to invest his time in working the land and to share in the input costs. The working of the land includes management to a certain extent: the tenant has to arrange the irrigation practices himself including the arrangement with the water provider. However if additional labour is needed on the land in certain periods of the production process the landowner hires in other villagers. Only in rare cases where the tenant is working for many years already on the land such a management task might be handed out to him. Access is created by the institutional arrangement, whereby the exchange of a part of the property bundle is transferred. With the arrangement, the tenant feels secure of having access to land and will treat the land as if it is his own. In many cases the tenancy arrangement is connected with the provision of loans, and due to indebtedness it can be rather difficult for the tenant to step out of the arrangement. However there is no possibility for a tenant who has worked the land for over a long period to inherit a part. The institutional arrangement remains of temporary nature which results in no real structural changes in the property relation as far as customary law is concerned. The landowner can step out of the arrangement whenever he wants, taking the land with him and leaving the tenant landless.

For mortgaged fields the property relations are rather different as compared to sharecropped fields. Again, the reason for offering a field is important for the terms of contract and the consequences for the landowner and the tenant. The mortgage is sort of last option: it is a compulsory deed enacted by the landowner to receive financial capital. The unofficial mortgage arrangements which occur in the villages are vicious for the official landowner: an enormous indebtedness is created. Besides, control over the land is handed over to the mortgager. The mortgager can decide what to do further with the land and the official landowner, choosing out of the three options as described. This shows that the right to use the land, the right to exclude others from the land, and the right to manage the land is now all in hands of the mortgager. An exception is the right to sell the land, which remains the right of the official landowner. The other three rights are –temporary- sold. This is the main difference with sharecropping, as with the sharecropping arrangement the right to manage and the right to sell remain with the official landowner. Furthermore, in the sharecropping arrangement the balance of power is positive for the official landowner while for mortgaged land the mortgager has power over the specific land and the official landowner.

Even though the official landowner still has the right to sell the land, this is restricted to a large extent. To leave the right to sell with the official landowner enhances the temporary nature of the mortgage arrangement and gives the official landowner the thought that he still has some control over the land. However, in practice the mortgage arrangement is permanent as long as the official landowner does not pay back the mortgage. There is minimum chance that he will be able to pay off the mortgager, which leads to selling the land exclusively to the mortgager for a humble price. Hence, even the right that remains with the official landowner

is restricted. It can be argued that the land effectively has become the property of the mortgager, and basically non-exchangeable.

6.2.2 Property and water

If the water would be sold for a fixed price related to the amount of water received, which occurs in other Gujarati villages, the water provider would care less how the water receiver treats the water. Here, the water ownership is actually transferred from water provider to water receiver and the water provider has no control anymore over the water. However, this is not the case in the research area. In the research villages, when a farmer complies with the conditions a water supplier has set, he has the right to receive water. In this case, the water provider becomes a right-to-water setter as opposed to a price setter. The right to have access to water for a farmer can be realized by making use of the customary institutional environment as set by the water providers. Hence, the right to water is to comply with a set of institutions. The water provider does not transfer the water entirely to the receiving farmer. The water provider remains a shareholder in the water, and retains a certain level of control on the water –and thus over the farmer who receives the water, for example through the choice of crop.

The question rises why the water providers do not sell the water, hand over ownership and be not dependent on the farmer's pursuit? Why do they include themselves in the production process? This is the result of a limited span of control of the water provider. First of all, the farmers have no money. Secondly, a price for water would mean a fixed amount not based on the specific season crop produce. When a price had to be paid, the farmer would show risk-aversion behaviour because the investment would not cover the losses if the harvest would fail. The farmers would not take the risk of losing so much; if they had to pay for the water they would not buy it. As way of adjustment to the farmers needs, the water providers were induced to find another means of exchange, because they needed the demand of the farmers in order to cover for their own investments in the tubewell and electricity use costs. The one-third share in crop as exchange for the water meets to a certain extent the difficulties a farmer meets during production. This enables the farmer to receive water, and at the same time enables the water provider to increase the value of the extracted water. A part of the risk is now taken by the water provider, as compared to a case when water would have been paid for by the farmer, giving all the risk to the farmer only.

The water provider hands over a certain level of control by supplying the water to other farmers: the water is given value only by the act of provision to other farmers. In return for the right to receive water, the farmer has the obligation to give one-third of the harvest to the water provider. Dependency is created by associating obligations with the right to water. Even if a farmer does not receive three turns of water to irrigate cumin he still has to hand over one-third of the crop. The water provider is the actor who has power over the arrangement and control over water, land and labour.

By having the right to receive a one-third share of the produced crop, the water provider has indirectly access to the productive capacity of land. By having access to capital in order to invest in the construction of a tubewell installed at an individually owned plot, control over water is created which leads to the control over and access to land and labour. Access is created to this land even though the water provider is not the main owner. He is able to control the production process by having the control over a high-grade production input namely water. Thus the arrangement exchanging water for crops can be seen as exchanging property rights over land and water up to a certain level.

Referring to the bundles of rights, including user rights, rights to exclude others, rights to manage and the rights to sell, the previous can be perfectly analyzed. With regard to the irrigated land, the rights to manage are transmitted to the water provider. The latter is the one who mainly controls the decisions concerning the production activities. User rights to the land are still in hands of the farmer working on the land. With regard to the water, user rights to a specific amount of water are exchanged to the irrigating farmer. This includes the right to exclude others, since the right to receive this amount of water is individually based. The right to manage the water and the right to sell the water remain with the water controller.

6.2.3 Land and water interface

Access to land is connected with access to water as many irrigated fields are offered for sharecropping, creating access to water. Three parties are involved and a complex form of access and property to the land and water is created. For the tenant, access to labour creates access to land which creates access to water. For the water supplier, control over water creates access to and even control over land and labour. And for the landowner, control over land creates access to labour and access to water. Besides, property rights form the basis of controlling water: property of land enables the property of water by being able to place a tubewell. Even more, groundwater in practice is common property (not in state law, but due to physical circumstances since everyone might withdraw the groundwater) but to control it one has to own a tubewell. Thus, access to capital is closely associated with controlling water.

6.4 Concluding remarks

Institutional arrangements enable the transfer of parts of the bundle of rights to property thus creating access to natural resources. Not the complete bundle of rights of property is transferred by the institutional arrangement, because of the temporal nature of the arrangement as well as the fact that sharecropping enables ‘making use of’ without the need to control the complete bundle of rights. Both land and water are exchanged and gain in value because of the exchange. This chapter showed that control over natural resources seems to be more important than the complete ownership. Furthermore, complete ownership is not necessary to make use of natural resources. The exchange of rights within the bundle of rights allows for an efficient reallocation of natural resources. The division of property rights enables efficient crop production as well, as sharecropping makes sure that the natural resources are brought together. The indivisible property right as seen by the state is much too rough and viscous. This system does not allow for flexibility and alteration within the property system. However, the customary institutional environment is socially inefficient. Those who have control over natural resources can easily concentrate control over more resources. The position of the small and marginal farmers becomes worse.

7 Conclusions and considerations

7.1 Conclusions

This study aimed to provide insight into the access mechanisms that farmers use in order to use land and water; and to display the organization of this local practice in relation to the policies and legislation as provided by the state government. To study these issues a focus was placed on the allocation of land and water in two villages in northern Gujarat, a semi-arid to dry region where irrigation of crops is dependent upon groundwater withdrawal and the unpredictable monsoon. The strategies and mechanisms used by farmers are dependent upon the environmental context both physically as institutionally: the groundwater depletion and soil degradation as well as the governmental rules and policies designed to address these problems.

Based on the concepts of property rights and access to natural resources a research framework was developed (Chapter two) to analyze the research data. It included that property rights can be subdivided into a bundle of rights, which is a different perception of property than that used by the state. The state sees property as complete ownership of all the rights within the bundle - the property right is indivisible. A bundle of rights, on the other hand, stands for a divisible property right: it means that the transfer of one type of property right can lead to access without the (legal) transfer of the complete property right. Even though the concept of access states that property is just one of the mechanisms to enable access to natural resources, the perception of a bundle of rights within property includes this flexibility and creates access. This transfer of property and the creation of access is observed within the institutional environment where rules and regulation as well as habits and customs provide the context in which farmers, water controllers and landowners try to gain, maintain and control natural resources. These gaining, maintaining and controlling strategies and mechanisms have been institutionalized in institutional arrangements that provide farmers with land, labour and water.

7.1.1 Institutional environment and institutional arrangements

The institutional environment consists of the customary rules of social relations, and of the rules and regulations as set by the government. Chapter three focused on the institutional environment provided by the state. Before Indian Independence and during the 1950s and 1960s, water policies were mainly stimulating the use of natural resources including groundwater. However, when it was discovered that the groundwater level was decreasing, putting the state on track for water scarcities and environmental degradation in the near future, policies were altered. New policies were meant to change groundwater use, but they were difficult to implement. Thus, the state reduced electricity provision, which did in fact result in the desired outcome. With regard to land, the Government of India adopted a number of laws to alter the former tax-systems where farmers were not seen as landowners. The Tenancy Act had a lot of impact by abolishing the tax-systems and granting the land to the individual users. Farmers became landowners and this was recorded at governmental offices.

Chapter four elaborated upon the institutional environment in much more detail. It provided administrative, physical, and socio-political background information to the research villages. It showed that there are no significant social differences between the two villages that could result in a total distinctive system of land and water allocation. An important difference between the villages is related to water supply: New Najupura has no access to tubewells within the village. They are completely dependent upon the neighbouring village Old

Najupura, where farmers supply water to some farmers from New Najupura. Rangpura on the other hand has three tubewells within the village. However, with regard to the customary institutional environment it was observed that these differences do not create dissimilarities. The rules and principles applied for water distribution and land allocation are corresponding to a large extent.

The descriptive analysis in Chapter five provided an overview of the customary institutional environment. The mechanisms and strategies to gain access to natural resources, as well as conditions (rules) and processes of water supply and allocation in the research area were discussed. The chapter showed that conditions to receive water can be structured into four categories: physical, social, economical and political. The rules are derived from the customary institutional environment. It turns out that economic benefit is an important factor for a water provider to supply a farmer with water, but this, as well, is embedded within the social, political and physical circumstances of the village. The process of gaining access to water has to be reproduced continuously in order to maintain access to the water. In this process, social relations are of great importance. Control mechanisms are mainly used by the water providers. As a result of the lowered groundwater level small and marginal farmers have no easy access to water: the installation of a tubewell is needed to reach the groundwater, thus a large investment has to be made. Only richer farmers can do this, and transfer water to other farmers by agreeing on a sharecropping arrangement. A similar process is related with transfer of land. A land market is absent and full ownership of land is solely transferred through inheritance. However, in cases when farmers are in need of land or money, sharecropping arrangements are used.

The sharecropping arrangement, which is the institutional arrangement, links three major production inputs: land, water and labour. The institutional arrangements within the villages are popular due of several reasons: they reduce uncertainty and risks mainly for small and poor farmers as natural resources are shared and access is secured; they reduce transaction costs for owners with concentrated property to seek, hire, monitor and maintain labourers; they allow for flexibility within the transfer of natural resources and mainly land, as a land market is absent and farmers do not prefer to sell their field, enabling efficient use and management of natural resources; they reduce transaction costs as they allow for unofficial processes of transfer, reducing the need for time-consuming official processes; and, finally, they seem to manage three scarce resources - land, water, and labour opportunities - by combining them.

Institutional arrangements stabilize access to land, labour and water, and the relation between the supplier and receiver for an undefined period of time. The arrangements reduce uncertainty as they increase trust for both parties. Input prices increase, leading to credits and loans. The indebtedness of poor farmers makes them even more vulnerable to the risk environment of droughts, saline water, land degradation and unstable prices. Sharecropping enables the sharing of these burdens. On both sides, incentives are created and maintained, which results in a preferable situation to enter into an arrangement compared to labour work. Arrangements are preferred over labour work for both parties. For landowners the sharecropping system saves them the transaction costs of supervising and managing labourers. The unofficial nature of the arrangements saves time and costs for each transfer as well, as compared to the official systems offered by the government. The provisional transfer forms flexibility for the farmers - property and ownership are not definitely transferred. The arrangements can stop and restart, and various people can enter. The limit is season-bound.

Finally, as labour opportunities are limited and a proper land market is absent; sharecropping forms a solution by offering access to land in exchange for providing labour.

7.1.2 Property and access

In the villages studied there is both absolute water scarcity - reduction of availability because of the groundwater decline - and relative water scarcity – less water available due to decrease of electricity supply, increase of electricity price, and the cost of installing a tubewell. These two types of scarcity make it even more difficult for small and marginal farmers to have access to groundwater. Access is necessary for livelihood security because they have no other options: the labour market is not working properly and almost all of the villagers are directly dependent upon agriculture. Institutional arrangements constitute access to natural resources without the need to transfer the entitlements, which is time consuming, costly and definite. With institutional arrangements only a part of the bundle of rights is transferred. This bundle includes user rights, rights to exclude others, rights to manage and rights to sell. This serves to retain a certain level of control over the resources, because part of the bundle of rights is retained with the official owner, the previous holder of the complete bundle. The two institutional arrangements observed in the villages are sharecropping (and derivatives) and mortgaging. The distinctive feature is the right to manage: the right to manage stays with the official landowner when referring to a sharecropping arrangement; but the right to manage is transferred to the mortgager when referring to a mortgage arrangement.

7.1.3 Power

This reallocation of property rights results in the concentration of property. Poor farmers often only have user rights if they enter into an arrangement for sharecropping as a labourer. For rich farmers, it is easier to retain or get control over a larger part of the bundle of rights. Furthermore, a level of dependency is created between the two parties of the institutional arrangement which is not equal on both sides. The land and water suppliers have control over the means of production because they own a tubewell or because they own high-quality land. Both suppliers need arrangements to increase the value of their controlled resource. Farmers with the capacities to farm but who don't own a field, or have access to irrigation water, are willing to comply with any kind of condition to acquire these resources. It is simple for a landowner and water supplier to find a farmer who is willing to enter into an arrangement. These farmers are more dependent on the supplier than the other way around. Power is given to the natural resource controllers, who can set the terms of arrangements and transfer burdens such as increased prices of inputs to the tenants, for example by giving a lower crop-share. Water providers have the ability to mediate others' access to water. This control is enabled by the fact that the tubewell is private property, providing property rights to the extracted water as well. Thus, access to water control is related with access to capital. The control of the water by the water providers is practiced at three levels: physically, by investing in the withdrawal techniques, controlling the opening of the *kundi*'s, and being the one who lets the water flow into the underground canal; institutionally, by setting the preconditions for receiving water and by connecting the water provision with the crop to be produced in an arrangement; and politically, by being able to cut the water supply when incidents on the social level occur. In short, the investment in techniques results in the control of water: property on water is created in the complete sense of the bundle.

Even though the arrangements are said to be of temporary nature, most often the arrangements endure for a longer period, or until the supplying farmer wants to finish the arrangement.

This enforces the power situation of the supplying farmer. In the case where labourers are in an arrangement with a landowner and/or water supplier for a longer period it is often reinforced with loans in cash or in kind. The supplying farmer does not want to finish the arrangement and so he creates a high level of trust towards the labouring farmer. This loan will accumulate during the years, disabling the labouring farmer to pay off the loan. As a result, the labouring farmer will not leave the arrangement anymore because he is in debt and cannot leave. A patron-client relation is developed, where reciprocity guides up to a certain level, but where the dependency is more prominent and power differences are created. The entrapment of the labouring farmers makes them increasingly dependent. In a mortgage situation a real and large power difference has been created. The mortgager receives all rights but one: the right to sell the land. However, if the official landowner is not able to pay off the mortgage sum, he will have to sell the land to the mortgager. Hence, no transaction costs are involved but the mortgager gains complete access to the land. The official landowner is completely obstructed by the mortgager, who leaves him no margins. Dependency relations are vertically structured: the water suppliers are both a patron to the farmers, and a client to their financial investors. Financial arrangements are created with people from the city who invest in the construction of a tubewell. Arrangements are set up based on sharecropping. This vertical chain of patron-client relations shows that the complete range of making groundwater withdrawal possible is embedded in power differences.

7.1.4 Legal pluralism

To place the organization of land and water within the broader context of laws and policies within the state of Gujarat, a view on legal pluralism will be provided. It is argued that reality itself will adjust these policies in order to fit local practice in addition to their own developed way of organizing the modes of production. In other words, local law is active regulating the important factors of sustaining a livelihood and the laws, policies and legislation are adapted so that they are useful for local practices.

In the research villages the role of the government with regard to water management is limited. The implementation, monitoring and enforcement of laws and policies are difficult. On the one hand, this is due to the liberal characteristics of the policies which clash with local reality. On the other hand, this is due to the local elite who resist progressive changes. Governmental influence on groundwater use does not reach further than altering electricity connections and supply. None of the tubewell owners understand the reasoning behind the reduction of electricity provision - they all feel that they need more electricity if they want to supply enough water to more farmers. Even though the government intervened in electricity supply with the goal of curtailing groundwater extraction, their policy also created a situation of unequal division of water, negatively affecting poor farmers. The tubewell owners were less able to provide water to more farmers as the command area had decreased, giving first preference to the tubewell owners' field and the fields of his close family. As a result of policies limiting water, wasteland, which is governmental property, is being used to construct checkdams without governmental approval; the water is distributed and economic benefit is made, while the claimants do not have to pay tax for the land. Similarly, the Santhali Pond, which is governmental property as well and should be used for animals and other village purposes, is 'sold' each winter season and used for water distribution. The local government, *Gram Panchayat*, must know about these processes and they tolerate them. Thus, the Model Groundwater Bill entailing a rights-based approach on water is not enacted. The farmers receive water on the basis of production; it is profitability that is the driving force behind the distribution of water. There is no governmental system monitoring the water rights approach.

The same is valid for land: land transfers occur through inheritance or sharecropping arrangements, leaving aside the official land registration offered by the *Talathi* office. Fields are not sold nor bought, which is the main idea behind creating private property and associated land registration. Land is perceived by the government to need the notion of private property, and so property as well as the transfer of the property is legally regulated at the *Talathi* office. The government did not succeed - institutional arrangements are designed to enable land and water transactions for a more efficient allocation. There are cases in which farmers need governmental enforcement provided by the *Talathi* office. This occurs only when a farmer thinks this is the best - he will decide to register the field in his name in order to secure his control or access to the field. This occurs on contested or newly acquired fields. The property right as provided by the government is only used to create additional security of access to land. However, the registered property rights to land say nothing about who has access to land and who not.

In the villages the customary rule system is mainly at work. There are several reasons for this: high transaction costs for legal processes; inflexibility of the legal system so that efficient use and management of natural resources is not possible as compared to the flexible use of the customary system which allows for efficient reallocation; and the traditional system is easier to use because it is better known. There are more possibilities provided for the villagers because of the varieties in arrangements. Therefore, adaptation to changing circumstances is facilitated. The customary system, however, is accompanied by limited use of governmental rules which leads to a mixture of legitimizing rule systems rather than preference. The choice depends on the issue and the individual - not all farmers are aware of the possibilities provided by the governmental system and will thus not make use of the possibilities. In addition, implemented national and state policies barely change village processes: it is hard to implement, monitor and enforce them. The customary system harmonizes with village reality, and political relations at village level.

7.2 Research considerations

This thesis focused on the land and water access mechanisms and strategies of farmers in the dry-land area of Gujarat where groundwater is used for irrigation. Using the political ecology approach has provided useful insights into the symbiosis and parallel existence of two separate rule systems on the use and management of natural resources: one governmental and one customary. They both shape the institutional environment and distinct institutional arrangements, meant to allocate the resources properly. The theory of access enabled the analysis of a farmer's use of strategies in order to gain, maintain and secure his access to natural resources. It resulted in a profound and detailed overview of institutional arrangements at work that are created to overcome transaction costs, which are perceived to be introduced with the governmental processes, as well as climate insecurity and land and water shortages. It showed that the customary system is regarded as the main system on which allocation and distribution practices take place, and that the official governmental rules are used in cases when they work out the best for the farmer in question.

The focus on institutional arrangements served as a useful tool to identify the main characteristics, issues and important factors that shape the terms of arrangements as well as the rules that create access to these arrangements. The focus on institutional arrangements as unofficial contracts in regulating land and water was practical to gain insight into the terms of

arrangement, the rules and principles, and in what way they add to the customary institutional environment.

Furthermore, the use of the concepts of property and access proved challenging. A definition of property is contested, and to place the concept within a theory of access makes its interpretation difficult. The theory of access allowed only the usage of the concept of property as seen by the state. The concepts access and property have been alternately used to analyze field data. Therefore it was necessary to include another view on property beyond that of property as an indivisible right: property as a divisible right. This has been done in order to create a better understanding of the customary institutional environment which enables people to alter state rules.

Further research could focus further on the land arrangements - deeper analysis is necessary to understand land transactions. Additional quantitative data will also be needed for a proper understanding of the decisions farmers make.

However, the two chosen villages were not significantly different in access mechanisms even though they varied in water availability. To study two research villages that vary with regard to access mechanisms may have provided more insight into such mechanisms. A comparative aspect within research often provides for better insight into processes, both within the villages and regarding theoretical analysis. One villager cited an example of another type of mechanism, saying that a real water market was in place in her sister's village, in which water was extracted and sold. A different water exchange system such as a water market may provide for different access dynamics. Or, a village with more social differentiation would have been challenging. The family-name Patel passed the discussions and interviews frequently. Patels represent the rural elite, who are higher classified within the caste-system, and who have distinct strategies on agricultural practices. Such a village would contribute to the discussion of social status versus land and water allocation.

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Annex 1 Conceptualizing concepts

1: Water control

Water control shows the power balance in all its features. According to Mollinga, water control can be divided in three parts: the technical part, the organisational part and the socio-economic and political part. Technical water control is the physical control of the stream and controlled water from the river (Mollinga, 2003). Stream water is the unregulated water from the river, which is generated by runoff. It can be diverted (by gravity) or abstracted (by pumping). Controlled water is the water that has been stored in reservoirs like dams and lakes. Human intervention is needed to store, divert and allocate the collected water (Molle, 2003). With the organizational part of water control is meant the managerial control of the water distribution process. “*Water control is the use of one’s skill, authority or other powers in order to lead, guide, command, or dominate persons or things. Control stresses the idea of authoritative guidance and suggests a keeping within set or desired bounds.*” (Mollinga 2003: 35-36) In other words, organizational water control is the ability to plan, to get and to keep the required volumes of water at the appropriate time and place. (Mollinga, 2003). In the organizational water control, negotiation and cooperation between the actors take place. Agreements can be made and implemented on the allocated amounts to each actor. With the socio-economic and political control by water is meant, where the technical and the organizational control are being put into practice in order to control processes and dominate people. It can be seen as the result execution of the other two parts of water control. The balance in water control is mainly set by power relations. Power act as the glue in this balancing process (Mollinga, 2003).

2: ‘Theory of access’ by Ribot and Peluso (2003)

Access to *technology* refers to physical inputs which enables people to control and extract a resource, both in the direct sense of means in order to extract the resources (tubewell) and in the sense of means in order to exclude others to extract the resource (fence). Furthermore, more indirect technologies such as the supply of electricity, roads and vehicles are important technologies concerning access to resources. Thus, technologies are tools both to control access to resources as well as to be able to exploit the resource.

