Socio-Cultural Implications of the Community-Based Water Management: A Case Study of Gujarat, India

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Zusammenfassung

In den 1980ern und 1990er Jahren führten Naturschutz- und Konservierungkomponenten in Entwicklungsprojekten zum *community-based natural resource management (CBNRM).* Dies leitete einen Paradigmenwechsel im vom System zentralisierter staatlicher Kontrolle hin zu CBNRM ein, wobei lokale Gemeinschaften eine aktive Rolle spielen und direkte Kontrolle über die Resourcennutzung besitzen. Diese kommunal-basierten Ansätze bedeuten eine Abkehr von der zentralstaatlichen Politik des Mangements natürlicher Ressourcens. Da dies sowohl zu Erfolgen als auch zu Fehlschlägen führte, wurde in der indischen Entwicklungspolitik die Frage aufgeworfen, warum CBNRM-Projekte daran scheiterten die angestrebten Ziele zu erreichen. Akademiker und Aktivisten kritisierten die partizipatorischen Interventionen für ihre, durch ein fehlendes Machtgleichgewicht entstandene, inhärente Vulnerabilität, die die Fähigkeit verschiedener Akteure beeinflusst, an den Entwicklungsprojekten zu partizipieren.

Das Ziel dieser Studie ist es, unter Verwendung einer Fallstudie im *Mathnaa Watershed Development Project* im Sabarkantha-Distrikt Gujarats in Indien, zu verstehen wie sozio-kulturelle Faktoren die partizipatorischen Institutionen und Gemeindebildungen beeinflussen, die durch CBNRM-Interventionen in ländlichen Gemeinden geschaffen wurden. Diese Dissertation versucht zu verstehen, ob die formale Arena der Partizipation, die geschaffen wurde, um die Teilhabe der Menschen zu fördern, in der Lage ist eine gerechte Teilhabe in den ländlichen Gemeinden zu ermöglichen.

Die Doktorarbeit greift die die Analyse sozio-kultureller Aspekte auf, die die Teilhabe und Strategien der Akteure in verschiedenen Nutzergruppen und anderen Gruppen in formellen und informellen Arenen des Wassermanagements beeinflusst. Kaste, Klasse und Genderdynamiken sowie ihr Einfluss auf verschiedene Gruppen werden besonders betrachtet. In der Folge wird die Thematik der Rolle von Machtverhältnissen in der Verbindung von formellen und informellen Institutionen untersucht, die in Mathnaas agieren und die Teilhabe der Schlüsselakteure in den Arenen der formellen Teilhabe gestalten.

Die Doktorarbeit zeigt auf, wie die Arenen der formellen Teilhabe und Institutionen, die durch die Prozesses der Dezentralisierung geschaffen wurden, den Mitgliedern marginalisierter Gemeinden die Möglichkeit bieten zu partizipieren. Die Machtungleichheiten in einer bestimmten Gemeinde garantieren jedoch mit geringerer Wahrscheinlichkeit ‚gerechte Teilhabe' als Ergebnis einer Intervention. Andererseits partizipieren die Akteure an diesen formal geschaffenene Arenen wie dem *watershed committee* oder Nutzergruppen; ihr soziales Leben besteht nicht ausschließlich aus formelle Beziehungen, Interaktionen und Verhandlungen. Daher besteht die Notwendigkeit zu verstehen welche Rolle das ‚Informelle' beim Funktionieren der ‚formellen Arenen der Teilhabe' spielt. Diese Dissertation umfasst sieben Kapitel inklusive eine Schlußfolgerung . Im Folgenden findet sich die Zusammenfassung jeden Kapitels.

Kapitel 1: Einleitung

Das erste Kapitel führt in die Studie ein und legt die Forschungsagenda dar. Das Kapitel beginnt mit einer Erörterung des Paradigmenwechsels bei der Intervention im Management natürlicher Ressourcen von einem zentralstaatlichen zu einem *community-based* partizipatorischen Ansatz. Auch wenn diese *community-based* Ansätze eine Abkehr von der früheren zentralstaatlichen Politik darstellen (Pretty und Shah, 1997), sind widerspüchliche Ergebnisse über die Erfolgsgeschichten und Unzulänglichkeiten dieser Ansätze aufgekommen.

Das Kapitel erklärt in Kürze die Bewegung hin zu CBNRM, das in den später 1980ern startete, um die Fähigkeiten lokaler Gemeinden zu verstehen natürliche Ressourcen zu verwalten (Berkes, 1989; Agrawal, 2001; Agrawal und Gibson, 2001; Baland und Plateau, 1996; Ostrom, 1990; Ostrom et al., 2002; Chambers, Pacey und Thrupp, 1990). Das ersetzte die weltweite Propaganda welche die ‚Gemeinde' für unvernünftige Ausbeutung natürlicher Ressourcen für eigennützige Bedürfnisse für verantwortlich hielt, weithin bekannt als die *‚tragedy of commons'* (Hardin, 1968). Die Beweise führten zur Propagierung und Ausbreitung von Entwicklungsanstrengungen um CBNRM als eine Lösung der *‚tragedy of commons'* voranzubringen (Agrawal und Gibson, 1999).

Aber eine neue Welle von Forschungsergebnissen in den späten 1990ern betonte die Notwendigkeit, das Machtgleichgewicht unter den ländlichen Gemeinden zu verstehen, so dass die ländliche lokale Elite nicht das *community-