Access to *capital* enables those to control and maintain resources by means of the ability to invest in the required technologies for example to be able to control and extract resources, labour mobilization, production and other inputs in order to gain. Here, capital is ‘*thought of as access to wealth in the form of finances and equipment*’ (Ribot and Peluso 2003:165). To maintain resources, capital becomes important by the need to pay rents, fees, credit and even bribery by paying to those who do have control over resources. In addition, by having the means to invest, property rights can come into existence. Then, it becomes socially recognized that investments such as planting trees, claims to property can be made to this piece of land. As the authors claim, capital affects also other types of access mechanisms ‘*since wealth, social identity, and power are mutually constituted*’ (ibid:166).

Access to *markets* is important in order to be able to benefit from exchange. Market access can be defined as ‘*the ability of individuals or groups to gain, control or maintain entry into exchange relations*’ (ibid:166). Access to markets is affected in many ways: it can be

stimulated by government policies, by means of capital, and cooperation between other market actors for example. Such relations and regulations creates the ability to pay access fees or allowance to enter the market. Furthermore, access to markets increases the opportunity to get benefits from a resource since exchange becomes profitable. In the end this can change property and access relations, since interests in several resources might grow and some actors want to create exclusionary rights on this resource. Finally, the price of a commodity also affects whether an individual can profit from its resource. This price can be set by the government, by the individual or by the market cooperation, and even by demand-supply balance. This price both determines whether the market is profitable for the seller, as well as it distributes access to the resource amongst the buyers.

Access to *labour and labour opportunities* is a means to benefit from resources as well. Control of labour means that a person can give his labour in return for resources. To control labour opportunities enables the actor to allocate labour whenever he likes. In the case of enough supply of labour and a limited supply of labour opportunities and resources, the actor who controls labour opportunities can exercise power and easily create patronage relationships based on mutual dependency although with inequality in socio-political and economic situation.

Access to *knowledge* refers to '*beliefs, ideological controls and discursive practices, as well as negotiated systems of meaning, [which] shape all forms of access*' (Ribot and Peluso 2003: 168). In this sense, belief and ideological controls are mentioned as they reflect the traditions of access: the stories which shape the access to some and reject the access of others. Knowledge might act as power to control access, for example through the framing of a typical area as protected environment based on scientific knowledge stating that environmental protection is highly necessary. Furthermore, knowledge might be indirectly used as well, holding knowledge on technology, prices, labour opportunities, specialized farming knowledge etc. To let this knowledge be restricted profitable it might be withheld.

Access to *authority*: '*privileged access to the individuals or institutions with the authority to make and implement laws can strongly influence who benefits from the resource in question*' (Ribot and Peluso 2003: 170). Authority, as the person who rules might request for the use and control of the resource just because this person is the one with the power. This authority might be legal, illegal or conventional, as long as the authority is acknowledged by those who are subjected to it. As stated by Ribot and Peluso, the access through authority is an important one since it bundles together several other mechanisms of access. Besides, authority can act as direct individual access and indirectly through the control and exclusion of other person's access.

Access through *social identity* is an important mechanism since often access to natural resources is directed by one's identity in a group (age, gender, ethnicity, religion, status, profession). Control and allocation might follow the line of identity since it shapes an easy method to create inclusion and exclusion.

Access to *social relations and via the negotiation of other social relations* includes friendship, trust, reciprocity, patronage, dependence, and obligation. Hence, actors invest in the social relations in order to gain and maintain access to natural resources.

In short: Access to *technology* refers to physical inputs which enables people to control and extract a resource. Access to *capital* enables those to control and maintain resources by means of the ability to invest in the required technologies. Access to *markets* is important in order to

be able to benefit from exchange. Market access can be defined as '*the ability of individuals or groups to gain, control or maintain entry into exchange relations*' (Ribot and Peluso 2003:166). Access to markets increases the opportunity to get benefits from a resource since exchange becomes profitable. Access to *labour and labour opportunities* is a means to benefit from resources as well. Control of labour means that a person can give his labour in return for resources. To control labour opportunities enables the actor to allocate labour whenever he likes. In the case of enough supply of labour and a limited supply of labour opportunities and resources, the actor who controls labour opportunities can exercise power and easily create patronage relationships based on mutual dependency although with inequality in socio-political and economic situation. Access to *knowledge* refers to '*beliefs, ideological controls and discursive practices, as well as negotiated systems of meaning, [which] shape all forms of access*' (ibid.: 168). In this sense, belief and ideological controls are mentioned as they reflect the traditions of access: the stories which shape the access to some and reject the access of others. Access to *authority*: '*privileged access to the individuals or institutions with the authority to make and implement laws can strongly influence who benefits from the resource in question*' (ibid.: 170). Authority, as the person who rules might request for the use and control of the resource just because this person is the one with the power. This authority might be legal, illegal or conventional, as long as the authority is acknowledged by those who are subjected to it. Access through *social identity* is an important mechanism since often access to natural resources is directed by ones identity in a group (age, gender, ethnicity, religion, status, profession). Control and allocation might follow the line of identity since it shapes and easy method to create inclusion and exclusion. Access to *social relations and via the negotiation of other social relations* includes friendship, trust, reciprocity, patronage, dependence, and obligation. Hence, actors invest in the social relations in order to gain and maintain access to natural resources.

Annex 2 Questionnaire

Farm

1. Where is your land?
2. What is the type of your soil? How would you describe the quality?
3. What is the size of your arable field?
 - Has this always been this size?
 - Do you have any other land that you do not cultivate?
4. Is your land fenced? What kind of fence? Who bought this fence?
5. What do you grow on your land?
6. A new season starts. What would we see you doing from the start of the season till the end?(analogue: process of the development of a human being, from birth, marriage till dying)

Checklist

- preparation of land: plough animal, machine, hand
 - buying of seeds (credit/loan)
 - fertilizer
 - sowing
 - plow (technology/machinery/animals)
 - irrigation
 - maintenance
 - harvest and post-harvest
 - selling of products
 - type of farming: seasonal/year round
7. What area for each crop?
 8. Why these crops? (low input, easy to sell, high profit, low risk of failure)
 9. Where do you sell the crops? At what price?
 10. What do you do with the plant remainder (stover)? (fed to animals, left on soil)
 11. After harvest, do you plant another crop? Which crop after which crop and what for? (extra food, income, soil cover, animal feed)
 12. What animals do you have? What do you do with each animal? (milk, traction, selling)

Land labour

13. Do you till the land yourself?
 - Is family labor employed?
 - How many members full time?
 - How many members part time?
 - How is labor divided? Who does what and why?
14. Do you have hired labor employed on your field?
 - How many people full time?
 - How many seasonal workers?
 - What is the average wage cost?
 - Do you have long term arrangements with land tillers?

Crop rotation and intercropping

15. When do you decide to grow which crops? What are the reasons for growing these crops under what circumstances? Did you change you crop pattern recently? Why?

16. Are you intercropping? What crops?

Machinery

1. Do you possess any farm machinery or animal traction? What machinery? (tractor, plough)/animal (cow, ox, buffalo). How many?
2. What other farm tools do you have? (hoe, spade, hand mill, storage facility)
3. Do you hire machinery/animals, borrow machinery/animals, share machinery/animals? For what operation and at what price?

Household

4. How many people live in this household?
5. What does he/she do (work in hh, farm, school, off farm job)
6. Who is mostly occupied with agriculture?
7. Are there any family members not living on the farm? Where are they? What do they do? Do you receive money from them?
8. Are you connected to the electricity network?
9. What are the biggest costs made by the household?
10. Do you have any off-farm jobs?

Water

1. How much water do you need for this crop?
2. Do you irrigate your field?
3. Where do you get the water from? Is there also surface irrigation?
4. Do you have any water storage devices?

(non-tube owner)

5. Do you get your water from another tube?
Do you know the owner(s)? What do you know about them? Do you have a special relation with them?
Is the tube where you get water from privately owned/ or included in corporation?
What is your role in the corporation? Do you have a share in the tube well?
Under what conditions can you get water from this tube?
How much water do you get from each specific source?
What is the price you have to pay? (cash, kind)
Can you buy water from other tube wells?
6. Do you know the water price?
7. How much water do you buy and how much do you pay to irrigate your field?
8. What is your motivation to buy water? Why from this specific owner?
9. How do you pay? Can you always pay on time? What if you cannot?
10. How is this water transported to your field?
Who constructed this? Did you help?
Who maintains this?
Who pays for these construction and maintenance costs?
Who owns these transport structures? Who manages? Self-governance?
When can you demand this water? Can you always get this water? (when, how much, for how long?)
11. Is there a fixed amount of water you can get? Proportional/volumetric? Tied to land? What are your opinions on this?
12. Are there any limitations for you to get water?

13. For what other purposes do you use water? Is this allowed?
14. Who is allowed to use the water?
15. Do you feel that you have secure ability to get water? Why is he/she (not) secure?
16. Do you have an agreement with the tube owner? (contract or informal)
 - What is the duration of the agreement?
 - Did you sign the agreement?
 - Do you know the rights?
 - What are your obligations?
 - Can your son/daughter in the future have secure ability to benefit from this agreement? (marriage & heritage)
 - What if your land is sold to an outsider, does he/she can extend this agreement? (even if not a formalized agreement, can they still make use of it?)
17. Does it sometimes happen that you do not get the water? What are the reasons for this?
18. Are there other sellers available?
19. What would you do if your current seller cannot fulfill the agreement to supply enough water?
20. Do you feel a written contract is/would be important?
21. Are you satisfied with the current agreement?
22. Who do you go to when you have a problem with the tube well owner/water supplier?
23. Can you benefit from the other tube wells in the village? Under what conditions and circumstances?
24. What if a drought occurs?
 - Can you still get water from the tube well?
 - Do you have other strategies to gain water?
 - Do you retain water yourself?
 - Who does still gets water from the tube although the drought?
25. Who are the main decision makers on the tube and those who can buy water from the tube?
26. What are the reasons for drought? (multiple claims?)
27. What if the tube well owner dies?

(tube owner)

28. Do you own the tube well?
 - Is this private owned or do you share or corporation?
 - How much do you dig per ...?
 - Do/did you sell/exchange the surplus?
 - How much do you sell/exchange?
 - To which type of farmer do you sell and give water?
 - Where can you find buyers?
 - How many years have you supplied to the same buyer?
 - What price do you receive? Is this fixed or do you negotiate over the price?
 - How is being paid? When do you receive the payment? What if payment cannot be done?
 - What is your motivation not to sell?
29. What if a conflict occurs? Who do you go to?
30. What if the tube well does not work?

Land

1. Land owned? (ha) Is this fully owned? (mortgage, loan)
2. Land rented? (ha)
3. Do you have to pay taxes for the land? How much? Is this fixed or proportional?
4. Total land used for crop production? (ha)
5. How did you get this land? From whom? For what? When?
6. Can you sell this land?
7. Can you buy this land?
8. Can you transfer the land to you son/daughter?
9. What does Bhagewi mean to you? Are you included in such a partnership? Why?

Tenure arrangement

- Did you sign an agreement (formal)? Did you make a negotiated agreement?
What is the duration of the agreement? (flexible or fixed)
What are your obligations?
What are your rights and benefits?
Who provides the agricultural inputs? Seeds, fertilizer, water?
For how long can you make use of these benefits?
Can you be thrown out of this agreement?
Do you know if any other land use agreements exist?
Why do you not buy land?
Do you have a debt due to the land lord?
Who interferes if conflicts occur between parties of agreement?

- Land tiller: What other contact do you have with the land owner?
 How many years have you worked on this land before agreement?
 Does it feel like as if you own the land yourself?
 Have the terms of agreement been changed over time?
 Do you have to pay rent in cash or kind for using the field?
 Does the 'original' owner provide assistance in your farming?
 Are you the only one allowed to work and harvest from this field?
 For how long are you (your family) working on this field?

- Land owner: To which type of farmer do you make such an agreement?
 Who was your previous land tiller? Why change?
 Do you change the terms of agreement?

Land and water

In how far are the arrangements for land and water use associated with each other? Shifting situation in land arrangements might lead to shifting arrangements in water use. (Context, embeddedness, institutionalization, dependency, interrelation)

Other questions

1. What is the main constraint to farming? (land, water, labour, inputs, conflict, theft)
Are there any differences in these constraints between the farmers?
2. Imagine you could change/improve one thing on your farm, what would it be?
3. What are the main problems/conflicts you encounter with other farmers related to land, water or agricultural production?

Semi-structured to Rangpura:

Water with focus on tube-well arrangements & Land

- What are the most important water sources to irrigate your field?
- In what circumstances are you sure you will obtain this water?
- What are the arrangements made between landowner-sharecropper and tubewellowner- water receiver? How would you describe the previous relation between these, before they went into the arrangement?
- Is the amount of water you get based on the crop growing, the land size or other reason?
- Why do other farmers not receive water from the same tubewellowner? What are the major differences between farmers who do get water and farmers who do not get water? (capital, knowledge, identity, network, authority, technology, social relationships, negotiation, formal arrangement, illegality)
- What is the timeline of these arrangements? (seasonal, regular)
- If you stop farming and give the responsibility of cultivation to your son, would he also be able to get the water from the tubewellowner?
- If you would not receive water from the tubewellowner which you did expect, what do you do? Whom do you go to?
- How big is your cultivated area? Who makes the final decisions about what to grow on your land? Do you have any loans on your own land? How did you obtain this land? Are you able to sell it? Are you able to buy it? What if you stop farming, can you hand it over to your son?
- Do you have to pay taxes for your land? How has this changed over time the last 15 years?
- What are the conflict/problems you encounter concerning the decision making of your own land?

Semi-structured to (New) Najupura:

Water with focus on near-village arrangement in historical perspective & Land

- Who gets water from old Najupura?
- Why do you get (no) water from this village? (capital, knowledge, identity, network, authority, technology, social relationships, negotiation, formal arrangement, illegality)
- Have this been the same of the last fifteen years? If not, what has changed so that you can (not) get water from old?
- What should you do if you wanted to get water from old as well?
- If you stop farming and give the responsibility of cultivation to your son, would he also be able to get the water from old?
- What are the main problems/conflicts you encounter with other farmers related to land, water or agricultural production?
- If you would not receive water from old which you did expect, what do you do? Who do you go to when you have a problem with the tube well owner/water supplier?
- Who makes the final decisions about what to grow on your land? Do you have any loans on your own land? How did you obtain this land? Are you able to sell it? Are you able to buy it? What if you stop farming, can you hand it over to your son?
- Do you have to pay taxes for your land? How has this changed over time the last 15 years?
- What are the conflict/problems you encounter concerning the decision making of your own land?

Annex 3 Pilot

Pilot questions to farmer

Can you give us some descriptive information about your land?

Where is your land?

What is the type of your soil?

What do you grow on your land?

Crop Calender

A new season starts. What would we see you doing from the start of the season till the end?(analogue: process of the development of a human being, from birth, marriage till dying)

Checklist

- preparation of land
- buying of seeds (credit/loan)
- fertilizer
- sowing
- plow (technology/machinery/animals)
- irrigation
- maintenance
- harvest
- selling of products

What kind of assistance do you receive during the crop season?

Checklist

- labourers
- family/friends
- machinery
- animals (hire?)
- relief from NGOs/government/other

5. What are your sources of water?

6. Do they suffice your needs?

7. Are water shortages an issue for you?

8. What other issues, besides water issues, affect your income?

9. In the past, what can you remember of other events that affected your income?

10. Where do you sell your products?

11. Are you expenses covered by the selling of your products? How?

12. Where you able in the past to cover for your expenses?

13. Are you a member of a farmers' association? In what way do you feel supported by this?

14. What are your expenditures on average? (food, health, education, social events (e.g. marriage)

15. What is your saving pattern?

Pilot questions farmer association

Amount of members?

- nr of women

- what age

Structure & elections

What are the conditions to become a member?

What is the farmers' contribution?

What are the responsibilities of the organization?

What is the main reason for farmers to become a member?

Why do you think other farmers are not member?

What is your opinion about the non-members?

What are your experiences of being a member?

How is the association financed?

(member) Do you feel supported?

Pilot questions Panchayat

- 1) How many villagers are engaged in agricultural activity?
- 2) What are the land sizes per household?
- 3) What are the main agricultural crops?
- 4) How would you describe the quality of the soil? And what are the important water resources?
- 5) Where do the farmers sell their products?
- 6) Do you think the farmers experience difficulties in transporting crops?
- 7) What are other economic activities people are engaged in?
- 8) Where and how do people in the village acquire credit?
- 9) Are there any farmers cooperatives and/or water user associations?
- 10) What are the education and health and sanitation facilities in use?
- 11) How many people live below the poverty line?
- 12) Do you keep a village record of the number of SC's and ST's in the village?

Description Village 2: (New) Najupura

District Patan, *Taluka* Radhanpur

Interviewer: Annemiek [Sarah, Rens]

Respondent: Manubhai Amthubhai Takore, farmer

Tolk: Palav and Sadhu

Date: 18th March 2008

We asked the respondent the questions prepared for 'farmer'. And for his crop-season and land preparation and use pattern we used the crop calendar.

We arrived in Najupura and were welcome in a house of farmer. I asked him where his field is located, and he showed with his arm the direction while standing up. It is a field of one hectare (2.5 acre) and he says that he is the owner of the land. The soil is sandy and due to flooding the condition of the land is not that good. The crop he is growing is basri (**poor people's roti, but this is what Palav said**) which is cultivated right after the monsoon. Due to the rain, the soil retains water and this is used for the growing of crops. Right after the rain, he sows the land (basri and cotton). Basri needs three months to be harvested. But if a flash-flood appears, the seeds get wetted. Both basri, karpash and joar grow in this season, although karpash needs about 7-8 months after monsoon. The land where basri had grown can be cultivated again in the 'winter' since this is a short crop. Before the monsoon the land is ploughed. The farmer says that rich people will use a tractor or a plough which they own (**Palav?**), but small farmers will hire a tractor for an hour which is 250 Rs. After this, the soil

looks dry and crusty and dries up. But the dry becomes more fertile due to the rainfall. Then, he buys the seeds in Radhanpur (distance...?) if he has the money to do so, or he uses seeds from last year but these are not that good of quality. Another option is to borrow money which this farmer always does. He repays the loan from selling the harvest. Then, the farmer answers that he does not irrigate his crops at all because he has no water. The groundwater in the village is not good due to salt in addition to the decreasing level and there is no money to dig deep wells. In the village a few farmers do get some water from neighbour rich farmer friends (which is an unofficial arrangement). The alternative to this is to request from a rich farmer who has a pipeline some water in return for one-third of the crop (sharecropping arrangement in exchange for water). In such an arrangement, the farmer will sow cumin since this crop gets high rates of return. 80% of the time the business relation go like this (Palav?). Three-fourth of the well-owners provide such alternatives to water scarcity for small farmers. The sources of water are flexible (not always the small farmer get water from the same water provider).

Then, it was asked where the farmer sells his product to. He answered that he goes to Radhanpur, bears the costs of transportation himself. In this city, he knows his traders who sell the products from him. The price is fixed by the farmer himself (this is information he gets out of the paper). Then an auction follows where the traders bid for the lowest price (no agents?).

We asked whether the farmer had suffice water in relation to his water needs. He answered no, there is not enough. And he cannot buy enough (?). First, it came about that if the farmer cannot manage to have enough water, he will not go for cultivation. Later, it became clear that he would not go for the cultivation of cumin in such circumstances. Moreover, already before cultivation it is predicted what the water resources and the amount will be in the cultivating season. He gathers this information by TV, newspaper, the weather. And it results in an unpredictable cropping pattern (Palav?). This process is mainly for the cultivation of cumin. In this case, there is great awareness of having enough water. If they know they have enough they will sow cumin (Palav). Others seeds will be sown after the first rain regardless of future perspectives. They sow the seeds and cope with the situation (Palav).

Then there was some confusion due to many people talking. Sarah wanted to introduce some questions concerning what other shocks and events affecting agriculture happened in the past. He answered with help of a panch member and other farmers: the earthquake in 2001; floods the last two years in July and August; insects (melloporren); nilguys.

The answer to the question if the farmers encounter any market problems [world market effects] was quit hard to answer for the farmer as he did not really understood the question. The panch member responded by saying that the price the farmers get by selling their products is getting lower and lower due to the availability of the products (import). Yet, at the same time the shopkeepers do sell the products for a high price.

Then it was asked about the expenditures made by the farmer. He spent money to food, oil, clothing and to smoke. After some help he added medicines and childcare.

According to farmers:
The village has 130 families
45 farmers owning land
rest: agricultural labourer

classification of land size by farmers present in the shed: (not to say that such farmers are existent in this village. Contradiction with serpanch)

three big farmers who have more than 15 acre

smaller than small: less than 5 acre

small: between 5 and 17 acre

big: above 17 acre

Observations and informal conversation during the visit to his field

Big gullies due to flooding.

Check dam funded by Climate Change Fund (sewa and also one of gov)

Tree in the field. I asked who planted the tree and the farmer said that it had been there long before him.

Bed in the field. He sleeps in the field all nights because of the Nilguy. This is a crop-destroying cow-animal especially active during the night.

No fencing of his field

Cotton (normal karpash). This was sown after the flood and the seeds were still too little. According to the farmer, this was not a good harvest.

The way the farmer copes with drought is by doing labour work in a near village. (also in village itself?). The farmer has no BPL card although he is poor. He has an APL status and cannot make use of the PDS public distribution shop.

We asked if he had any children; he answered No.

One way or another we found out that he had mortgaged his land to the government for 40,000 Rs. His daughter had to marry and due to the obliged dowry the farmer had to sell his land.

He had had two oxen but they died

Interviewer: Rens [Sarah, Annemiek]

Respondent: Ramjibai Bhagawandai Desai, Panchayat Serpanch (piraat)

Tolk: Palav, Sadhu

Date: 18th March 2008

We asked the respondent the questions prepared for 'Panchayat'.

In the village, 50 people are exclusively engaged in agriculture, but the direct answer to the question was 'all'. There are 133 households.

2-4 acre belongs to 20-25 households

rest owns 4-5 acres. Not more than that.

In total there are 900 villagers

The main crops are: basri, cotton, no cumin, oil seed, arenda (grown due to lack of water)

All the soils are classified by the serpanch as sandy. He tells us that all farmers are dependent on rainfall for irrigation and have not any storage facilities. In addition, the groundwater is not suitable for cultivation. They do receive water from Sehuri, a pipeline from a village 17 km away in limited amount. The agricultural products are sold at the market in Radhanpur. And the milk is sold to the Banas Dairy Cooperation. The farmers who own land have access to a

loan cooperation scheme covering four villages. Once a year the farmers have to deposit an amount which is not fixed. The serpanch gives 7.000 Rs. **It is an official governmental mandly (cooperation) and land can be byed.** The amount of credit supplied by the loan is dependent upon the amount of land a farmer has. In the village, there are no other organizations or associations active. There are no health facilities; education is provided from 1st to 7th grade by 7 teachers and 275 scholars. About 100 households live below the poverty line. 1 household is a Tribal Scheduled Caste, the rest belong to Other Backward Castes.

Then, he leaves the interview.

Interviewer: Rens [Sarah, Annemiek]

Respondent: Arjen Mawji Takore, panch member (man die naast mij zat in de hut)

Tolk: Palav, Sadhu

Date: 18th March 2008

As the Panchayat had to leave the interview, the panch member took over the role of respondent. We continued our questions prepared for the Panchayat.

This portion of the interview mainly concerned Rens' focus of the research. He asked which other organizations are active in the village:

SEWA

Sabdelpura Sewa Sahakari Mandly, a cooperation active in three villages. 11 members represent their village in the board which is chaired by one minister. All the farmers are member of this cooperation, and they give money according to the size of their land. As return, they can get a loan with an interest rate of 14%. The cooperation provide two kinds of credit to the farmers: dirane, which is an insurance of which all farmers can make use (and do make use) during their farming practices; and a loan, only for the big farmers and who want to take the risk to invest. Both are non-mandatory, but the first is used most of the time by all the farmers. This saving registration is registered in the government, hence an official cooperation with a regular audit. (quisan credit)

The government. It provided a drinking pipeline; drainage line; road levelling; two checkdams which are broken due to heavy rain (one in '87 build by gov. one in 2004-05 build by sewa); quisan credit; PDS (there is one pds shop between two villages for those with a BPL card).

Analysis

At the day after this interview, we asked Rasid if the village really had no irrigation, since there was created some contradiction during the interview. He told us that there is no well in new Najupura. However, old Najupura does have wells and they provide to about ten farmers water to new (actually, if we had paid attention to the farmer a bit more, we would have known this). This was important information for us to know and especially for Rens to include the village in his research. In addition, several years ago more farmers from new were able to benefit from water flows from old. And so, besides our idea that the village faced malnutrition and food insecurity in relation to external shocks and events after having spoken with the farmer and observed that many villagers are quit thin, it also is benefiting more or less in a political way from water. It is supposed that water arrangements will appear in this village. For these reasons, Najupura will be included in the research. For my focus, the historical evolvment of the water relations between old and new Najupura and the recent relations with the farmers who do get water from old is increasingly interesting. This

background will be explored in more detail during my research. This historical line might go parallel with the research Sarah is focusing upon.

Furthermore, attention has to be paid to triangulation. As can be seen from this review, Palav had a huge contribution in what is said. He gives manifold his own interpretation which does not give a clear picture of what the farmer says and what he wants to say. It is quite annoying since the information should come directly from the farmer without any misunderstandings or whatsoever from a third party. And, triangulation between the villagers should take place as well. The Serpanch provides different information than the farmers do. Such contradictions are important to see and to take notice of. They might explain a lot. The interview cannot be classified as valid due to third-party intervention. It is good to take notice in the future of such interruptions into the interview, and try to avoid these as much as possible.

Research focus

Why do those who receive water from old Najupura receive water?

Why do those who do not receive not receive?

What are the arrangements between the water suppliers from old and the water receivers from new?

What is the historical background in these arrangements and the fact that some do get water and others do not? How has this changed over time?

Are there any sharecropping arrangements connected to water? (with old and new?)

What are the sharecropping arrangements not connected to water but to lack of land, lack of labour and lack of money to invest and buy?

Description Village 3: Rangpura

District Patan, *Taluka* Radhanpur

Interviewer: Annemiek [Sarah, Rens]

Respondent: Hamirbhai Ghandabhai Takore, farmer (mooie man met gouden oorbellen)

Tolk: Palav, Sadhu, Said

Date: 19th March 2008

We asked the respondent the questions prepared for 'Panchayat' due to incomplete information that the respondent actually is a farmer.

The village has 156 households, including 576 people plus 142 children. Out of this, 76 households are completely engaged in agriculture, which means that they own land themselves. The size and distribution of these lands is as follows: the smallest, from zero to 5 acre, is owned by 19 households. The category small, from 5 to 15 acre, is owned by 42 households. The rest owns bigger than 15 acre. The crops grown on these fields are basri, karpash, arenda and joar right after the monsoon. During winter cumin, wheat, rapeseed and grape is grown (later, we will see that pulses are grown as well). The soil can be categorized in three types: sandy, lampi (crusty, granulated) and black (sticky), which is a real good soil. On the sandy soil, dahl (mung beans) and mud (yellow mung) is grown. On the black soil, karpash, cumin and wheat are cultivated. And basri, joar and arenda grow mainly on the lampi soils.

For the irrigation water supply, the farmers are foremost dependent upon the rainfall during the monsoon. In addition, there are 4 bore wells for irrigation and three check dams who store rainfall water. The water closer at the depth of 150ft is too salty and so 2 bore wells have a

depth of 700ft; one is 850 ft deep and one reaches 900ft which all started at a depth of 500ft from the surface but went deeper due to decreased level. Even at a depth of 700ft there was not enough water and so they went deeper to 850 and even 900ft. For this, a submerse pump (pump in the underground) is used driven by electricity. PVC brings the pumped water to the fields. This system only provides water to 50 farmers' fields; the rest of the farmers are dependent on rainfall and the water stored at the check dams which last for four months after monsoon. "They manage" (Palav / respondent).

The farmers sell their products at the market in Radhanpur. The respondent has special ties with a special person at this market in the sense of a long term relationship (Palav). He sells all his products at this shop and mentions that other farmers have such a relation with other shops. The respondent says that farmer is the only occupation people have in this village, including farm labour in farm fields outside the village in bigger farms. Marginalized people also do labour work in the village or they go to a bigger farmer and requests a portion of his land to cultivate with a share of his production in return. (Sharecropping) For credit, the farmers have several options: relatives; loan of a bigger farmer; Radhanpur, the market; or the local cooperative society for farmers. The latter is a formal loan system from the Banas Bank in Radhanpur. The farmers themselves do not have to deposit a yearly amount; however the interest rate of a loan contains 18%. The loan with interest has to be returned before the summer crop season starts. If they don't, they have to pay an additional interest of 4 or 5%, or sell their land property. Yet the government just had waved off the official debts of farmers. Of this local cooperative society, 42 farmers, who own land, are member. It is not a mandatory membership, but only 'voluntary' when there is a need for a loan. The amount of the loan is dependent on the size of the land owned. [7 acres means a loan of 25.000 Rs] If a farmer pays back the loan in time, he gains positive credit and is able to obtain a higher loan next time.

In the village a school is situated from 1st to 6th level with 4 teachers and an official enrolment of 150 children. However, due to labour on the lands, this turns out to be the actual number of 100 children regularly. Twice a week, a nurse visits the village from the hospital of Radhanpur, who goes from household to household. This is a governmental program and free for the villagers. In severe cases the villagers can go to the hospital, however due to a lack of infrastructure and the process itself in the hospital the villagers prefer private clinics. They have to pay the high costs themselves.

107 households have a Below Poverty Line (BPL) card and access to the (Public Distribution Service) PDS shop. In addition, there is a program called India Rural Development (IRD) in which 48 households are involved. The benefits include cheap electricity connection. Loans for cattle, where there is a subsidy on the loan which means that the person only has to pay back a portion of the loan. The creation of employment by the government by constructing roads and provision of salary is another example of the program. To become member of the IRD, one has to have a BPL card. Then, the government lists all the BPL card holders and chooses the 'worst off'. After that, the Panchayat has a meeting and chooses 18 households out of this list who will gain the benefits of IRD. Severity of the households is measured when: no drainage, van, bad housing, dirt, lack of money, living in a thatch (when rain falls, the houses can flood away). Every three months the Panchayat meets; every year they choose 18 households until they have reached the number of 48 (due to governmental lack of resources, not every year the village can let 48 people benefit from the program. And so, just 18 are chosen). After three years, the government again surveys amongst the BPL card holders and selects again for the list of IRD. New people might be included. Only people without land are

included in IRD. Malnutrition and food insecurity is quite relevant for 80 households who do not have enough food. IRD also provides food for a low charge to all 48 IRD's, yet the quality of these foods is very low especially last year.

[when counting, it turns out that also landowners are BPL members. Hence, land is not sufficient to provide food and income security]

for drinking water, the village is connected to a Netherlands build pipeline from Sihura, which supplies to two more villages. The water has to travel 23km to reach the village. Every three days they have water from 6pm to 6am which the villagers collect and store in their houses. There is one stem for all villagers. For bathing, they use a well which contains salty and hard water. Clothes are washed in here as well. For irrigation, the check dams are used. They are build by the government three years ago (and broken, then repaired by DMI). If farmers want to use water from the check dam they have to pay 350Rs. to the government for the use of the check dam. (who maintains, controls, uses?).

The village does not host villagers from the SC-ST's. 154 households belong to the other backward casts; two households are from the upper caste (temple priests; migrated).

Observations

Together with Rens and the farmer we visited the bore well of 900ft. The farmer told us that it was owner by one farmer who invested in the tube together with Mesana (business corporation). The pump of the bore well was at a depth of 900ft (30m). The owner of the tube does provide water to other farmers for 1/3rd of his crop. I am not sure anymore whether the tube was owner by more farmers as well, in the sense of a farmers cooperative.

Many people were working on the harvesting of cumin at the field close to the tube. Who does this field belong to?

The farmer told us that the last time of irrigation of the respectable field was November.

Analysis

This village has been included in the research. First of all, the water supply system for irrigation out of tube wells and the fact that only 50 of the 76 farmers can use the water from these tubes tells us that specific arrangements have to exist between the farmers. It has to be found out what kind of arrangements, and based on what these 50 do have access, and the other 26 have not. Is it just because they have no capital? Or because they cannot have a sharecropping arrangement since they need the food themselves? And what about the use of the check dams where they have to pay 350 Rs. for?

As can be concluded, this village is quite relevant for my research topic. In addition, the fact that many people live BPL and are included in the IRD scheme, as well as the IRD scheme and governmental and DMI interventions make the village relevant for Sarah and Rens.

Next time, more care has to be given to the respondent's occupation. This time we were not aware of the fact that the respondent was not a Panchayat serpanch. For the villagers to be selected for my research, I have to include the tube well owners, the water receivers, and the non-water receivers. The Panchayat might clarify a bit more about the water market and in how far the formal system has something to say about the provision of water for a share of the

crop in exchange. In how far is the Panchayat involved in conflicts? Triangulation is important, since I have to hear the voices both of the better of and the not-better off.

The pilot in this village was quite good. The respondent knew a lot, although we asked the questions made up for the Panchayat. Palav was better in translating more directly the answers of the respondent and this gave a more content feeling from our side. Said did a good job as well in helping Palav now and then in the translating job.

Research focus

Why do some receive from the tube and others do not?

What are the existing arrangements in water supply? Are there differences?

Who pays for the construction and maintenance costs? Mainly because sharecropping in kind does not provide direct money. Does the tube owner sell this share at the market? Why does he not request the share in cash?

What is the amount of water the share farmers get?

Is the tube well privately owned?

What are the sharecropping arrangement (not connected to water)

Description Village 4: Antrness

District Patan, *Taluka* Santalpur

Interviewer: Sarah Drost [Rens & Annemiek]

Respondent: Ramzanbhai Jemalti Rauma, dairy manager and farmer

Tolk: Palav Paul

Date: 19th March 2008, around four o'clock

We asked the Panchayat-questions to the respondent in order to create a comparable idea of this village with the other village visited, although the man was not the Serpanch or panch member. The serpanch in the village is for 31 years in charge, and this year his son will take over this responsibility.

430 households (1700 people) are living in this village. Out of this, 200 households are engaged in agriculture which means that they own land themselves. Round 150 households are salt farmers and another 50 collect eatable gum from trees, some are blacksmith. These other activities are mainly occupied by women. Another opportunity for the villagers is to join *Bhagewi*. This is the sharecropping arrangement where a landless farmer provides labor in exchange for land. The landless has to give one-third of his yield to the landowner. I asked what are the reasons for this partnership, the farmer named three: the huge amount of land cannot be cultivated totally; there is lack of manpower at the side of the landowner; the landless has not enough money in order to invest in land and related resources necessary to cultivate crops.

In the village, a dairy cooperative is located. It collects milk from the cattle-farmers in the village and checks the fat content. The more fat, the better and so the price is higher. Twice a day, a tractor with all the milk goes to the city Radhanpur (about 40 km away, with a sandy, hilly, shocking road) where it is sold. During the monsoon, it becomes really hard to sell the products and milk to the city because of the road which is totally flooded. Food is stored for these days, still live is hard for about 15 days (although last year monsoon endured a month). The respondent himself owns 10 cattle which provide 10 to 12 liters a day. They graze on his own field (42 acres). On his field where crops are growing also, he hires labor.

The crops growing in the village are: basri, joar, mugmud, karpash, arenda, cumine, rapeseed and tal. The soils in the village are black, red and sandy. The village gets its drinking water through a pipeline from another village Sehuri. For irrigation, about 12 water wells are used which dig up to 120 ft. These wells are only used by the well-owner. The rest are dependent upon rainwater and the soil retention capacity after the monsoon. From January to monsoon, also the well-owners do not use the wells because the water level is too deep and it becomes very costly to pump the water out. The village has a credit cooperation for landowners who can get a loan. There is a school and a nurse visits the village once a week (a man and a woman).

In Antrness, 180 households belong to the Below Poverty Line classification. According to the respondent, no one is facing malnutrition nor food insecurity. Yet, many farmers do take loans in and especially after the earthquake in 2001 which changed life in the city enormously. Several ngo's have been active which enabled the villagers to build up their economic activity again.

Analysis

This village is included in the research due to the idea that malnutrition and food security do hardly play a role, and the irrigation and water management regulations and arrangements are not that relational. Furthermore, the village was quite large compared to the other villages.

Analysis Pilot

The pilot conducted was both important for selecting the proper villages as well as to test our interview skills and questions. First of all, the questions enabled the selection of the proper village since they would provide the answers out of which we gained information based on which we could make the decision. However, what has been found out is that in the first meeting with people from a village, they do not open up immediately. Time and trust and participation and cooperation are necessary in order to attain the right information. As is been shown by Najupura, we could not right away see or hear that irrigation by other means than rainfall took place. The farmer did say something about buying water from another village; however the panch-member told us that all the farmers are dependent upon rainfall and no other storage facilities are constructed in the vicinity. This case shows first of all that the gathering of information is not something easy but it takes time. Secondly, farmers are maybe not telling their story in front of many other people. Thirdly, I might have asked the wrong questions. In addition, the farmer opened up quite well when walking on his field, showing his crops and trees, feels the soil and things alike. It was amazing what more information we got during this visit to his field. It shows how important it is to have some physical attachment with the topics we ask about during the interview.

In order to continue the formulation of my interview questions, I take the previous concerns into account. I think it is really important for me to actually visit the fields, to visit the tube-wells and to see the drought and the water structures. The story of water relations will become easier when starting with the physical world.

Moreover, the method of asking questions for me is still quite a job of gathering facts and filling the existing gaps. The way this should be done is still not fully clear to me, however as Anjal Prakash already told us that such things will come when one is into the field and stays with one person for a while. People start talking about 'political' life as well. The most important thing for me to find out is what are the partnerships, relationships, arrangements concerning land and water. Maybe still the best way to do this is how they get their water and land. One problem as well is that nowadays no irrigation takes place. Most are waiting for the

monsoon, even the tube well users. I hope I can find a way to dig into history: short for Rangpura but very long for Najupura.

Annex 4 Important interviews

New Najupura

- Lakdhir Thakor (NN2)
- Kanta Sama Thakor (NN)
- Mansang Pancha Neerashrit (NN6)

Rangpura

- Mumji Sankar Thakor (R15)

Tubewell 1 Rangpura

- Savsi Mala Thakor (R2)
- Pancha Laxman Rabari (R4)
- Hamir Ganda Thakor (R10)

Tubewell 2 Rangpura

- Rukna Mohan Thakor (R5)
- Rama Deia Thakor (R8)

Tubewell 3 Rangpura

- Rama Talsi Thakor (R11)
- Govind Chehor Rabari (R14)

Santhali Pond Rangpura

- Soma Harchand Thakor (R3)
- Karsan Jeha Rabari (R13)

Checkdam Rangpura

- Kanu Amta Thakor (9)
- Wiram Talsi Thakor (R18)

New Najupura

2nd Interview New Najupura

Date: April 1st 2008

Respondent: Lakdhir Thakor

Interviewer: Annemiek Schrijver

Translator: Saiyad Nagori

Summary

The respondent is Lakdhir Thakor. He has two sons and 2 daughters. One son and one daughter are married in an exchange-marriage. And so he had no dowry to pay, according to Lakdhir. But because the other family was quite poor Lakdhir decided to give 10.000Rs. His two sons and one daughter work on the field. He owns one ox, the other he gets from his brother in exchange for fodder. He has tools and equipment to plough and seed. For tilling and ploughing the land Lakdhir hires a tractor as well, for 250Rs per hour –although this year the tractor owner decided to increase this price to 300Rs per hour. The rest, seeding and

weeding is done by the ox and a car. Lakdhir lives in a paka-house and he has a BPL card because officially he owns one acre. Lakdhir is not educated. Since his 5th he is working on the farm of his father, sleeping there to keep the wild animals away from the crops. He saves a lot of money by farming and labor work as well. He is really proud of his own labor which he uses completely, because that is what he has and will always have. During droughts (1987, 1988, 1989) he worked in specific government programs. In addition, he saved from his agricultural crops and by doing so he was able to pay the mortgage price for his second land. If the official landowner wants to get back his land he will get the money and mortgage another piece of land. Furthermore, Lakdhir receives some financial help from one son. Both are working in Radhanpur at the hotel. One son is not giving to Lakdhir because he has his own family to take care of.

Lakdhir is farming on two fields. One field sized one acre defined by Lakdhir as really good quality and another field sized one hectare defined as good quality. The field of one acre is fully owned by Lakdhir himself, the other he took on mortgage from the landowner for a price of 50,000Rs. Lakdhir decided to cultivate this land himself. On this field, he receives help from both family and other hired laborers. They get the payment of 50Rs a day plus lunch and two times tea. In addition, Lakdhir is willing to pay for the smoking habit. In this case, Mana who is Lakdhir's uncle smokes and Lakdhir provides for this. Lakdhir prefers laborers he knows from the village, but the labor provided is not regular and not by the same persons. If there is no labor in the village he will go to another village and search for laborers. This is done by going to their houses and asks if they want to work for him the next few days.

The land mortgaged by Lakdhir is not irrigated. Lakdhir agreed with the mortgage arrangement for about five to ten years now. This arrangement will be valid until the official land owner wants the land back. In this case, Lakdhir has to pay back the mortgage price. The tax for the land upon which Lakdhir took a mortgage is being paid by the official landowner, but Lakdhir pays this amount to the landowner. The amount of tax is dependent upon the size of the land.

Lakdhir's field of one acre does get irrigated through a pipeline coming from three kilometers away. The last time irrigation was November 2007. The owners are two Patel brothers from Old Najupura, Amba and Nita. They have a well driven by an engine in the Banas river. This water is used by farmers both from Old and New Najupura. Nearby Lakdhir's farm is the inlet from the pipeline to his field located. Out of this inlet, about ten farmers get the water. Four of them are his brothers who have their field bordered with that of Lakdhir. He gets three turns of water (amount dependent upon crop; too much is not good for crop) on demand, which means that if the farmer wants a turn, he has to go to the pipeline owner and he will provide the water. The irrigation only takes place during winter season as the groundwater level has dropped in that period. Lakdhir feels very sure of getting water. He gets water from this pipeline since two years now because (according to Lakdhir) there was not enough rain to provide for a good crop. Lakdhir says that he has no specific relation with the Patel brothers. He gets water from the Patels because they have good water and he wants to get a good crop. Patel asked him if he wanted to have water and Lakdhir said yes, because the Patels have enough water. According to Lakdhir, they provided the last two years enough water as well, so he feels secure about getting water. Since the Patels have enough water, they can make use of it. They want to use it all and so they asked several farmers if they want water in exchange for 1/3rd of the produce. This arrangement is not signed in any contract but orally agreed upon. Issues discussed with the water provider are: the type of crop on the land; the amount of seeds; which time and amount of water needed. These topics are discussed with the water provider

and Lakdhir. Up to now, Lakdhir did not encounter any problems in water provision. Sometimes there are problems with the water provider and other farmers. In these cases, the water will not be provided. However, they will be solved in a group together with other farmers. The arrangement of Lakdhir's access to water is not classified as part of the baghwi-system.

According to Lakdhir, if water is not sufficient from the pipeline or the monsoon period, some farmers will dig a well in their farmland by making deep holes so the water will seep through. However, this is salty water.

The mortgage is also orally arranged. Up to now, Lakdhir did not face any problems with these agreements. I asked whether his son, after heritage, would also be able to get water from this arrangement Lakdhir confirmed.

Analysis

- It turns out that it is important to have land close by Old Najupura in order to get water from the Banas river. For this shorter distance, the pipeline construction is less costly; (Lakdhir's field is situated between Old and New Najupura)
- Regardless of how much water Lakdhir will ask for his crop, he has to pay a 1/3rd share to the water provider
- The mortgage Lakdhir has with the official landowner is based on an oral agreement. This means that the official activities such as paying land tax still has to be done by the official landowner as well. It also means that he is able to receive a BPL card because officially he only owns one acre of land
- Labor is also provided on a basis of oral agreements. For this, Lakdhir has his preferences for some people but if they are not available he will go search further.
- Lakdhir felt secure of getting his water from the Patel brothers in the amount he wanted
- Lakdhir feels secure of getting the coming years water from this pipeline as well
- Lakdhir feels secure of getting back his money of his mortgaged land when the official landowner wants to by saying that if the agreement stops, he will mortgage another land
- The daily salary for laborers is the same: 50Rs.

4th Interview New Najupura

Date: April 3rd 2008

Respondent: Kanta Sama Thakor (wife); Sama Ramzi Thakor (husband); Ramzi Thakor (father)

Interviewer: Annemiek Schrijver

Translator: Ramdhir P Thakor

Summary

The family interviewed lives in the wada in a paka-house. The household contains six persons, four children and husband and wife. They have two sons and two daughters, of which both daughters are married in an exchange-marriage. The daughters live in the household according to the tradition of *ana*, where the daughters both live alternately in the house of their husbands as well as in their own parent's house, in turns of about five days depending upon the circumstances of holy days and other activities. This is a tradition as the lady cannot stay continuously at her husband's house. After the daughters have given birth they will stay

at the husband's house. In the exchange marriage, no money matters occurred as the family gave two daughters and in time they will receive two daughters for their sons. Nowadays both sons are going to school: one in 8th standard and the other in 7th standard. The two daughters completed respectively 7th and 3rd standard.

The family is working on a two hectare land, owned by the father of Sama, Ramzi. Sama has three other brothers also working on this land. They do not live together. The soil of the land is sandy. This year they are growing cotton and kester on the field, which is not irrigated. When father expires, the Kanta said that she might receive 1 acre (Ramzi was sitting behind her). From the field, each brother and father receives 1/5th share of the crop. Ramzi is the main decision-maker concerning the land. The field is located nearby Lakhdir's field and is not irrigated because there is no water reaching this area. A long time ago the field had been irrigated for one year. Gogal Patel committed Ramzi if they wanted water and after that Patel constructed the pipeline. I asked whether if they would have said no, would the pipeline make another route. They said yes.

The inlet of the water from the pipeline was on the bank of their field. More farmers received water from this same inlet. Ramzi irrigated cumin at the time. In that season, they received three turns of water for which they had to pay 1/3rd of their crop produce. They told me that there was enough water to irrigate three times. What if the water supply would not be enough, they answered that the cumin will not grow to a full crop. In addition, even though you take only a little bit of the water they would still have to give 1/3rd of the crop.

No other underground pipeline reached their field than the one of Patel. Yet in the village there were more underground pipelines constructed by other tubewell owners. The family has a special relationship with Patel. For the construction of the pipeline, Patel asked them as one of the first. Furthermore he requested the opinion of the family about other farmers. This due to the fact that Patel wanted to know more about the farmers before he would go into an arrangement with them. 'Because not all farmers are the same': some don't work hard; some are not reliable; some are not treating others with respect; and some are not able to invest in neither their field nor the share. Patel avoided these people and by doing so he listened to what the family had told him. He had asked other farmers to their opinion as well. The reliable persons were asked first for receiving water from Patel. When I asked if caste also played a role in Patel's decision making, they said no because Patel's income had to be derived from this pipeline. It was an individual investment mainly based on business. Yet, due to a drought that year the water became salty. The deep water which seeped through was salty and there was not enough water due to scarce rain in the monsoon.

The last three years they have had enough rain for their crops. The pipeline is still in the ground but not in use. Or actually, only partly in use. The beginning of the pipeline nearby the river is still in use. Here, the farm of Patel is located and he irrigates only his own field. He is not giving water to any other farmer because there is not sufficient. The other farmers have no other source of receiving water than the rain during the monsoon, and the recharged groundwater level at that time. And so, this family is also working on Patel's farm: Kanta, Sama and their sons and daughters in the baghwi-system. They receive 1/5th of the produce in cash; Patel gets 4/5th. Patel pays for the primary inputs as seeds, water, fertilizer and machinery. Only labor is provided by Sama and Kanta. They are working on Patel's field for about ten to fifteen years already, but they will never get a part of his land. During the monsoon period, Sama and Kanta receive 1/4th of the share. Five years ago they received a 1/3rd share. However, due to increases in expenses from Patel's side such as a tractor, diesel,

fertilizers and pesticides, the share to Sama and Kanta became less. Patel's farm is three hectares, cultivating cotton and kester and they are the only family working on the field. Patel's farm is sandy but they use a lot of fertilizer and manure. Kanta and Sama did not sign a contract, but the arrangement is orally agreed upon. They do the job, and when they are finished they can go home. There is no pressure from Patel on them. Patel will only commit somebody else to work on his field if Sawa is not willing to work there anymore. Patel decides what to grow because he is the owner of the field. The 1/5th share is not sufficient but he cannot go somewhere else. This arrangement is their only source of income. In drought periods, they have to do labor work. Sama and Kanta are not into labor work regularly because Patel provides other facilities as well, such as loans in grain or in money. This loan will be subtracted from his share at the end of the season. By being in this partnership with Patel they feel secure of having a job and the ability to take a loan.

Analysis

- Access to land and water via baghwi
- Access to good crop via baghwi
- Baghwi also in monsoon period: higher share
- Low share compared to rest of baghwi
- Even lower share due to increased expenses
- Access to baghwi via social relation
- Location important for having access to water
- Trust: mutual. Land tiller is given responsibility of the land and cultivation; land tiller feels secure of having a job in the future as well. The arrangement will stop when the tiller does not want to work anymore
- Farming mainly in monsoon period
- If drought occurs, labor work
- Access to loan via baghwi
- No payment in primary expenses

6th Interview New Najupura

Date: April 4th 2008

Respondent: Mansang Pancha Nirasrit

Interviewer: Annemiek Schrijver

Translator: Saiyad Nagori

Summary

The household of which Mansang is the head contains seven persons: Mansang, his wife, his father and two daughters and two sons who all go to school. Mansang, his wife and his father are illiterate. They own one ox in order to help farming but nowadays it is still too young. They have a buffalo for milk. They do the farming by hiring a tractor or oxes. Mansang is not a member of the farmer cooperation. If the farming work of the monsoon and winter season they will go for labour somewhere else: charcoal and digging for pipelines. Then, the father watches the children and cooks the food. Sometimes they borrow money from relatives, but now they have no debt at all. They have a cow-baby. The mother is sick and replaced to Godana, another village where sick and unwanted cows are gathered. Mansang sometimes hires in labour for cutting and sowing, whenever necessary.

Mansang is farming on the field of his father. This father inherited this land from his father, who received it from the Indian government as they were refugees from the Pakistan partition.

This land once was bigger, but due to inheritance after inheritance, little pieces are left over. His father is not working here anymore, and is part of Mansang's household. The land is 1.5 hectares and still on father's name. When he expires the land will be equally divided between Mansang and his two other brothers. The father does not like to divide the land unequally. The land will be officially transferred to the eldest son, which is Mansang. When the brothers inherit a part of the land they might be willing to work the land themselves. But if they don't like to work on the field they will give the land to Mansang and let him work on it. Nowadays, Mansang and his wife are working on the field. Mansang's brothers live outside the village, and they only work on the field when they visit the village. This is not regular but whenever they like to come. Sometimes Mansang provides a part of the crops to his brothers, and sometimes Mansang receives some remittances from his brothers. Both are active in labour work because 1.5 hectares is not enough to provide food for the three families. One of his brothers is disabled as well as his wife. Still, he is occupied with labour work.

The land is not irrigated nowadays and it has never been. If there is enough rain they will start cultivate a crop which can grow without irrigation. If there is not enough rain during the monsoon, he won't sow seeds but go for labour work somewhere else. Mansang grows a crop once a year in the monsoon season. For this land, Mansang pays for the primary inputs and the land tax. Although the land is on the name of the father, this is not a problem because they are living together.

In addition to farming this family field, Mansang is working on two other farms. One in Old Najupura, 1km further; and one in Kamalpura, 5km further from his house. Both farms are irrigated and he agreed upon the baghwi-arrangement. The owner of the land in Old Najupura is Mada Desai. The farm is one hectare and in the field there is a well with a depth of 20ft which provides for the irrigation water. The water is pumped up by an engine running on diesel. In the winter season Mansang works here because in the summer Desai is providing for the labour himself. This year Desai choose to grow wheat on his farm which gets irrigated five times a season. Mansang and his wife provide for the labour and they receive a share of 1/3rd for this of the produce in crop. The primary expenses are shared between Desai and Mansang, fifty-fifty. This is the first year Mansang is working on Desai's land, after he asked Mansang to do labour work on his field. They know each other from the village and Mansang explains that he has no special relation with him. 'He is from another caste' (so, no family). Mansang is not sure if he will work on the farm of Desai next year. Maybe. If Mansang is free, he wants to do it. But it depends on what Desai want.

The farm in Kamalpura is owned by Sunda Nirasrit. It's size is 0.5 hectares and irrigated. Cumin is cultivated which is irrigated four times in a season. Here as well, Mansang works only in the winter season because in monsoon season Sunda will work himself on the land. This is the first season Mansang is working with Sunda. His share is 1/3rd and the primary expenses are shared as well, fifty-fifty. Sunda asked Mansang to work on his field and Mansang took the opportunity. Sunda is a relative. Before this year, Mansang was occupied during winter season with labour work in another place. He said for labour we go outside the village with the children and wife and this is not very easy. Now as they work in the village the children and wife can stay at home and he does the work on the farm. In addition, wheat (irrigated crop) is a necessity for the household (rotli). Sunda also pays Mansang in kind, of which he stores somewhat. The rest he sells in Radhanpur. In this farm Mansang is also not sure if he will work on the field next year, mainly because some land is salty and this will not give enough produce. So, Mansang himself will decide not to do this anymore.

After the question what he thinks about baghwi he said, if I would have irrigation facilities myself I would like to irrigate my own crop on my own field. For now, this is good enough. He has no facilities because the groundwater is salty. Last year he checked by making holes, but the water was salty. His father already told him. But it was just to be sure, because it can be that the water is sweet. In both baghwi cases, the landowner pays the land taxes. Mansang did not sign any contract; both are agreed upon orally. Mansang cannot/did not take a loan from Sunda nor Desai. I asked whether Mansang was in the possibility to buy land, he said no. This is their livelihood, it is based on land. And buy more land they also cannot due to shortage of money. In general it is possible to gain more land, by buying and mortgaging. Both are required a stamp from Radhanpur. I asked what he would do if he could make changes to his farm to make things better, he answered that no changes are necessary. Later, maybe some machinery and tools would be welcome. Furthermore, sometimes Mansang encounters the problem of not being able to pay the labourers because he has not enough money after selling the product at the market.

Analysis

- baghwi because more easy with family situation
- two baghwi cases: hardworking man
- all children to school
- one baghwi not secure due to 1st year: dependent upon what landowner wants
- one baghwi not secure (also 1st year): land is salty and the farmer does not want to work on salty land because it will provide less crops
- share in primary expenses

Rangpura

15th Interview Rangpura

Date: May 13th, 2008

Respondent: Mumji Sankar Thakor

Interviewer: Annemiek Schrijver

Translator: Randhirbhai P. Thakor

Mumji has 4 hectares, inherited from his father. He has another 12 hectares, taken under mortgage from 6 other farmers. His father had 10 hectares in total. The 4 hectares, separated in 1.5 and 2.5 lands, are goradu and qualified by Mumji as good. On the mortgage land, the official landowner does the labour. They share 50-50 in expenses and in harvest as well. On his own land Mumji is working himself.

The mortgaged lands are alternately irrigated as well (depending on crop and amount of rainfall), from Santhali pond, from Rama Deia and from Rama Talsi. The farmers sometimes only give half of their land for irrigation, when the water is not sufficient in the tubewell for example. The tubewell owner tell the farmers that they can only irrigate half because by this the tubewell owner can include more farmers for irrigation. Plus, the farmers can do better on a smaller plot concerning their inputs of labour, expenses and water. Yet, 1 hectare is the minimum for a farmer to earn something out of it as well (cumin). Still, 1 hectare will give better results than 2 hectares of cumin grown. (input-output ratio)

I asked who will make the arrangement with the water supplier. Muji says that this depends upon the landowner. Sometimes the owner will do it, sometimes Mumji has to do it. This when the landowner himself cannot make the arrangement himself. Type of social tradition, to

mature these farmers. The water supplier has to trust that the landowner is capable of hard work, expenses, instruments, speed and timing of the work. But one thing is that the tubewell owners and water suppliers have trust in Mumji. So they are eager to give to these fields Mumji took on mortgage because the water suppliers know that Mumji is the other 'landowner' and will do the expenses correctly. These lands will be treated good. In such a situation, the landowner and the water supplier will make the arrangement together as well, when the trust is already established. In special cases, when there is a new landowner and Mumji has no full trust in him, then Mumji will go to the water supplier and make the arrangement. Yet these are rare cases (maybe when the landowner migrated and took a land labourer).

The mortgage situations are made official by means of legal stamp paper. This is not registered at the Register Office (this only happens in selling and buying land). He has mortgaged one land of Rama Deia. The total price of all the mortgaged land is 5 lacks Rs. This money he gathered from earning from his own crop, he has a tractor (hiring), shop in the village. He has a good economic situation. The mortgage will be stopped when the official landowner pays back the sum, there is no official time limit. It can only happen after the season has finished. And the two parties have to agree. Mumji pays the land taxes of the mortgaged lands. The original landowner gets the bill for the land tax, but Mumji gives the money to the land owner so he can pay the tax. In heritage he will divide his own lands to his son. The mortgage-lands will be divided to his sons as well. This will not be official. If the mortgaged land is irrigated, his share is not 50-50. First, $1/3^{\text{rd}}$ is given to the water supplier. Then, out of $2/3^{\text{rd}}$ the expenses are shared between the landowner and Mumji. The rest which is left over is divided in half and shared between Mumji and the landowner. Mumji wants to pay on forehand for the primary expenses because if you do good expenses in the beginning, the earnings will become good.

Mumji irrigates his own land as well. This year 1 hectare, cumin. The water comes from the tubewell of Rama Talsi. Mumji asked Rama Talsi for this. A kundi and the pipeline enter his field. The tubewell is next to his farm. He receives water from this tubewell since the bore exists. When Mumji needs water, he can get. He always got three turns during the season. He can even get water for wheat and rajkot in the summer season. Mumji feels secure of getting water and three times from this water source. He cannot demand 'give me' and then get, receiving water for him as well depends on the preparing of the field. The ranking of the farmers occurs according to the timing of this preparation. Usually Mumji is free from any tension because his field is near the tubewell and he has a good relation with Rama Talsi. He feels secure that in the future as well he will receive water from Rama Talsi. Will his sons be secure from this source as well, Mumji answers that this will not be because Mumji is their father but only if they will work hard themselves as well.

He also received water from the Santhali pond. Yet, he only received two turns, the third he got water from Rama Deia's bore. This because the water in the pond was empty. It was the same for all the farmers.

Mumji has 5 buffaloes and a bike. He has 5 daughters who did not go to school and two sons who did go to school. They help him on his land. Mumji went to 4th standard. He has a tractor hired out for 300Rs/hour. The tractor had cost 3 lack Rs, for which he took a loan from the State Bank of India, three years ago. He did not fully paid back yet. Every year he buys for 60.000Rs fertilizer to supply to all the fields. 30.00Rs for running his tractor and 5 barrel diesel is consumed. All during winter season. Mumji tells us that his situation is the fruits of

effort. He is saving money to invest, he is working hard so he get earnings. Furthermore, he is saving in assets, land and technology out of which he can earn again.

Analysis

- knowledge, capability, effort, network, intelligence, timing, hard working, earning, investing, saving.
- It turns out that it is important that Mumji is the person who took land under mortgage for irrigation of the land. Because the water supplier knows that the expenses and inputs and labour made on the land will be good because Mumji will provide for this in a very good sense. As a result, the tubewell owners are eager to provide for water. When there is less trust between the official landowner and the water supplier (or Mumji has less trust in them) at that time Mumji will make the arrangement for water. This will make a difference because now the water supplier knows that he is the one who supplies for the primary expenses. In some cases as well when there is a new land labourer Mumji will make the arrangement because the water supplier does not know the new one yet. Still, these are rare cases.

Tubewell 1 Rangpura

2nd Interview Rangpura

Date: April 16th 2008

Respondent: Savsi Mala Thakor and Rama Savsi Thakor

Interviewer: Annemiek Schrijver

Translator: Saiyad Nagori

The respondent Rama (son of Savsi) has three children, two sons and one daughter. They all attend school. Rama himself did not attend school but he can read everything. He lives in a house together with his wife, children and parents. He is the second brother. First the eldest brother also lived within this household, however he left to the village and took the roof of the house with him. And so the house has no roof which makes it seem to be collapsed. Rama has two hectares of land, as have his three other brothers. This land is all listed on their own name, given to them by their father. Father is 95 years old and got the land from the Nawab 80 years ago. The Nawab gave it to him. They own one buffalo who gives milk for the household.

In their homegarden a tubewell is located. This tubewell is constructed after three trials and errors: the holes were bored but the water was not reached. The fourth time they did reach the water and the tubewell got constructed in 2001. The tube is 740ft deep and runs on electricity. The electricity bill during winter season is to about 5000Rs a month. This is a price per unit of electricity (farmer does not know more). The expenses of construction of the tubewell were about 10 to 15 lacks. The actual owner of the tubewell is the father, Savsi Mala Thakor. Yet he made an arrangement with Patel from Mesana. Patel entered as partner after the first failed trial. He had heard of Patel who was also in an arrangement with a tube-owner in another village and so Savsi asked him. Patel is the owner of a motor company and he is a rich person. If there is a problem with the tube or engine, Patel can provide everything. This is the reason why they asked Patel to enter the partnership. A relative told them about Patel having the partnership in the other village. Patel and Savsi shared 50-50 in expenses and now they share 50-50 in profit.

Nowadays they have eight hours of electricity each day; one week during the day and the other week during the night. This is a government rule to each tubewell-owner (electricity board). The father, Savsi, that the electricity is really expensive. The season when a lot of water is requested runs from November till March. Then they use the full eight hours to pump the water out. But actually they need twelve hours in order to provide water to more farmers. But this is not possible because they are restricted to do so. Before 2002, eighteen hours of electricity was provided in three phase (high voltage). This endured for about two years, when it was reduced to twelve hours and after a while even eight hours. When I asked why this rule was introduced, they told me it is the government. They do not know why the government implemented such a rule. They did blame the transfer of electricity from the government to a private company in 2005. Since then, the hours of electricity became less.

The tube-owner provides water to about seventeen-eighteen hectares, due to the eight-hours scheme. If they would have had twelve hours electricity provision they can provide water to twenty hectares for irrigation. The beneficiaries of the seventeen-eighteen hectares are ten farmers. These ten farmers have their lands nearby the tubewell. Outside the covered area of this tubewell there is another tubewell who provides water to those farms located nearby.

The last years, they have given water to the same farmers. They add that due to insufficient water they give water to these ten nearby farmers, otherwise they would have given to all farmers. Before the farmers sow their seeds an oral agreement is made with the tube-owner and the farmer. If the tube-owner agrees to provide the water in exchange for a 1/3rd share in the crop produce they will sow the good seeds for the winter crop. Many more farmers come to ask for water, which they cannot provide. The irrigation turns given for cumin are four; for wheat six-seven; rapeseed four and kester seven.

The water is of good quality for irrigation and drinking. Sometimes when the water did not come from the Sihuri pipeline people from the village came to his tubewell and asked for water. The tubewell-owner had not encountered any problems with the agreement, in the sense that they have always provided enough water. Sometimes it did happen, about 4-5 times every season, that the engine fell down into the tube. And so 2-3 days the tubewell was shut down. But due to quick reparation they could still provide for the water, although with delay. The share they get is always 1/3rd even though the harvest of the specific farmer might be damaged. Sometimes this happens, which is not good for them but they will still provide water to this farmer the next year. They know that this system brings profits and damage. It's real agriculture. They still do this because they have neither facilities nor capabilities to do otherwise.

Before the winter season starts, the farmers visit the tube-owner and request water for irrigation. The owner makes a list and ranks the farmers according to the moment when the farmer came: he who comes first will be on the list for sure, independent of crop. Although the tubewell-owner prefers to give water to mainly cumin and wheat, as they are cash crops, the system of 'who enters first' makes sure that those who have sown rapeseed and kester are able to receive water as well. Furthermore, irrigation will take place according to the ranking list, except when a farmer requests for his turn at a later moment. The opposite is not possible, to request your water ahead of your turn as written on the list. At the first time of irrigation, the tube-owner goes to the farmer and asks whether they want their turn. He provides them water in the same 'line' as the ranking made on beforehand. First, due to growing season of rapeseed and kester, their turns will be given ahead of cumin and wheat. However, a farmer

cannot get water earlier than written down on the list, only when another farm wants his turn at a later moment. Then, they can change in number.

At the time of listing the requesting farmers, the tubewell-owner sees whether he has reached his limit by accounting the size of land and the type of crop to be irrigated. Based on this it is decided whether the tubewell can supply water to more farmers. Big farms get irrigation water supply of 30-40 hours; small farms are finished after 8 hours.

During the water supply from the tubewell to the farmland, the tubewell-owner visits the irrigated land to check the water and if the farmer used the water properly or not. If the farmer wastes the water, he will get a notice and be punished by not giving him water the next year. Waste can take place in the night when the farmer receives his turn of irrigation but falls asleep. The water reaches out of the network of canals and gets spilled. This has not occurred yet because every time the owner goes to the farm and follows the water. He never had to punish a farmer, because he keeps watch.

The water reaches the farmlands by means of transportation through an underground pipeline of cement, 3ft deep. The water flows from the tank near the tubewell through the pipeline and reaches a nearby kundi in order to check whether the water flows. There are about eleven kundi's in the field. Two to three farmers can use one kundi. This kundi can be opened and blocked. During the irrigation turn, the tubewell-owner asks the farmer to block the kundi again when the water supply is enough on his field.

Analysis

- father invested: rich man who had 15 hectares
- partnership with Patel. Rich man plus company in motors
- told about Patel by relative
- type of crop important for irrigation
- punishment system for wasting water
- system for who comes first, gets water
- location important in having access to water from the tube
- no failure in giving water
- even when crop-failure of the farmer, they still demand their 1/3rd
- restricted electricity, do not know why this is
- story that they are 'poor' and have a hard time

Second interview Savsi Mala Thakor

9th May 2008

Randhirbhai P Thakor

The first tubewell constructed was 25-26 years ago and had run for 10 years. For this Savsi took a loan from the Bank of Baroda. The second tubewell, for which he took a loan from the cooperative bank, run for one year only. These both tubewells were fully owned by Savsi as he took the loan himself and paid back himself. Then, two years there was no bore until the third got constructed, which had run for 5 years. The fourth is already running for 4 years and still running. The two latter are both constructed in partnership with Naranbhai Patel from Mesana. The fourth is even in full ownership of Patel.

The share Savsi receives for the tubewell nowadays is a yearly salary of 25,000Rs. For this, they have to start the engine, to distribute the water and decide which farmers will receive

water. They are responsible for the full management of the tubewell. Patel pays the electricity bill and receives the full 1/3rd share of the farmers. Furthermore, Savsi gave all his 2.5 hectares land under mortgage to the same Patel for the construction of both the third and the fourth tubewell. The third tubewell was 4 lack Rs and Savsi had to pay 2 lack of this. As he already paid a part, he gave his land under mortgage to fulfil the 2 lack. At the time, Naranbhai was not the full owner of this tubewell. The arrangement was 50-50 in expenses. The costs of the fourth rose up to 3 lack Rs. Savsi mentions that last year he had to give 2/3rd of the crop from his mortgaged land to Naranbhai, 1/3rd for his water and 1/3rd for his land. 1/3rd he could keep himself. Naranbhai already 'offered' Savsi to pay him off, so that Savsi is the owner because Naranbhai does not want to be the owner anymore. However, for this Savsi has to give 6 lack Rs.

Savsi managed to pay back the previous loans of the first and second tubewells out of the 1/3rd share he received and his own land earnings. In addition he had constructed at the time four other tubewells in other villages and here he earned a share as well although nowadays they are not running anymore. These were made in partnership with Naran as well, providing 25% income to Naran and 75% to Savsi according to the balance of investment.

Rama Savsi, the son of Savsi Mala, will inherit all. He is the main responsible person nowadays for running the tubewell and working on the land. all property will come in Rama's account. Rama and his brothers already were given a three hectares share of the land. Rama is trying to pay off the partnership with Naran. For the arrangement of 6 lack Rs he has to sell his own land (the other three hectares) or to make a new partnership. Actually, Savsi tells us, Naran did not want to invest in the construction of a fourth bore. Yet Savsi compressed him to do so because there were already so many investments available. The electricity, the underground pipeline. He thought that it could better be used by a fourth tubewell. Savsi told Naran that he would pay him back in one year. But last three years he was not able to pay back. 17.000Rs expenses came in between due to sickness of Savsi himself. Now this year, Savsi and Rama will make an arrangement and handle this. If they are not able this year, then they will pay next year. I asked whether the other sons are helping, but Savsi replies that they are not involved in any way. They already got their share of 3 hectare. Naran is paying the electricity bill and getting the full 1/3rd share. He comes to visit sometimes, 2-3 times a winter season, and only if he is called.

This tubewell does not make use of PVC pipeline, all underground pipelines are made and constructed, there is no use of PVC. The ranking of the farmers is based on the timing of the farmers' soil preparation. First, the tubewell owner sets a target, 8 hectares. Then, he who prepares first can get the water first. The farmers are selected by the tubewell owner himself. The underground pipeline is running all around so they can supply to these farmers. They have two pipelines as well, so they can supply water to two farmers at the same time. Yet, this depends upon the amount of electricity provided (in hours) by the electricity board. With these two pipelines he can both provide in timing of preparation as well as in line of location (nearest first). Due to insufficient water and hours of electricity provision Savsi has to tell farmers to limit the amount of land to be irrigated, in order to include more farmers. Sometimes is occurred that a farmer could not receive water for the third turn. This happened only when the tubewell suffered from technical or electrical problems. Then there was a little water crisis and he had to fix the tubewell as quick as possible.

I asked whether Savsi still likes to give water to the same land if the landowner changes or gives the land to a labourer. Savsi replied that when a land labourer comes to Savsi to ask for

irrigation he tells them that if he prepares his land early he will get water. So, there is no question about who is the owner of who is the labourer or the change in this. Every newcomer has to work good and be reliable. He has to do hard work. Furthermore, the landowner also will force the labourer to work hard for his profit, so he has to. Also when Savsi knows the landowner but the labourer changes he will give water. If it turns out that the labourer is not good, Savsi will tell the landowner to change the labourer for the next season.

To give water, the tubewell owner is for 90% interested to give for cumin. Furthermore, location is important as well as the timing and the type of soil preparation. Total pipeline is already in the fields, so mostly fixed lands can receive water. There is not possibility of change in this. Savsi adds that he is not responsible for the crops of the farmers.

Next I inquire about conflicting and problem situations. Savsi tells he takes no action against people who waste water. He is just disappointed. Every year, 2-3 persons like wasting water happen. It will not change. He will give hints to them and patrolling them during irrigation. But always there will be 2-3 people like this. He does not punish them by not giving water the next season. Yet, if not enough and no good crop will come from their field this season, then he will refuse to give water next season. And, a not hard worker will not get water anymore next season.

The family has a house in the village as well where they live alternately. Rama lives permanently near the tubewell. The tubewell is constructed at this location because here was the land owned by Savsi. Savsi is the official owner of the electricity connection. Savsi was member so he could take the loan of the cooperative bank.

Analysis

- brothers not helping and not involving
- no PVC: means, more fixed people can use water.
- Tubewell owner deadlocked
- 'because of the tubewell he became rich, and because of the tubewell he became poor'
- 4th tubewell because the property was there and he wanted to make use of it.
- Reshmben: the 4 other tubewells in other villages were in partnership with his brother-relatives' land. Because he earned a lot of money with his first two tubewells. But brothers and relatives were not reliable: they did not good behaviour and he lost trust in them. They did not pay back to Savsi, they did not give him a regular part of the share either. Day by day he lost money. Relatives took profit from his good intention but they were unfaithful. They have not recovered anything.

4th Interview Rangpura

Date: April 17th 2008

Respondent: Pancha Laxman Rabari

Interviewer: Annemiek Schrijver

Translator: Randhir P Thakor

Farmer is doing two baghwi's for the next year. Both for the first time. One with his father and the other with his uncle. For both they have arranged a special partnership.

From his uncle he received one hectare for cultivation. All the expenses Pancha has to bear himself. After harvesting, he has to give 1/2nd of the produce to his uncle, of which the seed-expenses will be deducted. And so, they share 50-50 in seed expenses only. His uncle decided what to grow on the field.

This field was irrigated but not anymore because the underground pipeline was broken. The tubewell-owner is Rama Talsi Thakor. The share was 1/3rd. In the future, the pipeline will be repaired by the tube-owner. The beneficiary farmers tell Rama: if you want your share then repair. Otherwise he will not get his share. Rama has not decided anything yet about reparation. If he completes his target concerning income without reparation he will not repair. But if he needs more share for income, he will repair the pipeline. In the arrangement, if Pancha wants water he has to make the arrangement himself with the tubewell-owner. He is not yet going to make an arrangement with the tube-owner. He will wait until monsoon and if there is enough rain. Only after this monsoon season he will decide if he needs irrigation.

Security for uncles field: this season he will work on his field. Then he will see if they both liked it. If so, then the arrangement will continue for a longer time. Otherwise, they refuse. It is dependent on both sides.

The special partnership is made after they have heard of it by others who had such a partnership before.

The partnership on the other land is with the land of his father, also one hectare. His father had two hectares before but one hectare was cut due to the construction of the Narmada canal. The arrangement is the same as with his uncle. Father decides what crop to grow on the field. This land will be irrigated if Savsi Mala has enough water in his tubewell. If he feels secure of this source, he answers that this depends on Savsi and the near lands: if Savsi can irrigate the nearer lands, he will not go far with the water. If no farmers nearby want irrigation, then Savsi will go further. The transport to this field is by means of an underground pipeline, kundi and dahlia. There is one field between the kundi and this field. I asked whether he thinks that he can work the coming years on the field Pancha (eldest son) answered that this also depends on both him and his father. If they like, they will continue. This is the first time he will do baghwi on his fathers land.

For the coming season he had to purchase all the agricultural machinery himself: the lands will be on his own responsibility. He will work on the fields in both seasons if rain is good (monsoon season) and if he receives irrigation water (winter season).

Pancha has only done baghwi before to get income in another village. He has worked on a two hectare and 1.5 hectare owned by his uncle. His uncle offered him this opportunity. The first chance was for Pancha. His uncle decided to give a first offer for partnership to a family member. The land is not irrigated and Pancha received a 1/5th share of the crop produce in cumin. He has worked this land in both seasons, but the monsoon season had failed. He did not have to share in the primary expenses. The land of this uncle he has worked on before is irrigated land of 1.5 hectares. But due to insufficient water from the tubewell of Savsi Mala there was no wintercrop this year. There is a kundi but there are many fields in between. Yet Pancha did not experience irrigation on this field because he only worked for one year on this field, and the water was not enough. Savsi did provide water to some farmers but not enough

for all. He and his uncle are not angry at him. Savsi is the owner, the water supply depends on him. If he likes, then he gives. His share was 1/5th of the crop produce.

Both these baghwi's with the same landowner stopped due to the fact that Pancha wanted to live in his village again where he was offered baghwi with his father and uncle. In addition, the landowner wanted to work this field on his own now.

Pancha prefers baghwi above labour work because if he goes for labour work the income comes daily and he cannot save. With a partnership, the whole stock comes at once. So he can save, and he can show his family that this is what he has worked for. He wants to save for marriage and other purchases necessary. Furthermore in the past, the labour work charge was low. Baghwi was a better source of income. Yet nowadays the labour charge increases. Still he prefers baghwi.

When he will receive land from his father it will be on the name of all his four brothers. They have to go to the government to get the land on your own name: 'Revenue Department'. His sisters cannot get the land, they receive gifts during their wedding.

Analysis

- baghwi to save
- baghwi because better earnings
- baghwi with family
- dependency on tube-owner to get water
- water main stake if a crop will grow
- land cut due to Narmada canal
- family relations important
- share in expenses: 1/2 share in crop produce
- no share in expenses: 1/5th share in crop produce
- live in own village important
- father baghwi to eldest son
- monsoon crop failed due to floods last year

10th Interview Rangpura

Date: April 23rd 2008

Respondent: Hamir Ganda Thakor

Interviewer: Annemiek Schrijver

Translator: Rawi Kakkat Thakkr

Hamir is 37 years old, completed 10th standard and has two sons. Hamir is working on his own field of 10 vikas, received from his father. The land is still on the name of his father, but if he dies, according to Hamir, the government will enlist the land on the name of the oldest son. 90 vikas was on the name of Hamir's grandfather. When he died, the land got divided between his three sons who all worked on their field. An additional two hectares was owned by Hamir's grandmother. One month ago she died and the land will again be divided with her three sons at the Talathi office. He will give this information to the Collector of Patan district.

Hamir has taken into mortgage another 50 vikas for 4.5 lack Rs. Legally these lands are not on his name. Hamir made the arrangement semi-official by introducing non-judicial court

stamp papers, which have a specific value of 20 to 100Rs. These stamp papers are signed by both parties and enlists the mortgage in Hamir's own registration. The mortgages are taken because the other person need the money, but did not want to sell the land. In total he purchased a land under mortgage of eight people. Hamir is working on these lands himself, not in partnership with the official landowner ["only my Misses is my partner"] except for one land. Here the landowner is working on his own field. The share is 1/3rd for Hamir if the land receives irrigation water; the share is 1/2nd in monsoon period. Furthermore, they share in the primary expenses. Hamir decides what to grow on the field, and the land labourer has to make the arrangement with the tubewell owner for receiving irrigation water. Hamir does not have to pay the tax for these lands, the official land owner has to. Hamir is not paying the real landowner back the amount of these taxes (10Rs/year for 5 vikas). I asked who decides when the mortgage agreement is cancelled. Hamir answered that this happens when the real owner has the money to pay back to Hamir and if Hamir agrees to nullify the agreement. If Hamir refuses, the agreement will continue. The real landowner won't have to pay an interest for the money provided by Hamir, and Hamir will not pay for the reduction of soil quality due to use over the years of the arrangement.

Above this, Hamir is in the process of buying another land from his uncle. This uncle wanted to sell the land and Hamir has the money to do so. The process is not completed yet, so the land is still registered on the name of this uncle. The process of buying land is as follows: the land is registered on the name of the uncle. In order to transfer the owner, an application has to be made at the Talathi office. He informs the Patan district Collector who decides the price of the land. If the price is one lack Rs, the tax to be paid is 15.000Rs for the transferring of ownership. This has to be paid to the Talathi. In the case of Hamir and his uncle these costs were shared 50-50. At the time the price of the land was 2,5 lack Rs. Nowadays the value has risen up to 10 lack Rs. The land of his uncle is Old Sarat land, which means that it can be sold because Old Sarat land is complete property of the farmer who owns the land. Besides this, there is New Sarat land. In this land, the government is a partner at some level. The farmer does not have to pay tax, but he cannot sell the land and the government is registered as the property-holder. Yet the crop is your own. Even though the farmer is tilling the land for so many years, the land is government property. In Rangpura, about 60-70 hectares are New Sarat.

On the land of his uncle is ten vikas and Hamir is working on it for the last five years. Hamir harvested this winter season 86 mur cumin from it. The land is irrigated with the tubewell of Savsi Mala who, according to Hamir, supplies water to cumin, wheat, cotton, juvar and bajra. The conditions to receive water are:

- to have good land
- to be a good farmer
- a farmer who shows that he is a good worker, so that the water supplier can be satisfied if he provides water to this person

Otherwise, the tubewell owner will not give water. He and the tubewell owner have no specific relation except that they are from the same village. The tubewell owner request information about other farmers to Hamir about soil, how he executes irrigation, how he is working etc. in order to decided if he should supply water to them or not.

I asked about what type of activities farmers do in order to have water supply next year also, Hamir responded:

- they plan for good fertilizer

- they plan for good crop seeds and pesticides
- they supply more and more fertilizer

Furthermore, based on the previous crop: who has the most crop will get water first. And if the tubewell owner is disappointed he will not supply water for one year. According to Hamir, a friendship or family relation is very important in the supply of water to the specific farmer, they get the first chance to receive water. The water reaches the field with an underground pipeline of cement at a depth of 3.5ft. A kundi is at the corner of his farmland, and ten other farmers make use of this kundi. I asked whether Hamir believes that he is able to receive water the coming years for irrigation from the tubewell, he replied that if the Narmada is completed, there is no need anymore for making use of the tubewell. When the project is completed, each farmer has to pay 300Rs for four months in order to have access to water. They can get water according to their need, and has to be pumped out of the canal with an engine supplied by the farmer himself. They say that the project will be completed in 2010. For those who cannot pay for the engine, baghwi will reoccur again. Yet until 2010 Hamir will make use of the tubewell. He got the best cumin in the village last season so he is sure. The tubewell owner even calls him kaka (uncle).

Analysis

- hamir decides what to grow on the field, but the land labourer has to make the arrangement for irrigation water
- land under mortgage official with stamp papers
- hamir not paying the tax
- tax 10Rs/year for 5 vikas
- both have to agree upon finishing the agreement. If Hamir does not agree to stop the agreement, then it won't happen
- no interest for the landowner; no payment for Hamir for quality reduction of the soil

Tubewell 2

5th Interview Rangpura

Date: April 17th 2008

Respondent: Rukna Mohan Thakor

Interviewer: Annemiek Schrijver

Translator: Randhir P Thakor

The farmer interviewed is the owner of two separate lands, one sized 1.5 hectares and one sized 2 hectares. He inherited this from his father who cleared the land years ago in time of the Nawab. At the time, his father was a watchman and servant of the Nawab, and so he had good relations. Furthermore, he was able to clear a lot of land. And what you can clear, you were allowed to have. This enabled him to provide 5.5 hectares to each of his sons, three in total. The respondent had already given two hectares to two of his sons. He has three sons and one daughter. One son, the youngest, lives with Rukna. All his sons went to school but his daughter did not.

Both his lands are goradu, which Rukna qualifies as medium quality. From his 1.5 hectares he collects cumin. This field receives water for irrigation from the tubewell of Rama Deia Thakor. He is from the village but lives near his tubewell outside the village. Since ten years

Rukna receives water from this tubewell to irrigate his field. The tube-owner is far family. At the time Rukna went to Rama Deia and requested water, which he did receive in the agreed turns over all the ten years. The water reaches his field from the tube by an underground pipeline. The kundi is about 40m away, so the water arrives the field by means of a dahlia. Three turns should be given for cumin in return for a 1/3rd share of the crop produce.

However, this season Rukna only received two turns. Rukna demanded for the third turn but the tube-owner did not give him the water. Rama Deia is the owner, so he decides what happens. The reason Rama Deia did not want to provide water to Rukna is due to family problems: the children of both parties were having a fight. Rukna did go to Rama Deia and wanted to stop the quarrel to not let it become a problem of water. But the owner decided to not supply water to Rukna. Furthermore, although Rukna received two turns of water, he still gave 1/3rd of his crop produce to Rama Deia. 'Legally' the tube-owner did have to provide three turns of water which he did not. And Rukna could have decided to not give the 1/3rd share. However, it is tradition to still give the share. He did this because it is the most honest, and a social rule. In addition, in the future people cannot tell him that he did not give his part. It gives a better impression that he gives his share, an impression of reliability.

As a result of not receiving the third turn the cumin harvest was 240kg instead of 1000kg. The tube-owners share will be less also, but he has twelve other farmers to receive a share from. The coming season Rukna will not request water anymore from Rama Deia. He hopes on a good monsoon season so that the water storage near the checkdam will be good. If the rain is good, he will receive water from this checkdam from the engine of Sunda Savsi Thakor, who owns a part of land in the checkdam. Otherwise Rukna will change his crop to juwar or cotton, and he will sow no crop during winter season. He will go to Sunda Savsi to make an agreement only when there is water in the checkdam: he will not make an agreement now yet, because what to make the agreement about, as there is no water.

Some people did go to Rama Deia to make a compromise between Rama Deia and Rukna, but Rama did not want to compromise. He did not want to match with Rukna, and he refused any proposal. Rama Deia also did not attend the holy ritual last Thursday neither the ritual of Hamir's grandmother's death due to the dispute. In the future they won't be friends. Only maybe when in Rukna's family someone will expire, Rukna will invite Rama Deia. At such a moment, a compromise might be made again and visit each others house. According to Rukna, fifteen families are behind Rukna whilst three families back-up Rama Deia. All the fifteen families do not want to visit Rama Deia's house. And the effect of the dispute will endure for a long time.

I asked whether Rukna feels insecure about his water for irrigation for the coming season. Rukna said no, he does not feel insecure because Baghwan gives the water, not Rama. If the rainfall will be enough, we do not need any tubewell. There is no dependence on Rama. We have rain. He has faith in Baghwan. Above all, he has another two hectares with irrigation, so he feels secure.

This second land is irrigated by the tubewell of Savsi Mala Thakor. For the last twenty years Rukna receives water from this tubewell. They have no specific relation. Rukna went to Savsi and requested water, and Savsi agreed on this. Savsi provides water if Rukna, or any other farmer, sows cumin. For wheat or any other crop Savsi will not provide water. This year Rukna had sown one hectare cumin. The kundi is on the edge of his field and he has to give 1/3rd share of his crop produce to Savsi in return for the water. Since the agreement twenty

years ago he always three turns of water from Savsi Mala. Rukna does not sow cumin every year because that is not good for the soil. After a while the crop will become less and less (exhausted). From Savsi Mala, Rukna feels secure that he will receive water three times, also in the future. He has a lot of trust in Savsi Mala. For cumin, Savsi has to give water to Rukna.

Rukna owns two oxes for cultivation and one buffalo for household milk consumption. Sometimes he hires a tractor for 300Rs an hour. He hires labour as well, derived from the village. These are flexible labourers, hired for one day. He has no specific persons as labourers, he who wants first can work. He hires them in only when he needs additional labour. They receive 60Rs a day, chai, lunch and habit. Rukna completed 8th standard school in Radhanpur, 18km away which he walked at the time every day.

Analysis

- Savsi Mala only water for cumin irrigation; he himself says that he also gives water to other crops...
- Social rules on behaviour during disputes
- Community interferes in disputes
- Community is not neutral in disputes
- Reason of dispute nothing to do with agriculture

Second interview Rukna Mohan Thakor

12th May 2008

Randhirbhai P Thakor

Rukna received water both from Rama Deia and Rama Savsi on two separate fields. The tubewell of Rama Savsi is besides his field of 2 hectares (goradu, good quality). He received water only for cumin. He demanded water for another crop but this was not provided to him. This because the tubewell owner can only get less profit out of another crop whilst it will cost him more water and a higher bill of electricity. So most he provides for cumin because this brings a higher profit and costs less water.

His other field, 1 hectare (black stoney, medium), knows a distance of 5 fields in between and the tubewell of Rama Deia. From this tubewell he received for about 6 seasons water for irrigation. Before the quarrel between Rama and Rukna they had a good friendship relation. Rukna says: to give or not to give water is dependent upon the tubewell owner. Before the quarrel he did feel secure for getting enough water from Rama Deia. He had trust.

I asked what would happen if Rukna's son wants to receive water from Rama Deia, he responded that this social problem has to be compromised upon. Furthermore he says that Rama Deia might give water to his son because then Rama Deia will get a profit and that is the most important for him. Yet, Rukna adds that if he can get water from the checkdam he will prefer this and his son as well. If this is not possible, then they would like to get from the tubewell of Rama Deia. They cannot force Rama Deia to do so, only if he is willing to give to Rukna. Otherwise, Rukna will not get. Besides, Rukna only wants if he is secure of proper and three times of water.

The conditions to receive water for irrigation are according to Rukna hard working, sufficient expenditures to make on the field and timing of the work on the soil. For both tubewells Rukna went to the tubewell owner to request for water. And he prepared his fields early so he

could get the water in a high turn. To maintain the 'access' to water, Rukna is working hard. He says that both parties are eager to get a good crop, this is the main thing for both the parties.

I ask about the differences he perceives between the two tubewell owners, he tells us that Savsi is a better person because he gives water regularly; he has a good relation with Savsi; his field is besides the tubewell; and this area is bigger (2 hectares). Furthermore, Savsi Mala's nature is good. He is reliable and flexible. He has good emotions about the other villagers. Sometimes Rukna made mistakes but still he got water from Savsi. So Rukna likes the behaviour of Savsi. There are no disputes between them. He can do something wrong but this is not a big problem. He does not like the ego of Rama Deia. But as a part of business, if Rama Deia would give regular water Rukna would irrigate from this tubewell.

8th Interview Rangpura

Date: April 22nd 2008

Respondent: Rama Daha Thakor

Interviewer: Annemiek Schrijver

Translator: Randhir P Thakor

Village politics

Hamir does not want to go to the house of this tubewell owner. He explains that they don't like him because he is practicing some tantra and other spiritual activities. They don't like. Furthermore, the other interview I have had with a villagers had a conflict with this specific tubewell owner. Since I am staying at Hamir's house special care had to be taken in order to gain somewhat trust with the respondent, as I was eager to have an interview with him.

According to Hamir, the bore of Rama is new since last 2 years. His partner in this is mister Fazelbhai, who constructed the tubewell. Before, the other tubewell was in partnership with Wirbanbhai Daha, the brother of Rama. They were bore owners for 12 years. The bore was demolished and he could not make the expenses for a new. And so mr Fazelbhai entered the scene. According to Hamir, the brother if Rama is the main owner of the bore.

Summary

The respondent was somewhat reserved at the beginning of the interview. I decided to start with the most technical questions and not ask anything specific about relations with any villagers or whatsoever.

The respondent is living next to his tubewell. The tube is 710ft deep and a width of 10 inch. The respondent tells that because today there was no water from the Sihuri pipeline he provided water to the villagers for drinking and bathing. He tells that the quality of the water is good, it is sweet. Furthermore, the water from the other tubewells are hot and his water is cool.

He provides water for irrigation to about 50-60 hectares in one season accounting to 20-22 farmers, if the electricity provision is regular and the pump is running well. Normally, electricity is supplied every day for seven hours. During the winter season, he is running the tubewell 7 hours a day.

The tubewell is constructed 8 months ago, so it is quite new. Before, there was a tubewell of 14 years old but it failed due to acidity in the soil which made the tube become broken. Furthermore, the pipe had a depth of 200ft and no water could be pumped up anymore.

In the construction of this new tubewell the respondent has a financial partner, who made the expenses for drilling the tube, the building of the underground pipe and other instruments necessary for running a tubewell. This partner bears the total expenses of the construction. The partner of the old tubewell could not make the expenses anymore for a new one. That's why Rama sought a new partner. The 1/3rd share from the farmers is again shared between Rama and the financial partner. The partner is from Radhanpur, and they know each other as friends and from years before. His name is Fazelbhai Chauhan. Rama told Fazel that he wanted to construct a new bore and that he searched for a new partner who is eager to be in an arrangement with a tubewell. Fazel agreed becoming a partner and assist in the construction of the tubewell.

The electricity connection is paid by Rama since 8 months again. Before, for 4 years he did not have to pay the bill because there was no bore, as 5 years ago the old bore stopped running. In the meanwhile he ran little wells.

The electricity price in running season was to about 7000Rs some years ago when electricity was provided 14-16 hours. Then they did not pay per unit. Nowadays they pay per unit used with a meter, reaching 3000-3500Rs a month. The electricity is given in three phase only, as the government separated the one phase and three phase electricity. Three phase is given in the agricultural scheme. Government divided this because farmers were able to make from one phase electricity three phase connections. To the question if the tubewell owner knows why the electricity provision has decreased over the years the respondent answered that he doesn't know.

The tubewell is connected with two underground pipelines. This in order to prevent overflowing in one pipe, because the tubewell is quite big with 10 inch. Now he can divide the water over two pipelines. With kundi's and dahlia's the water reaches the farmlands. Rama has a PVC flexible pipeline as well in order to reach the farmlands who are not connected with the underground pipeline.

Before the season starts, the farmers visit Rama and ask if they can receive water for the season. He makes a schedule of who comes first. The water is provided in this same sequence.

The conditions to say yes to a farmer are:

- Who demands first, if the land is prepared
- Who completed his land first
- To every crop he provides water
- Only if the soil is good: if salty, no water; low quality soil, no water
- If the farmer is a hard worker; uses good seeds and fertilizer. Rama gives the first chance of receiving water to them
- If the farmer is honest and financially and physically capable in working

To inquire information about the conditions, Rama asks other farmers to clear up his knowledge concerning the farmers. As a result of this inquiry he decides whether to give water or not. Due to the fact that Rama has two underground pipelines, he can both provide water at the right time to those who are in the schedule as well as that he can provide water to those who have prepared their land first or who he likes to give. With the two pipelines he the

water can reach two farmers at the same time. Sometimes Rama has to say no to farmers who request water: due to insufficient water (as a result of the electricity provision or pump problems); and because he won't give water to farmers who request water during the season. Then, he already reached his limit as written down in the schedule. Furthermore, to relatives and friends he provides help although they are less capable or not hard working persons. He will give water to them always, he has to. In some cases other farmers come to him and recommend to give to a specific farmer, despite of their less hard working character. When two or three farmers recommend for one specific farmer, he will give water to this specific farmer.

One time this season it occurred that a farmer growing wheat and cumin had drunk alcohol. He did not request for his water the second time nor did he harvest his produce. And so, Rama provided the water, collected the harvest and hired in labour to help doing the work. As the drunken farmer was not the owner of the land, Rama gave 1/3rd of the produce to the landowner, 1/3rd to himself for the water and 1/3rd –out of which first the labour charge was paid- to the drunken farmer. Before the season, other farmers had recommended him to give water to this farmer because he is poor, and so he did. However, next year he will not give water to this farmer anymore. I asked if such things happen occasionally, he said that this is only one case. The other farmers are really alert and well aware before they come to him and ask for water.

The water is provided regularly. This year, the rain was good and so to some fields he only had to provide two turns of water because otherwise it would do damage to the crop (cumin). He provided three and four times to some farmers as well, all for cumin.

Whether to give water to farmers, this is dependent upon himself and not from the recommendation or compression of others. If he not likes to give, he tells the farmers this before the season. Although others come to recommend, he still says no to specific farmers, if they are not on speaking terms for example. The other way around, due to some circumstances, quarrels might occur, but still he provides water. A third person is used in order to communicate between the farmer and Rama. This mediate person interferes in each stadium, such as supplying the share to the tubewell owner. Both the farmer and the tubewell owner use this mediate person. Yet it even happens that a farmer does not want to take water from the tubewell owner.

Second meeting

Date: April 28th 2008

Respondent: Rama Daha Thakor

Interviewer: Annemiek Schrijver

Translator: Randhir P Thakor

In the morning we were searching for my respondent we encountered with Rama Daha. He invited us to his house and started telling about his plans to construct a checkdam on his own land, so that he can put an engine in the stored water at the same time as when he is running his tubewell. He has plans to constantly run his tubewell and fill the checkdam with water from this. He adds that nobody of the village will help him nor support him in constructing and recommend this checkdam. Then, the interview starts. The respondent is eager to tell stories himself especially to my translator. According to my translator, "Rama was playing with political terms". This made the interview quite hard for me to ask my questions and get proper answers to the questions I had left for Rama.

Rama has a house in the village and near his tubewell because here are many instruments which he has to keep. This interview occurred in his village house whilst the first interview took place at his house next to the tubewell.

In total Rama Daha has 5.5 hectares of land. Of this, 3 hectares is located in the covering region of his own tubewell and another 1.5 hectares is located in the west of the village. On this field, he cultivates crops if the rain is good in the monsoon and if he can get water he will irrigate in winter season. Otherwise it is not possible to grow a crop here in winter. He has a second one hectare where he is growing cumin, cotton and wheat [hence, irrigated as I can conclude. Further questioning however was not possible]. All the land is on the name of his father. Rama has two other brothers, who both have their own land. Father is together with Rama in kitchen and in land. Rama has to pay $1/3^{\text{rd}}$ of his crop produce from his 3 hectares land as well since this is irrigated and the $1/3^{\text{rd}}$ share is divided on its turn in 50-50 to him and his partner.

The recent tubewell of Rama had cost 4 lacks Rs. including motor, drilling, pipeline -as he constructed a new one. Initially his financial partner paid all the expenses. When Rama is capable he will pay 2 lacks Rs. so they made the arrangement to share 50-50 in expenses. As a result they will both own the tubewell. They both receive half of the share in $1/3^{\text{rd}}$ crop produce from the farmers. The electricity connection is registered on Rama Daha's name, but electricity bill is shared. They both like the arrangement of 50-50 both in rewards and expenses so Rama is not intending to pay off his financial partner.

The first tubewell at the location was constructed 19 years ago and ran for 14 years -5 years ago it stopped running. The costs for this tubewell amounted to 6 lacks Rs. including the tubewell drilling, the motor and the electricity connection, all initially paid at the time by his partner -also Fazelbhai the same as in the new tubewell. At the time Rama paid Fazel around 10,000 to 20,000 Rs. out of his account from the rewards of his land and the $1/3^{\text{rd}}$ share of which Rama received half and Fazel half. In the 14 years running, Rama paid off 3 lacks Rs. as agreed upon in the arrangement. Both owned the tubewell for 50-50 and it was not necessary for Rama to pay the complete 6 lacks Rs. Yet, the tubewell failed and Rama wanted to construct a new tubewell at the time of failure, but the partner was not capable of making the investment. After 4 years the partner was capable again and they constructed this new tubewell.

I asked why Rama chose this place for constructing the tube, he answered that this is because here is his own land. Furthermore, for his 1.5 hectares land there are two other tubewells near and around. If he would have drilled his tube over there he would not be able to supply water to farmers as the covering areas of the tubewells would overlap.

The irrigation turns go in the ranking line as in which the farmers came to request for water. The first time follows this ranking, when the farmers are ready. The second turn of water is supplied 7-10 days after the first turn. So, when the last farmer finished his first turn the second turn can start for the first farmer. The third turn will occur in discussion with the farmers. This occurs in the same sequence as the two before. The fourth depend upon the crop cultivated by the farmer, this in consultation with the tubewell owner and the farmer. With 7-8 hours of electricity supply Rama can irrigate 2 hectares. In the time between the second and the third time for a group of farmers, he supplies first and second turns to other group of

farmers. And so, the tubewell is running constantly for three months. After three months, Rama provides water for wheat and rajko if somebody wants.

Rama has 6 sons and 2 daughters. All went to school, and two still attend school nowadays. The sons help on the land. He owns three buffaloes of which Rama uses the milk himself. He has one ox and an ox-car. One ox had died. This season he will purchase a new ox. He has no partnership for his 5.5 hectares of land. Rama is capable of working the land himself, together with his sons and children. He has even taken an additional 5 hectares in partnership where he works. His share is 50-50 out of the total produce, and 50-50 in expenses as well. The landowner himself decides what to grow on the field.

Analysis

- two turns to cumin
- prefers cumin
- 10 inch, two pipelines and PVC
- inquires about farmers
- punish drunken person
- friendship first
- conditions for giving water
- hard working peoples and recommendation
- two pipelines make the shift in series possible: one to make the series, the other to give to farmers who request in between → good crop and soil
- he is the tubewell owner, he decides whom to give
- second tube, financial partner
- farmer has to be financially and physically capable of doing good farming before he is able to receive water
- some farmers do not do their best to maintain access to water: they drink, they fall asleep, they don't irrigate properly → crop will fail so the tubewell owner will not give anymore next year

Tubewell 3 Rangpura

11th Interview Rangpura

Date: April 24th 2008

Respondent: Rama Talsi Thakor

Interviewer: Annemiek Schrijver

Translator: Randhirbhai P Thakor

Rama Talsi says that he has always time

Rama got his land due to heritage from his father who is expired. Father had seven hectares. His other brother received three hectares. Rama is the youngest brother; he has one sister. Rama has two sons and four daughters, who already left the house. His two sons and their wives, Rama and his wife are working on the farm. All his six children went to school. Sometimes they hire labour from the village, both relatives and other villagers. He gives 60Rs, lunch, chai and bidi. He hires a tractor now and then for 300Rs per hour. He has two buffalo's and uses the milk in the households and brings some to the mawa-maker as well.

Rama is owner of a land sized four hectares. Here he grows specific kinds of crops, this year bajri but it failed so he used it as compost. In winterseason he cultivated cotton and arenda. Besides, he is in an arrangement with another five hectares, a land owned by somebody else. He provides the full labour for this field. The landowner and Rama share 50-50 in the total produce of the crop. The expenses are shared as well, deducted from the crop produce. The landowner decides what is grown on the field. Rama is working on this field for the last ten years. This land of the other owner is neighbouring his own field, that is why they now eachother and the landowner requested him to be in the arrangement. They are friends also. The landowner offered Rama the opportunity; he asked if Rama wanted to be in the partnership with him.

His own land of four hectares is completely irrigated by his own tubewell. The other land of five hectares is only half irrigated, by his own tubewell as well. This tubewell is five years old, has a depth of 700ft and width 8 inch. He supplies water to other farmers, to about 10-15 hectares he irrigates which accounts to about five farmers. Sometimes it is more, sometimes it is less. He receives 1/3rd share of the crop produce in return from all the farmers. I asked whether these five farmers are in a special relation with him. They are all family brothers [sons of his uncle].

The conditions set by Rama before he supplies water to the farmers:

- those who are working hard
- those who have a good soil
- those who supply good fertilizers and sow good seeds
- those who do the right things at the right moment
- most to cumin; also water to cotton, arenda and wheat

Sometimes these five farmers change because the farmlands are not irrigated continuously. In order to provide water to other farmers, these landowners change. Other villagers receive the water. The conditions for these other villagers are the same. When he is selecting the farmers Rama tells them that they have to fulfil the conditions, both to his family brothers and the villagers. But sometimes when a 'brother' cannot supply good enough fertilizer or good work, Rama will still provide water to them. Otherwise, the crop will not be good. Above this, from villagers he really expects to act according the conditions, otherwise Rama will refuse to give them water. To his brothers he will not refuse.

The arrangement is agreed upon after the villagers come to him and request water for irrigation the coming season. He refuses when the limit is reached. The bore runs on full capacity during winter season, 8 hours with 60hp. With 8 hours running, 1 hectare can be irrigated. During this tubewell there were times he received 10-12 hours electricity, however the government stopped. I asked if he knows why, he said that it shall be of some political reason. [at this moment, the interpreter asked me if he is allowed to explain the reason according to him to the farmer. And so he did, that it is mainly due to the fact that the government wants to limit groundwater exploitation]

Nowadays, the tubewell is completely owned by Rama himself. Yet, the tubewell was constructed in a partnership. The partner, Ganapeth Ratia Shah, made all the financial expenses. Rama paid back the amount of these expenses and so he is the owner now. The price of drilling the tubewell was 4 lack Rs. The other expenses, as the underground pipeline and the motor were paid by Rama himself. The partner is from Billud. At the time, Rama wanted to construct a new tubewell (the old one stopped running) but he had no capital. He

new this partner because some years ago he lived in the village Rangpura. He is a merchant. Rama offered him the partnership and Ganapeth agreed. At the time they made the agreement that Ganapeth paid the expenses for drilling the bore, and Rama should pay back these costs. During the time the costs were not paid back completely yet by Rama, Ganapeth received out of the 1/3rd share of the crop produce from the farmers who got the water for irrigation 75% and Rama 25%. Within five years the partnership was closed because Rama paid back the costs to Ganapeth.

He arranged the money for paying back Ganapeth by taking a mortgage on his own land, plus the earnings he received from the 25% of the 1/3rd share from the crop produce of the farmers, and he is working in partnership on another land. He took the loan for his land for the total 4 hectares: he received 2 lack Rs from the Banas Bank. Still he is the official owner of this land. The interest for the loan is 12% per year. Rama took the loan last year, and immediately he released the partnership. The coming season he will receive the full 1/3rd share from the farmers. The other 2 lack he completed by saving, out of labour and the crop etc. Rama wants to pay back the loan as soon as possible, with a limit of seven years, if the crops are good.

I asked why he did all this effort as starting a loan and give his land for mortgage. Rama answered that our agricultural system is dry. So, in order to get more crop and more earnings, the water is essential. With water, this can be reached. In addition, other parties have done the same and Rama was eager to do so himself. The other parties motivated him.

The quality of the water is good and drinkable: the villagers come in times of failure of the Sihuri pipeline to take water from the tubewell. Last two years the water level has risen due to the heavy rains. The electricity price depend upon the use per unit. In winter season Rama is running the tubewell continuously.

Turns provided: cumin 3; wheat 5/6; arenda 4; cotton 4.

Rama had a tubewell before, about fifteen years ago. It ran for eight hours, until it stopped running due to the earthquake in 2001. The underground pipeline was partly demolished as well. He repaired only those parts accessible due to the cracks in the soil. When the soil broke, only these places could be repaired. The parts he could not repair. He will repair this in the future, 1/3rd still has to be repaired. He has to, because the farmlands which cannot be reached nowadays became good soil, mainly because no irrigation has taken place here the last couple of years. So he wants to repair it because of the good soil. The tube before the earthquake was 8 inch as well, and he irrigated 30 hectares at the time, because electricity was provided 24 hours. As a result, he had to say no to some farmers who did receive water from the old tubewell but cannot receive from the new anymore. I asked based on what motivation which farmers are chosen to get water nowadays: Rama answered that he decided that first his own and his relatives land will be irrigated. The remaining water he will give to other farmers.

The construction of this bore went in partnership as well. He commissioned a partner, Kudidan Jula, former Minister of Water Supply of Gujarat. It was a private tubewell. The total costs were spent by this partner. The same arrangement was made: 25% of the 1/3rd share of the crop produce went to Rama, 75% to the partner. [Rama had to pay back all the expenses] However, because the bore failed Rama did not pay back the total costs yet. In total, the costs amounted to 4 lacks Rs. Rama had to pay 1 lack back to mister Jula because these were the costs of the electricity connection, which was not broken due to the earthquake and Rama could still make use of it. [It seems that the risk-costs were bear by the partner] The partner

was chosen by Rama because he knew he was a rich person and he was in more of such partnerships. Rama went to mister Jula and offered him another such an arrangement. Mister Jula lived in Santalpur Taluka. According to the respondent and the interpreter, mister Jula was a good person, a human man. He is the one who enabled the construction of the Sihuri pipeline by making use of the Dutch grant.

Second meeting

Date: April 29th 2008

Respondent: Rama Talsi Thakor

Interviewer: Annemiek Schrijver

Translator: Randhirbhai P Thakor

The focus of this interview was to inquire about the irrigation-turn supply to each farmer and how it is decided when a farmer can irrigate.

First, Rama wants to irrigate his own land. And he prepares his land before all the farmers, so there will be no question by the others to why he takes the water first. Above this he informs the others that he irrigates firstly.

For the others, first of all they come to Rama to ask whether they can have irrigation water for the winter season. Then, Rama makes the ranking of sequence himself, so he decides who gets irrigation water first, based on land preparation. Then he decides in accordance with the specific farmer if and when there is need for irrigation. The second turn will follow in the same sequence as the first. Rama decides when the third turn takes place: a farmer cannot get water without his turn. Rama decides who gets what and when, and for the third turn this is based upon land preparation. If the land is cleaned from weeding and he supplied sufficient fertilizer and sulphur, then Rama will give the third turn. After completion of the second turn, and the farmer is not yet ready for the third, Rama will supply the water to another farmer. Sometimes it happens that there is still too much weed in between the crop, that the farmer has not enough labour to help on the field, and that it takes more days to prepare the field properly for irrigation, then there is not yet use of irrigation water supply. After completion of these activities the farmer can get his third turn.

For cumin, there is 8-9 days in between the first and the second turn, and 40-45 days in between the second and the third turn. In monsoon season, when there was not enough rain to grow a crop, Rama provides water for cotton as well. Rama does set a limitation to the amount of farmers he takes in his water provision scheme. He notes down the farmers and according to the size of the land and the type of crop Rama knows when the limit is reached. It does happen that he tells a farmer he should cultivate less area of land with cumin.

I ask whether it occurs that Rama cannot provide for the third turn, he answers that delays do happen due to failures of the mechanical and electrical system of the tubewell. In such a situation he cannot provide for the water at the right moment. Furthermore, to those who are late with land preparation and do not do their job very well, he has to provide water to them this year but the next year he won't select them to get water.

In Rama's tubewell it did not happen that he could not provide for the third time at all due to other reasons. Sometimes due to a bad monsoon it happens that he has not enough water. Then, in the last month of the season Rama places new pipes to reach the water, and lifts it (technical story: Randhir). What about the other tubewells? He replies that in our social

tradition water should be given. Rama has to give three turns of water and he has to receive 1/3rd. But who does not supplies the water properly as agreed upon, they are like a police.

I questioned what technical and electrical failures occur on his tubewell. These are:

- the motor is burnt out
- overload of electricity supply
- motor is not fixed, so it falls down
- faults in the pipeline: holes and cracks

Rama's tubewell has two underground pipelines connected with a kundi, and a PVC flex to reach the fields not connected with the underground pipes. These are the new lands as well as the lands of the farmers who received water from his tubewell before the earthquake and whose fields are not to be reached anymore due to the broken pipeline.

Rama lives near his bore. Someone has to stay there to keep guard of the place. So many instruments are there which have to be prevented from steeling. There are also animals to keep in this house: 2 buffaloes, one of his son and the other his own. The milk is brought to the mawa-maker.

I asked why the tubewell is constructed at this specific place, he answers that this is because his land is located higher than the other lands. As a result, the water from the storage tank can flow easily to all the farmlands via the underground pipeline. There is no need for an extra pump to pump the water to the fields.

Analysis

- conditions
- first family, then others
- when broken down, first himself and family, then others
- first tube constructed 15 years ago: good time to construct
- mortgage for pay back the partner
- eager to become private owner without partnership
- loan to pay back partner
- partner mainly for financial investments
- eager to make benefits of farming more
-
- in monsoon sometimes provides for cotton
- Rama decides when a farmer can get water for irrigation, based on land preparation

14th Interview Rangpura

Date: April 29th 2008

Respondent: Govind Chehor Rabari

Interviewer: Annemiek Schrijver

Translator: Randhir P Thakor

The interview took place in the middle of a farmland, under a fruit tree from which children were collecting the little berries. First me and the translator walked by whilst the Rabari-fellow was lying down in the shade of the tree waiting for his goats eating the leaves of the cotton and kester-plants. We had another goal, the tubewell. But we returned and seated besides him. We started talking and it turned out to become an interview.

He started by saying that he has two sons, Madev and Mada, and one daughter, Rada. Govind is the owner of 8 hectares of land. The division to his children did not occur yet, and so they work on the same land. However, in kitchen they are separate. Govind inherited the land from his father who appropriated it during the Nawab-time. When I questioned about whether he irrigates or not he first answered that he had once irrigated from the checkdam, where he got the water via the engine of Wiram; and that he received water once from the tubewell of Rama Talsi. He irrigates his fields in intervals, which means one year he does irrigate and two years after he does not irrigate.

However, Govind came up with another story as well, where he explained that he has two separate fields both of 4 hectares. On one of them he irrigates each year two hectares and shifts each following year between these two hectares, alternately. He received 2 seasons from the tubewell of Rama Talsi, and 5-6 seasons water from the checkdam. He made the transfer from tubewell to checkdam because the checkdam seemed to be less far from his field than the bore of Rama Talsi. He irrigates cumin only, as for cotton and kester Govind cannot request water. Govind only wants to irrigate one 4 hectare field, and not the other one because this might become salty. Due to too much rain in monsoon, he cannot grow a crop in monsoon season.

Wiram asked Govind if he wanted to get water from the checkdam. The quality of Govind's land is black and stoney, which he qualifies as good. If there is no water for irrigation, still wheat can grow there. Wiram has to give three turns of water and Govind has to give 1/3rd of his crop produce to Wiram. I asked under what conditions Wiram supplied water, he answered that if Wiram likes to give water to a farmer, he will go to him to inquire whether this farmer would like to receive water for irrigation. So the conditions are already reached when Wiram asks a farmer. Govind told Wiram, if you are willing to give me water three times then I will irrigate, otherwise I will not take your water.

Govind will get water from the checkdam if the rain is good that year, because the monsoon period is necessary in order to fill the checkdam for irrigation water. Otherwise, he will get water from the tubewell of Rama Talsi. Because if Govind wants, he can get water from this tubewell. He is a hard worker, so he can get. Although nowadays the underground pipeline due to the earthquake is not reaching the field of Govind anymore, the water reaches his field by means of a PVC pipeline. The conditions set for the different sources of water are similar according to Govind. But he prefers to get water from the checkdam, after that the tubewell.

However, this year Govind only received two turns of water from the checkdam: the water was not sufficient to provide for the third turn. And so, Rama Talsi gave water from his tubewell to supply the third turn of irrigation. The arrangement between the engine owner of the checkdam and the tubewell owner Rama Talsi was as follows: all the farmers had to supply 1/3rd to the checkdam owner Wiram, who had to give half of this to Rama Talsi. The checkdam was empty for all the farmers, and the third turn of the tubewell of Rama Talsi was as well provided to all the farmers. Rama Talsi did the same for the farmers who irrigated from the Santhali-pond, where the water was not sufficient as well to supply for the third turn. The question if he believes he will receive water from the checkdam in the near future he replied that this depends on the rain in monsoon season. When this is enough, he will get otherwise he wont.

Govind never encountered any problems with Wiram nor Rama Talsi. He has a close friendship relation with both of them. Govind has full of trust in his friends and their water supply. They prefer to give him water first. They will give to him. And even if they would not supply water they still would be friends. Due to this friendship he receives water, as in a brother relation.

And then, the interview stopped because his goats want to go home and to be milked.

Analysis

- water from checkdam: friendship relation
- water from tubewell: friendship relation
- prefers checkdam because of distance
- good soil
- hard worker
- checkdam: although friends, did not supply third turn of water because the checkdam was empty
- third turn sought for by tubewell owners
- tubewell owner was granted half of the 1/3rd share crop produce
- realizes that the checkdam water is based on the monsoon rain. If this is not enough then not enough water is available for irrigation water supply
- the respondent says that there was no one farmer

Santhali Pond Rangpura

3rd Interview Rangpura

Date: April 16th 2008

Respondent: Soma Harchand Thakor

Interviewer: Annemiek Schrijver

Translator: Saiyad Nagori

The respondent has two hectares of land of good quality nearby his house. His house is made by SEWA after the earthquake. He is growing bajra, mug and mud in monsoon season and cumin or wheat during winter season. His land is divided in two parts: there is a green wall in between so the water stays better in both sides of the land as well as that the trees enable increased infiltration of rainwater. He has two other brothers who both have two hectares of land, all given by their father.

The farmer interviewed is getting water from the Santali-pond, Ganda Patel, for the first year in exchange for a share of 1/3rd of the crop produce. He went to Ganda Patel and asked for water because he had heard of Patel taking the pond on rent. If he feels secure of water from the pond, he answered that if somebody puts an engine in the pond, he will take the water. The water reaches his field by means of a flexible PVC pipe above the ground. Anybody is allowed to use the water from the pond. Patel is providing water to many farmers.

Before he got water from the tubewell but the pipeline was broken. This Santali-water is better than the water from the tubewell. But if the pipeline will be repaired he will take water from the tubewell again. Because the owner is his uncle. The same goes the other way around: he will get water from the tubewell-owner because he is the brother of his father. In addition, the pond is far away and the tubewell is near; and the ponds water is based on rain falling

during the monsoon whilst the tubewell gives regular water. The tubewell-owner is Rama Talsi Thakor. If anybody is allowed to use the water from the tubewell, this depends on the tubewell-owner. Sometimes he says no to people, due to not enough water or electricity or the farmers fields are too far away and no irrigation and pipeline facilities can reach this field. The years he received water from the tubewell this came regular, as agreed upon in the arrangement. After the oral agreement has been made, the farmer believes there is no need for an official contract because there is no system of such an agreement. If a tubewell-owner says 'I give water' then they give water. This tubewell-owner cannot say no to him (refuse him out of the agreement) because he is his nephew.

The pipeline was fifteen years ago constructed. Only two to three years he makes use of the pipeline because before, when the tubewell was constructed the pipeline did not reach his field yet. The tubewell constructed at the time was running for five years but broken. After some years it was rebuild again and since then he could make use of it as well. The owner now made a bigger pipeline because then more people could make use of it. For the water, the respondent has to provide 1/3rd of his crop produce to the tubewell-owner. This is an orally agreement. The pipeline will not yet be reconstructed because it is too costly. At the time of construction, the tubewell-owner asked Soma if he wanted to make use of the pipeline and he agreed. After that, the pipeline also reaches his farm where the water rises by means of a kundi. Three to four other farmers also use this kundi. The tubewell-owner paid for the kundi.

What if he will not have any water source to irrigate? Then, he will not irrigate. And without irrigation he will not grow a crop during winter season. Eighteen years ago, the farmer replies, there was a drought. And at the time there were no tubewells available and there was no water in the pond. And so, no crop was grown.

Analysis

- security of water due to family relation
- although water is better on the other side, still he will use his uncles water
- asked to make use of the pipeline because they are family
- pipeline is broken, but too costly to reconstruct

13th Interview Rangpura

Date: April 28th 2008

Respondent: Karsan Jeha Rabari

Interviewer: Annemiek Schrijver

Translator: Randhirbhai P Thakor

Karsan is the owner of 1 hectare land, resided near the village pond. He inherited this land from his father, who did not clean more wasteland than 1 hectare in the time of the Nawab. Karsan has no brothers to which the land had to be divided. In monsoon period he grows joar. His land is not good, qualified by Karsan as of very low quality. As a result no good grain can be cultivated out of this. Only if rain falls, they have a crop. In winter there is no water, Karsan tells, this is a dry area.

Yet this year Karsan received for the first time irrigation water, from the Santali-pond. However, he only received two turns of irrigation because the amount of water in the pond was not sufficient to supply another turn. This was the same for all the farmers. No one received a third time. The engine owner who pumped the water out of the pond to the

farmlands was Ganda Patel from Radhanpur. Karsan still had to pay a 1/3rd share of his total crop produce. Ganda Patel tried to get water for the third turn from the tubewell owners. He managed, but it turned out to be too late for many farmers. Karsan did receive his third turn, however the harvest was low “only like seeds” (Gujarati expression). Karsan says that the engine owner of the Santali-pond did not say no to anyone. He had not set a limit to the amount of beneficial farmers to get water. Who demanded water could get water, and so Ganda Patel did not set any conditions. I asked if Karsan went to Ganda Patel to tell him that he is not happy with the situation. He did not go to Ganda Patel, and Ganda Patel also did not go to meet the farmers. Water is nature, what can Ganda do about it. Again he says that he gave water without a limit. That is the problem. There was no target set.

This was the first year he took water for irrigation, and he will do it this year only. Karsan does not want water from the pond next year. He does not want to irrigate. The water is not sufficient. All the expenses are not covered. Karsan does not want to take water once more. Karsan spent 16-20,000Rs. He harvested 200kg cumin of which he had to give 100kg to the person he took seeds from (60kg seeds in the 2:3 seeds arrangement makes about 100kg) and 60kg to the water provider (1/3rd share of the total crop). As a result, Karsan could sell 40kg in Radhanpur where he made a return of 320Rs. [to be questioned] Karsan had to borrow money from relatives and took a loan to make the sum of his expenses complete.

Karsan has three sons, who are married and whose wives are coming and going within the ana-tradition, and one daughter who lives elsewhere. All are working in the land of their father. Karsan has another 30 sheep who graze on the wasteland. The milk is brought to the mawa-maker where he gains 25-30Rs a day (1 liter milk brings 7-8Rs). Karsan nor his wife and sons are doing labour work; they have to look after the sheep.

Then, the respondent says he wants to go to the wasteland with his sheep to let them graze. However, he is quite curious about my lifestyle situation and starts to interview me. (who will take care for my parents when they are old, why am I writing down, what am I doing here)

Analysis

- no third turn of water from Santali-pond
- engine owner went to tubewell to ask for third turn, however too late for the crop
- engine owner not went to farmers to apologize
- farmer did not went to Patel to tell him they don't like this behaviour
- still, the farmer did know about the main reason for him not to get water: there was no limit set by the engine owner. He just said yes to anyone who demanded water
- the respondent also says that it is nature, what can the owner do about it
- the respondent says that there was no one farmer who could get his third turn

Second interview with Karsan Jeha Rabari

8th May 2008

Randhirbhai P Thakor

Karsan's field is 2km away from the pond. This is far away according to Karsan. Karsan went to the engine owner to ask if he could get water for irrigation. When I asked under what conditions the engine owner wanted to supply, he told us that all the farmers owning land surrounding the field of Karsan were receiving water from the pond for irrigation. In this situation, he could irrigate as well. The third water turn was not supplied for by the pond and he received water from the tubewell of Rama Deia. This was a special arrangement, not

regular adds Karsan. Ganda Patel, the engine owner of the Santhali-pond went to the tubewell owners to tell that they might give water for the third water supply for cumin to all the farmers.

When Karsan made the arrangement with the Santhali pond engine owner, he had full trust in receiving enough water. He had not made any estimation so far that he would not receive for the third turn. According to Karsan the ranking of the farmers receiving water was based on location. During the irrigation time, there was some direct communication between the water supplier and the farmer.

...

The respondent has fallen asleep

Analysis

- meeliften op de mensen om je heen om ook irrigatie te verkrijgen
- the engine owner made the arrangement for the farmers who did not receive third turn from the Santhali pond
- tubewell owners can give, not in time, but can give
- respondent is not interested anymore. Atmosphere of interview not really good
- Reshmben: his nature is cruel, like a dog. When anybody asks him, he does not reply well. He is always a negative person
- Hamirbhai: he sow his cumin seeds at a late season, so water became empty.

Checkdam Rangpura

9th Interview Rangpura

Date: April 23rd 2008

Respondent: Kanu Amta Thakor

Interviewer: Annemiek Schrijver

Translator: Rawi Kakkat

The respondent has seven *vikas* land near the temple. The quality is good and last season they grew cumin, which is irrigated. In the monsoon season they had sown cotton, but this failed due to heavy rains. The land is registered on the name of his eldest brother but Kanu is the main owner. Two years ago they separated the 25 *vikas* land of their father amongst the five brothers, but still the land is on his brother's name because father did so. He does not know why. They did not undertake any legal action yet, mainly because it is not so important for them. Still he can give the land to his son in heritage. And he says that this year he will make the transfer of registration to his own name. The costs to do this at the Talathi office include about 5000Rs. Without giving this he cannot transfer the land to his name. In the process, he needs the signature of his brother.

His land is irrigated with water from the checkdam, which is 1km away from his farmland. He receives the water from Wirambhai (son of Talsi Savsi/Mawa) who puts an engine in the the stored water. In exchange Kanu has to give 1/3rd share of his crop produce. Already for three years he receives water from Wirambhai. He has received in total three years of water from the checkdam. The relation with Wirambhai: he is the son of Kanu's cousin. Kanu went to Wiram as he knew about him owning land in the checkdam and putting an engine in the

stored water. Both live in the village, and Kanu knew that Wiram makes arrangement with farmers for providing water.

The conditions for Wiram to provide water to Kanu are:

- because Kanu has good quality of land
- because they have a family relation
- he only gives water to cumin

Wiram inquired for information about farmers with other farmers

- if he is a good farmer or not
- if he is an efficient worker with water and his land
- if he is a good labourer
- if he is good to his crop

Kanu received three sequential years water from the checkdam. I asked what did he do to get water the next years also. He answered: I will do labour good, I will fulfil the water to the crop at the right amount and the right time, and I will not let fail the cumin. Kanu says that he is a good farmer so he fulfils these conditions. I asked whether he thinks that he can make use of the water from the checkdam coming years also, he answered that he can but the following years he will not sow cumin again because this is not good for the soil. He receives three turns of water per season for his crop; Kanu always received these three turns. The water is not enough so it is not possible to receive more. Yet for cumin he gets enough water according to his need.

Wiram tells the beneficiary farmers that they can only grow a specific size with cumin, according to the water supply of that year. The last three years all his seven vikas he cultivated cumin and all got irrigated. But if this is not possible, then Wiram tells the farmer to grow less area with cumin. I asked what according to Kanu is the reason for less water in the pond, he answered that there are also other farmers.

Before he received water from the checkdam, Kanu had not irrigated his land but always relied on the rain. He did not try even to get access to water. I asked why he tried this time (three years ago) to gain access to water, he answered that because the pond is near and the other water sources are far. Furthermore, the checkdam made irrigation possible.

If there is enough water stored in the checkdam he will get in the near future water as well. And he even can get water for another crop [if cumin fails for example, and he sows another crop which needs irrigation]

I asked how another engine-owner who pump out water from the checkdam to the farmlands will not that Kanu is a good. Kanu told me that the village relation will maintain the knowledge and pass it over to other engine owners. And Wiram knows. If another owner will put an engine, Kanu will go to him and ask for water. This one will request the same conditions as listed above and inquire from other sources about the farmers. Above all, the information will be passed over from engine owner to engine owner.

To grow cumin, 10.000Rs are needed for primary expenses as seeds, labour and fertilizer.

Analysis

- tubewell owner has conditions for providing water: not all farmers

- tubewell owner sets conditions for providing water: only a specific area to sow with cumin
- land on name of eldest son. 5000Rs to transfer
- family-relation important for access to water
- checkdam as a source. Not 100% secure because other farmers also use the water
- checkdam is near and other sources are far
- if enough water he will get, also for other crops
- family told about another water-system in the village of her sister: there the water is given and the farmers have to pay per hour of water supplied. No baghwi

Second interview with Kanu Amtu Thakor

8th May 2008

Randhir P Thakor

Kanu receives water from the tubewell of Rama Deia besides the water from the checkdam. For the last 16 years, the pipeline reached his farm where a kundi is located. However, because two years ago the bore got failed he could not take the water from this anymore. And this year he decided to receive water from the checkdam. Yet, last year the bore of Rama Deia got reconstructed again so he will take water from him from now on. Kanu prefers to use the bore, because for the next season, if he wants to receive water to irrigate in summer season this is only possible with water from the tubewell. Furthermore, the checkdam is dependent upon rain and so it is a not confirmed source. Rama Deia is his cousin, and this is another reason for Kanu to prefer the tubewell above the checkdam. There are 5 fields in between his field and the tubewell. According to Kanu this is close. He got water for cumin from the bore. But if he wants to irrigate in another crop he can get: cotton, kester, but only if two times of water to cumin is given. Only then (due to 40 days of break for cumin) the tubewell will provide for other crops. But Kanu preferred cumin. For the checkdam this is different, they will only give to cumin because for wheat more water is needed which is not available.

Kanu did receive three turns of water from the checkdam whilst others did not. This was because his turn was coming in the first rank and so he was lucky. He came in first rank because he prepared his field first. In monsoon period, he had not sown any crop so he could prepare early. Still his land is far away from the checkdam, but the early preparation gave him precedence. The quality of his land is according to Kanu good. It is a mix of goradu, retal, black and fertilizer.

At the beginning of the season, about 20-25 farmers were entitled to receive water from the checkdam. The amount of farmers became more and more and the engine owner had no expectations about the amount of water stored and its capacity for irrigation. As a result not all farmers could in the end receive their fully awarded water. In line, Kanu could get first. The other farmers received from tubewell owners (and the tubewells constructed by Wiram).

Concerning regularity with water from the tubewell of Rama Deia, Kanu replies that for any crop, at any time and whenever he wanted he received water from Rama. Kanu tells that he is a hard worker, has a good soil and a good relation with Rama Deia. That is why he gets a high rank in irrigation line. Kanu's son will keep the good relation with this branch of the family and so he will be secure of getting water from this source as well. However, Kanu adds that if his sons will work hard, then they will get water easily. If he is not, he won't be given water. *'Every water owner wants to earn'*. If he can earn, then he will give. Otherwise, (if the labourer is not a real good worker) he will be given water late, as late turns are given to those

from whom the water owner can earn less. *'If we do not work hard, we cannot get water in time and we get the water turn late'*. This is both based on the facts that soil should be prepared before irrigation water can be applied as well as on previous achieved results, like last season.

Water supply also depends upon the time and the water storage. Dependent upon that, the limited amount of total farmers able to get water are committed. The turn of each farmer depends upon land preparation, hard working, and expenditures. Again, based on these features the water suppliers base the ranking to whom to give first. In addition, a farmers who finished his preparation will go to the tubewellowner first.

Kanu asked the tubewell owner if he could receive water for irrigation. Somewhere around the end of September, start of October the farmers will go to the water supplier and ask him if he can supply water to them. Then the farmer will prepare his land so that he can receive the water.

In monsoon season, if the rain is not in time and the crop gets burned then the tubewell owner is also asked if he can give water. A 1/3rd part has to be paid, even though the rain might come after a while and only one turn of water is supplied by the tubewell owner. If the farmer and the tubewell owner in such circumstances have a good relation it might happen that the tubewell owner says, oke give me some less than 1/3rd. Yet this depends upon the nature of the tubewell owner.

The irrigation from a tubewell owners runs from turn-by-turn. The rank has already been made on beforehand and the farmers know their rank. All farmers are waiting for their water. They are in their fields everyday and they know from each other when his irrigation turn is completed and the other starts.

For cumin, 7-8 days are in between the first and the second irrigation turn, most essential for cumin to grow properly. The second turn is more important then the first turn, and so when the full round of the farmers for their first turn is not yet completed but 7-8 days have past for the first few farmers, they are given priority and the line of irrigation is cut for a while. After completion of this second turn for these farmers, the water supply to those who still have to receive for the first time continues.

The tubewell owner comes and visit the irrigating farmers. He is the one to open and close the kundi to the right farmer. Sometimes the farmer can open the kundi himself, but this is done with compromise of the tubewell owner. The farmers in between communicate with each other when the previous is finished his turn and the following can open the kundi and start irrigation. According to Kanu stealing of water does not take place.

With regard to the checkdam, the system is somewhat different. First of all, Kanu had a PVC pipeline from the checkdam leading directly to his field. Yet, there are three different systems running here in order to divide the water amongst the farmers. First of all, the pipeline reaches directly to the farmland. Second, the pipeline has junctions where the water can be led out. Here, the farmland is located or the water has to flow through dahlia's in order to reach the exact land. And third, by means of an extra long pipe in order to reach far away and good quality lands.

The ranking to the lands with the junction-system is carried out primarily according to location: the water will be given to the nearest lands, like following the line of the PVC pipe. However, at the junction points, not only one land but more lands have to receive water. At these points, dependent upon hard working, preparation of the soil and necessity of water the water suppliers will make the decision whom to give the water to first.

Except of the tubewell and the checkdam, Kanu never received water from any other water source. And the 1/3rd share has always been the same for water. There are no changes whatsoever in irrigation over the last 20 years. Last 25 years, the system of irrigation increased. Before, they made wells with oxes in the farmlands. The oxes were ties with a rope and had to pull out buckets of water. These were private sources and not for trade in baghwi. Every landowner constructed such a well for himself in drought periods. I asked what Kanu thinks of the changes towards engines and tubewells. He answers that when they see science and technology, they also want to apply such technology. And because of these engines the production became higher. So it is good.

Analysis

- checkdam dependent upon rain and bore not (although the bore is as well, only less directly in the eyes of the farmers)
- system of ranking is self-sustainable as the rank is based on hard working and timing of preparation. It is not a punishment to give late to a not-hard worker because his field is just not ready yet for irrigation. And he who had prepared first will go to the tubewell owner first. Yet, sometimes it is not dependent upon hard working but on expenditures as well, since for soil preparation sometimes money and labour is necessary.
- Monitoring: sometimes yes, sometimes no. different stories. However, the thing that too much water is not good for the crop makes it easier for the tubewell owner to let some control of opening and closing kundi's go to the farmers themselves.
- Not real heritage of water right. Only within the relation sphere, but this is usual as the relation itself is inherited. Still, the family itself has to do a good job as well before being secure getting water. Family does ties more however
- Family bond makes that Kanu prefers for the next season to get water from tubewell
- Tubewell better and more reliable: can give to more crops, more secure that there is enough water
- Checkdam only to cumin; less confirmed source
- Ranking based on hard working and preparation and expenditures
- Water suppliers main goal is to earn money
- Tubewell owner controls kundi preferably. Control given away. Important to say that the crops cannot have too much water so they will not take water without permission
- Stealing does not take place

18th Interview Rangpura

Date: May 16, 2008

Respondent: Wiram Talsi Thakor

Interviewer: Annemiek Schrijver

Translator: Randhirbhai P. Thakor

Wiram has 6 hectares of land in the checkdam. He received from his father, who had bounded and cleared the land. Officially the land is from the government, and not registered on the

name of Wiram nor his father. In the Talathi office, the record of the land under nr. 7 is government (ownership) but nr. 12 Wiram (usufruct right).

The use of the land is solely for storing water. He places an engine in this water and provides to other farmers. Wiram is the only one who places an engine. Otherwise, if the rain is good then three others can place an engine as well. This year water was not sufficient so only Wiram placed an engine.

During last monsoon season Wiram made the expenses to stop the water, as the soil of the checkdam was partly washed away. He places sacks with sand and hired labour.

Since four years Wiram is placing an engine. Sometimes others put one as well.

The first checkdam was made by Hamir and DMI. Wiram did not help in this. The full expenses were made by DMI.

Out of the 1/3rd share Wiram receives from the farmers he is giving a part to his brother Haja. Haja is not demanding this but Wiram is giving, because he is in debt. He has economic load and Wiram wants to help him release from this load.

No other brothers than Wiram and Haja have a claim on the land in the checkdam. Last two years Haja did not pay anything in the partnership, but coming year Wiram wants to include him in the expenses. One year it was Haja who placed an engine, he only payed for the diesel and not for the instruments which were already purchased by Wiram. At the time, Wiram migrated for labour work. So out of the four years, Wiram placed three times an engine. The first year, Wiram bought an engine, as the price was not that high yet. However, that year he did not earn anything.

Last year 9 farmers and a total of 9 hectares received water for irrigation. Wiram told them that they can only grow 1 hectare so that 9 farmers could make use of the water. "If only 1 or 2 farmers can irrigate, then what can the others do?" And so Wiram divided the water over 9 farmers. Everybody wants to irrigate, he gave the minimum.

(conditions) The farmers were chosen by Wiram and he told them to do only 1 hectare, so everybody is able to do the expenses, hard-working and good involvement in their land. These 9 farmers were chosen because they have their soil near the checkdam. He only selected nearby farmers, so that he did not had to make more expenses. He did not want to go too far with his water. He only gave water for cumin.

(ranking) The water to the farmers is given in line of the PVC pipeline because he cannot change/adjust the direction of this pipeline. At a joint, where the water comes out, more farmers can make use of this joint (division structure) through the use of the dahlia's. Here, dependent on who has finished his land first will get water first. The division structures are opened by Wiram himself. Wiram is checking 24 hours during irrigation. He is wandering around: 1 person will sit at the engine and 1 person will check around at the farmers. They do this in order to prevent mistakes. A mistake might be that a joint is open at the wrong place and the water will go somewhere else. A farmer close by this water will make use of the water by irrigating his field.

The water supply for the third turn will go in the same line as the second and the first. It is dependent upon when a farmer had completed its weeding, then the farmer will demand for its third turn. It did not happen that a farmer did not complete his weeding too late: the farmers do this at the right time.

Last season there was enough water for three turns: three times Wiram provided water. Yet in the checkdam the water was empty and so he made tubewells of 20ft deep (three in one) and provided for the third time out of this. The extra expenses amounted to 5000Rs. He took a loan with 4% interest per month from a Rabari out of Limburka, 20.000Rs. From Unjah he took another loan, 15.000Rs. The other expenses such as diesel (20.000), new pipeline (10.000) amounted to 30.000Rs. Wiram earned 1000kg from the 1/3rd share from the beneficiary farmers. These earnings were not enough to pay for the expenses. And so, Wiram is wandering around because he has to get the money (little jobs here and there) and he sold half of the ornaments of his wife.

If he will give the land in the checkdam to his son, he replied that he has to. His father gave the land to him, so he has to give it to his son. It is tradition. "Land will be short, but heritage will not be short". Wiram does not have to pay tax for this land.

The other persons having land in the checkdam are Sunda Savsi and Kunra Devsi. The location of Wiram's land is in the lowest part, that is why Wiram has the first position in the checkdam. If he does not agree on them placing an engine as well, they cannot place it. He has the most rights.

Wiram has some political support. Officially, his farm is wasteland. When he possessed it and cleaned and bounded the area and used for cultivation many years ago (with his father), many Rabari people came to him and demanded to release the area in order to make it usable for cattle again. He did not release it. And year by year the chance of a dam came. Nowadays he receives good earnings out of the stored water. However, when he prepared the checkdam the Talathi did not support him. But he got political support from Member Legislative Assembly (MLE) and by this reference the Talathi provided all the papers so that the checkdam could be made and he could get earnings out of it. Nowadays the government wants to make it deeper in order to construct a public pond. However, they cannot because it is no wasteland anymore. The land has become private land with main rights by Wiram.

First, DMI together with Hamir constructed a soil-dam and made a waste-weir out of stone. However due to heavy rains the soil was washed away. Wiram hired labour and used bags of sand to make the wall higher again in order to at least store some water during monsoon. He had to do this every year. This year, two months ago a new checkdam was constructed by the government at the same location. Yet Wiram wants to make the checkdam higher by adding 1 meter so he can store more water. Within 15 days he wants to do this. 25.000/30.000Rs are included, but he does not know yet where he will get the money from now. A loan or an arrangement, he has not decided yet. He is searching. He already made bricks for the 1 meter.

Wiram gets many offers from several parties who want to do the investment and reconstruction (50.000Rs) of the checkdam and by this they want to involve with Wiram. By this they want to place an engine and receive 50-50 out of the 1/3rd. Wiram has to give permission. Hamir offered Wiram to be in such a partnership, but Wiram said no, let the government reconstruct the checkdam. Furthermore, Wiram does not want to be in a partnership. The relationship with such a partner should be really good: he has to know for

sure that the partner will be in the arrangement for a longer time. It is not about the money that he does not want the partnership, but because of the relation. (relation is more important). Trust and reliability is necessary to start a partnership.

Wiram tells us that he has no conflict with any of the other land owners. Because he is the complete owner. He is completely reliable and free of conflict.

Analysis

- nr 7 and nr 12 at Talathi office
- MLE
- Main rights, because he has the lowest part
- Unofficially verkregen
- Tijd belangrijk
- Leningen etc. to make the expenses complete
- Because of investments he has the main rights
- Water given based on location
- Only one hectare, to make good cumin because by this the farmers can give their time and expenses completely to this 1hecrates
- Only for 2 times enough water. After that he constructed extra tubewells to make the demand of water complete
- "Land will be short, but heritage will not be short".

Annex 5 Mid-term analysis

Overview Watersources

<i>Watersource</i>	<i>Structure</i>	<i>Arrangement</i>	<i>Conditions</i>
Tube-well 1	fixed	1/3 rd	cumin; soil; labour; location
Tube-well 2	fixed, flex	1/3 rd	cumin; soil; labour; location
Tube-well 3	fixed, flex	1/3 rd	cumin; soil; labour; himself; brothers
Santali pond	flex	1/3 rd	cumin; labour; location; not soil
Checkdam	flex	1/3 rd	poor; soil; location;

Tubewell 1: Savsi Mala Thakor; house near tube; constructed 2001 after three failures

Tubewell 2: Rama Deia Thakor; house near tube; 10 inch, 710ft deep; first constructed 19 years ago. Two pipelines and flexible pipeline.

Tubewell 3: Rama Talsi Thakor; house near tube; 8 inch, 700ft deep; first constructed 15 years ago. Two pipelines and PVC flex

Lands irrigated by each water controller:

Land owned by each water controller:

1: 2 hectares (father 8, who paid the tubewell)

2:

3: 4 hecets

Santali pond: Ganda Patel

Check dam: 5 hecets (3 cultivalable, 2 water storage)

Type of partnership in the water control system:

1:

2:

3:

Santali-pond:

Checkdam: brother arrangement

Acquired:

- Santali pond: auction led by the village committee. Not registered at any official office
- Checkdam: illegal access to land; checkdam construction, by NGO's as well as the 'landowners' themselves. Loans from the bank and villagers in order to have money for maintenance, engine etc. Savings to construct checkdam. Partnership with brother
- Tubewell 1: financial partnership with Patel who is rich and has a motor-company
- Tubewell 2: financial partnership
- Tubewell 3: financial partnership; saving; mortgage;

Control:

- Checkdam: determines how much land can be irrigated. If a farmer should sow less of his land with cumin for example (Wiram: Kanu Amtu Thakor)
- Tubewell 3: he decides about the sequence of irrigation supply. He decides when a farmer can get his third turn, based upon land preparation
- Crop, size,

Failures:

- Santhali-pond: not provide the third time: no limit, even provide to not high-quality soils

Heritage

- checkdam: the land in the checkdam which is appropriated illegally by the builders of the checkdam is inherited to their sons. This means that they can have control on the water in their lifetime as well. One problem is that the sons so have to be financially capable of running the engine to provide water. According to the mother some are and some are not. Dependent upon this, she might divide her land to their sons. The checkdam already went to father of Talsi, then Talsi and his brother, and then Wiram.
 - The farmers use alternately the name of the father and son from whom they get the water. This means that the water control is transmittable.
 - What obligations belong to the job of tubewell owner?
 - What rights belong to the tubewell owner?
 - What controlling role does the tubewell owner have? (what can he ask, what can he request
- Location mainly important for tubewell due to: construction of underground pipeline is costly; underground pipeline is fixed; dependent upon *kundi* and reaching of the underground pipeline.
- All inquire information about farmers by inquiring other farmers.
 - To grow cumin, 10.000Rs are needed for primary expenses as seeds, labour and fertilizer.
 - Cumin needs the least times of water and is the most profitable crop: very good for tubewell owner
 - Water regularly provided because otherwise the crop will fail. Main goal of the tubeowner. Things have to be really harsh if he will not provide the third time. Then he will loose as well.
 - All the three tubewell owners are eager to give their water for drinking purposes for the villagers when the Sihuri pipeline is not running well. They do this without requesting any charge.

Presentation AIDMI

Access to water

Rangpura, Radhanpur Taluka
Patan District

Method

- Participatory village observations
- Formal and informal interviews
 - Open interview
 - Semi-structured
 - Structured
- Exploration of water sources and their technical use
- Selection of key-informants and via key-informant find starting respondents and follow-the-network approach
- Questioning: follow the flow of land and water
 - Conflicts
 - Transactions
 - Tenure arrangements

Main findings (2)

Controllers reach:

- Set conditions for farmers
 - Family/friend relations
 - Type of crop (cumin)
 - Quality of soil
 - Location of land
 - Amount of land to be sown with cumin
 - Inquire information with others about the farmers
- Limitation on total amount of land possible for irrigation
- First irrigate own land, then family then rest
- If farmer does not comply, farmer is not chosen or next year won't receive water
- In conflict: not third turn given
- In shortage: not third turn given. Solution sought by other water providers

Main findings (4)

Arrangements

- Bagwhi:
 - 1/3rd for water in winter season
 - 1/4th - 1/5th on good quality soils. Explained by respondent due to rising prices in investments
- Mortgage:
 - Labour by landowner: 50-50. Not yet clear the difference in irrigated and non-irrigated mortgage land
 - Labour by mortgage-payer

Main objective

The objective of this research is to provide an overview of the access mechanisms to water in use:

How are access mechanisms used by farmers in order to secure access to land and water and based on what conditions is this access established and maintained?

Theory of access

Access: 'the ability to derive benefits from things'

- Three categories: Control, Gain, Maintain
- Mechanisms:
 - Technology
 - Capital
 - Markets
 - Labour
 - Knowledge
 - Authority
 - Identity
 - Social relations

Main findings (1)

Water Controllers: tubewell, checkdam, Santali pond

- Tubewell: owning land
- Checkdam: illegally acquired land; investment and construction of checkdam enables them to control the water stored
- Santali-pond: auction enables a party to place an engine

- Financial capacity
- Financial relations

Main findings (3)

• Gainers and maintainers strategies:

- Hard-working farmers
- Knowledge of good farming
- On-time land preparation
- Financial capacity to invest in land preparation, labour, seeds and fertilizers
- Location
- Family/friend relations (like an obligation)
- Others recommend at the water provider
- In conflict: next year won't take water
- In irregularity: next year won't take water. Water provider is not blamed
- Security: dependent on situation
 - Monsoon: if sufficient
 - Water source: if the owner wants to give to him
 - Farmer: alternately irrigating his field

Conclusions up to now

- Controllers have a lot to say in who can irrigate and who not: power
- Farmers are willing to comply and do not see the controllers as having power
- Conditions are institutionalized

Points of discussion

- Focus on heritage, transfer and change
- Other research methods for gathering information
- Time shortage
- Language shortage
- Difference between formal story and 'reality'

Annex 6 Water supply detailed

- TUBEWELL 1

Tubewell 1 is owned by Savsi Mala Thakor and his son Rama Savsi Thakor. The tubewell is located on land which was owned by Savsi Mala³⁸. Savsi Mala once owned twelve hectares of land which he subdivided to his three sons, each three hectares and three hectares to keep himself. The land is officially transferred to his sons, which means that the land is registered at the *Talathi* office on their own names. Savsi Mala is about 95 years old and fell under the policy that he was allocated land in 19XX. The tubewell is a reconstructed version, the fourth in a row. The three before stopped working after several years due to groundwater depletion and salinization. This fourth is running from 2001 onwards. The tubewell is 740ft deep and runs on electricity. The high-season to supply water to the farmers runs from November till March. In this period, the electric pump is turned on for as many hours as possible which is eight hours nowadays. Before 2002 the hours of electricity supply from the government was eighteen hours, but the hours have been reduced first to twelve and then to eight. As Savsi sais, ‘.we need twelve hours in order to provide water to more farmers’. Because of this, they can ‘only’ provide water to irrigate about seventeen or eighteen hectares instead of twenty. An underground pipeline is constructed which reaches the farmlands through means of a *kundi*. A *kundi* is a concrete construction which allows the water from the underground pipeline to reach the surface. The water will flow out of the *kundi* and directed into *dahlia*’s. A *dahlia* is an earthen canal which transports the water on the surface. The tubewell is connected with about eleven *kundi*’s.

The first tubewell was constructed 25 years ago and had run for ten years. At the time, father Savsi Mala was in charge of the management. For the construction of this tubewell Savsi contracted a loan from the Bank of Baroda in order to be able to pay for the drilling and the underground pipeline. After this stopped working Savsi contracted another loan from the cooperative bank to construct a second tubewell at another location. Yet this only ran for one year. Both stopped working because of water level depletion. As Savsi explains, he restituted both loans completely which made him the entire owner of these successive tubewells. The farmers Savsi supplied with water at the time had to give one-third of their crop produce. Out of this share combined with his own land produce he was able to repay the loan. In addition, at the time Savsi had constructed four other tubewells in different villages where he earned his one-third share in crop produce as well. These tubewells were constructed in partnership with Naranbhai Patel providing three-fourth of the yield to Patel and one-fourth to Savsi, as was the arrangement for the expenses.

After two years of no tubewell the third got constructed. It ran for five years, followed by a fourth which is working four years already. For the investment in these latter two Savsi went into an agreement with Naranbhai Patel again. For the third tubewell endeavor, N Patel and Savsi made a 50-50 arrangement: the complete costs would reach 4 *lakh* Rs of which Savsi had to pay 2 *lakh* Rs. At the time, both Patel and Savsi shared ownership. However, Savsi was not able to pay off these two *lakh* completely at the time when this third tubewell stopped working as well and so he gave away his land of 2.5 hectares for mortgage to Patel in liability for 1 *lakh* Rs. The terms of contract considering the mortgage arrangement were that Savsi

³⁸ According to the tubewell owner the water is of good quality both for irrigation and drinking purposes. Sometimes when the pipeline originating from Siruhi does not supply any drinking water the villagers (women) will go to the tubewell with their pots and pans to collect water; other villagers (men) visit the tubewell to take a bath.

would work on the land himself and give half of the yield to Patel until Savsi was able to pay off the 1 *lakh* Rs.

However, Savsi considered it a waste of previous investments in the underground pipeline and electricity connection so he convinced Patel to invest once more in the drilling of a tubewell. The costs amounted to 3 *lakh* Rs. As Savsi was not able to make any investments, Patel provided the money which made him the full owner of the fourth tubewell. Above this, he made a labourer of Savsi by paying him a 25,000 Rs salary a year for managing the tubewell and the water supply process. Included tasks are starting the engine, distributing the water and deciding to whom supply the water. Patel pays the electricity bill and receives the complete one-third share of the crop produce of the farmers who have received irrigation water. Savsi mentions that last year he had to provide two-third of his total crop produce derived from his 2.5 hectares land to Patel: one-third for the irrigation water and one-third for the mortgaged land.

- TUBEWELL 2

Rama Daha Thakor is the owner of tubewell 2. The tubewell has a depth 710ft and a width of 10inch³⁹. The owner provides irrigation water to 50-60 hectares which includes 22 farmers, if the electricity provision is regular and the pump is running well. According to this owner, seven hours of electricity is supplied normally which he fully uses during the peak irrigation season. This tubewell is running for eight months now; the one before had been active for fourteen years however due to acidity the pipe had broken. In addition, the former tubewell pumped at a depth of 200ft where no water could be extracted anymore. The new tubewell is constructed at exactly the same location as the old one since it is prohibited to dig new holes: only existing holes can be dug deeper and renovated. This tubewell is connected with two underground pipelines, in two different directions. This is necessary to prevent overflowing of the pipeline since the tubewell has a width of 10inch. The water can be divided over two pipelines and the command area for irrigation water supply is increased. Through *kundi*'s and *dahlia*'s the farmlands can be reached. The tubewell owner has a PVC pipeline as well, which can be used more flexible in order to reach land which is not in the coverage area of the underground pipeline.

The costs of the first tubewell amounted to 6 *lakh* Rs including the tubewell drilling, the pump and electricity connection. All this was initially paid for by Fazelbhai. At the starting time, Rama Daha was able to pay 20,000 Rs out of the yield rewards. Furthermore, in the fourteen years of running Rama Daha was able to pay off 3 *lakh* Rs. They both owned the tubewell 50-50 and there was no need for Rama to pay off the complete costs. However, the tubewell stopped working and at the time Fazelbhai was not capable of investing.

For the construction of the newly built tubewell Rama Daha went into a partnership with Fazelbhai Chauhan who financed for the drilling of the tube, the construction of the extra underground pipeline and other instruments necessary for running a tubewell properly. The costs of 4 *lakh* Rs are initially paid for by Fazelbhai, yet they made the agreement that when Rama Daha is able to pay 2 *lakh* Rs he has to, to 50-50 in expenses. The one-third share in crop produce given by the farmers who receive irrigation water from the tubewell is shared 50-50 between Rama and Fazelbhai. Rama Daha pays the electricity bill as the connection is registered on his name, however the cost is shared 50-50 as well with Fazelbhai. Hence, the

³⁹ The owner explains that he as well provides water for drinking and bathing once the Siruhi pipeline is stopped. According to Rama Daha the water is sweet and of good quality.

tubewell is owned both by Rama Daha and Fazelbhai; and Rama is not intending to pay off Fazelbhai in order to become the full owner. He is content with the situation.

- TUBEWELL 3

The owner of tubewell 3 is Rama Talsi Thakor⁴⁰. The tubewell has been reconstructed five years ago, has a depth of 700ft and is 8inch wide. About ten to fifteen hectares are irrigated which stands for about five (big) farmers. Sometimes it is more, sometimes it is less. In winter season the pump is running at full capacity, limited by the hours of electricity supply. According to Rama Talsi the water level has not decreased over the last two years, it even increased due to the heavy rains. The tubewell which was constructed at first occurred about fifteen years ago.

Fifteen years ago Rama entered into arrangement in order to construct that tubewell at the time with Kudidan Jula, the former Gujarat minister of Water Supply. The total costs were made by Jula; the one-third share in crop produce was divided by one-fourth to Rama and three-fourth to Jula and it was Rama's intention to pay off the complete costs. Yet this could not be entirely done due to the earthquake. And as a result, they agreed upon the pay-off of 1 *lakh* Rs (out of the total 4 *lakh* Rs) for the electricity connection which had not broken done due to the earthquake, and could still make use of. Rama had chosen the partner himself, because he new that Jula had enough capital to invest and that he had other such arrangements as well. It had been running for eight years before being stopped by the earthquake that hit the area in 2001. The system of underground pipelines was partly demolished as well. Until now, the owner only repaired those parts which were accessible due to cracks in the soil. One-third still has to be repaired which will be done in the future. This tubewell had a width of eight inch as well, yet at the time he was able to irrigate 30 hectares because electricity was supplied 24hours a day.

The tubewell of Rama Talsi is nowadays completely owned by himself. Yet for the new investments five years ago, Rama entered into an agreement with Ganapeth Ratia Shah. The price of drilling the tube amounted to 4 *lakh* Rs, paid by Ganapeth. Other costs such as the construction of the underground pipeline and the pump were paid for by Rama already before, since this was a renewed tubewell. Rama had not enough capital to invest in the tubewell and so he went into a partnership with Ganapeth. The agreement was composed in such a way that Ganapeth received three-fourth of the paid out one-third share of the crop from the farmers who had received water, whilst Rama received one-fourth. Within five years the partnership was closed as Rama had paid back the costs to Ganapeth.

In order to pay back Ganapeth as soon as possible Rama used to save his one-fourth of the one-third share in crop, he went into a partnership as labourer at someone else's land, and he took a mortgage on his land at the Banas Bank. Here, he mortgaged 4 hectares and received 2 *lakh* Rs for it. Immediately he paid off Ganapeth. Now, he is still the owner of the 4 hectares of land, he receives the complete one-third share of the crop produce and his share as labourer in the other partnership. This will be used to pay off the loan at the Bank, who demands a 12% interest per year. Rama wants to pay back the loan as soon as possible, with a limit of seven years.

- CHECKDAM

⁴⁰ The water is of good quality and drinkable: every now and then when the Siruhi pipeline fails to deliver water the villagers will come for drinking water.

The checkdam is an overflow structure made of concrete which is constructed at the lowest pond of a storage area. This storage area is surrounded by mud walls, and the purpose of the checkdam is to avoid the collapse of these walls as the surplus of water will flow over. The land covered by the checkdam was officially government owned land, and still is. The area covered is 116.56 acres. The checkdam of Rangpura is constructed and reconstructed during a period of twenty years by several different persons who took a claim on the covered land. In 1992 the dam got constructed by means of mud walls. The monsoon water flows downwards from east to west –in the direction of Kutch– will be stopped by this mud construction. Dependent upon the height of the mud wall and the amount of water fallen during the monsoon an amount of water is stored. Electric pumps are installed in the stored water and through PVC pipelines they pump the water out in order to irrigate farmland. The reason for shifting constructors has to do with the fact that the sand wall got collapsed several times due to heavy rains and even floods. As a result, another farmer grabbed the opportunity to invest in the construction. Furthermore, a catholic NGO invested in 1998 in reconstructing the wall; in 2002 the All Indian Disaster Mitigation Institute (AIDMI) again rebuild it with a cement checkdam in between the mud walls in order to prevent break down. At the time 30 to 40 farmers could benefit from the water stored for irrigation. Yet again, due to severe floods the last two years the mud walls were broken down again and the water stored reduced more than half. Which means that nowadays only ten to twelve farmers can make use of the water for irrigation.

The case of the tubewells refer mostly to the fact that once a person owns land, he can invest in that land and giving some space free in order to install a tubewell.

A different approach will be used to explain in more detail the processes with regard to the checkdam. The aforementioned access strategies and mechanisms from the farmer's perspective and the water providers' perspective does cover the mechanisms of the checkdam. However, more than these are at stake here: legal pluralism and access to land leads to access to water

To gain: take the land under the checkdam by clearing the land and installing mud walls so that you can say the stored water is yours

To maintain: keep the mud walls high and invest in pumps so that you can deliver water

To control: same as maintain. Controlled by a sense of ownership, which is accepted by many water receivers from the village

Why were these people able to impose themselves?

With regards to the checkdam, several different versions exist which makes it hard to provide an unambiguous overview of how the owners reached their status of being owner of the water source. An attempt will be made in order to give a clearer picture of the ownership situation regarding the checkdam. First of all, **four** persons can be pointed out as having -or have had- a main stake on the land-area covered by the checkdam. These are Sunda Savsi Thakor; Talsi Mawa Savsi Thakor including his sons (Talsi is the brother of Sunda); Raja Daha Thakor; and Chela Mana Thakor. Chela Mana constructed a checkdam in the wasteland at first in 1992, by constructing a mud wall. The water was stored and used for irrigation, which was divided by Chela to about twenty farmers. He received a one-third share from the farmers, completely for himself. Yet due to wall-collapsing no water could be stored anymore and Chela lost his claim on the land. And so in 1996 Savsi Saka Thakor (father of Sunda and Talsi) reconstructed the dam which made him the main shareholder on the land, allocating water in exchange for one-third of the crop as well. When he died in 2006, the claimed ownership rights were handed over to his two sons. Raja Daha did not construct any wall to store water in the area: he made

a wall of wood and remains of plants bounding a specific plot within the wasteland and claimed the land as his. At last, and not yet mentioned, is the impact of the construction of the checkdam by AIDMI in 2002. This enabled Savsi at the time (including his sons) to receive the one-third share again from forty farmers, until these mud walls collapsed as well. Hence, AIDMI constructed a checkdam so that forty farmers could use it, while making one specific person benefiting the most. This was argued by an AIDMI agent who stated that this individual sense of responsibility will at least lead to sustainability of the checkdam, as he will be eager to keep up with the dam and not let it collapse. He will invest so that more farmer will make use of the water on the long term. AIDMI did not see this deed as doing wrong, since still for pumping the water etc. the farmer himself had to invest in the technologies. And by this, it is better to have more farmers make use than none at all.

* According to Teji Talsi Thakor (wife of Talsi), they acquired 2 hectares of the wasteland by clearing the land and since this is still government property, officially the land cannot be owned and is not registered as owned by any villager. Yet, as they invested in the clearing and construction of the mud wall they see themselves as owners. Mrs. Talsi explains that she and her husband own the land located at the lowest point of the checkdam-covered area, denoting the point where the most water can be stored. As a result, according to Mrs. Talsi the others who have a stake in the wasteland area are able to grow crops on their land since this land is located at higher levels where the water is hardly stored and even less due to the pumping. Furthermore, the Talsi-family does not want the others to place an engine for pumping out the water for irrigation in exchange for a one-third share of the crop. According to the respondent, they have the principal and only rights to use the water since they have repaired the mud wall two years ago, and invested money and labour to do so: it amounted to about 1 *lakh* Rs. Still, the other parties place an engine which the Talsi-family does not like because the water left over for them will be less. Although Sunda is the brother of Talsi, they don't like him to place an engine since he did not share in the expenses.

* Sunda 'owns' two hectares in the water storage area as well. Again, the land is officially government property which got claimed 25 years ago by Sunda's (and Talsi's) father Savsi Saka, by means of placing boundaries at the sides. Sunda does not have to pay any taxes, although he mentions that a request for official ownership is running at the *Taluka* office. The land cannot be cultivated, so only water is stored. Initially, Sunda's father had cleared and bounded the land to use it for animal husbandry. Nowadays, Sunda explains that about fifteen farmers can make use of the water stored. According to Sunda, only those five persons who have a claim on the storage land are allowed to place an engine. If the water stored is sufficient four engines can be placed and the latter will have to make a 50-50 arrangement; if the water is not sufficient only two engines can be placed. In this case, Sunda belongs to those who can place an engine even if the water is not sufficient. Those who cannot place an engine in this case will have to make an arrangement or have to receive some money from the others.

If the monsoon is good about 20 hectares can be irrigated. Sunda's land is situated at the lowest point where the most water is stored as well; he explains that he shares the land with his brother Talsi. Alternately they place an engine in the water, last year it was Talsi's turn. In total, four brothers have a position on the land however not all are financially capable of investing in the engine and diesel plus maintenance costs for the mud dam. The two active brothers share the one-third share from the farmers who had received irrigation water; the other two -who have no claim at all on the water stored in the checkdam- receive about 10kg cumin per hectare irrigated. As for the explanation of Sunda, Sunda and Wiram, the son of Talsi, were responsible for the reconstruction of the wall so that more water could be stored

again. They invested about 5000-6000 Rs and labour. As a result, only Wiram (and Talsi) and Sunda are permitted to place an engine to make benefit out of it. Compared to Misses Talsi, Sunda tells that Sunda and Talsi share the land and the income derived from the water provision as well, even if the water is not sufficient and only one engine can be placed. He says that they share in the produce because they share in the expenses as well. Furthermore, if the water is solely stored at their plot, no other parties are allowed to place an engine.

For the costs, the respondent had to pay 80.000Rs the first year for the engine, the pipelines, the diesel, seeds and fertilizer. For this, he took a loan. 20-30.000 from another villager and 50.000 from the APMC⁴¹ imposing a 3% interest rate each month. From now on, every year Sunda takes these loans, as maintenance costs, seeds, and fertilizers together will cost 60.000Rs. And so, he has to pay back these loans each year as well. The expenses are deducted from the income derived from the one-third share in crop produce from the irrigated farmers, and shared between him and his brother. They share both in losses and profits. Furthermore, an engine will run for three years. After that, a new one has to be bought. Within five months he pays back his loan, at the time when the cumin is harvested. If he has not enough to pay back the loan, then he will pay it back next year. The costs of repairing the checkdam were made from his saved money.

→ total picture not clear: what does he earn?

* Wiram is the son of Talsi. Wiram received the land in the checkdam from his father who had cleared it. According to Wiram the area covered to be used by him is 6 hectares. Wiram notes that the land is officially not owned by him, as it is government property (nr.7), however he has usufruct rights registered at the *Talathi* office under nr.12. The land is solely usable for storing water to provide to farmers for irrigation. He is the one who placed an engine last year, and he was the only one due to insufficient water. If the water would have been more the others could have placed an engine as well. During last monsoon Wiram was the one who invested in the construction of a short-term dam by piling up sandbags and hiring labour to do so. Wiram has one brother Haja, but he has no active claim on the land since he is not financially capable of installing an engine. Last two years Haja was not involved in a partnership with Wiram but coming year Wiram wants to include his brother in the expenses again. The last four years Wiram had invested in an engine; one year it was Haja who managed the irrigation water supply as Wiram migrated for labour work. Four years ago, it was Wiram who had bought the engine, because at the time the price was not that high yet.

This season, in order to provide for more water as the checkdam water had run empty, Wiram had to invest in extra water supply by means of 20ft deep wells. The extra expenses for this instalment amounted to 5.000 Rs. For this and the other investment such as the engine, the diesel, the mud wall, the pipeline and the hired labour Wiram took a loan of 20.000 Rs from a Rabari coming from the neighbouring village Limburka, with an interest rate of 4% per month. Furthermore, Wiram took a loan of 15.000 Rs from a villager of Unjah.

→ conclusion from checkdam area: illegally owned and acquired land can be inherited as well which happens in this story very clearly. Plus: **he who invests, is allowed to make the benefit even though the others are brothers!!!!** (geld ook bij tubewells). They all see different other parties involved in the land; this explains that the situation is quite divers and difficult and scattered and unclear

→ checkdam: tragedy of the commons

⁴¹ Agricultural Produce Marketing Committee

- SANTHALI POND

The last water source for Rangpuran farmers to be discussed is the Santhali-pond. The Santhali-pond is the village pond of the neighbouring village Santhali. Since thirty years the water from this pond is pumped out and used for irrigation. Although a village pond is governmental property as well, they allowed others to make the water available to cover the irrigation demand for the surrounding farmers. Every year the Santhali village committee organizes an auction where the rights to pump out the water of the Santhali-pond are sold to the highest bidder. Anybody from the region can make a bid. Subsequently this person is allowed to install several pumps in the pond and provide the water to the farmers.

→ Santhali: geld is de constraining factor / enabling factor

t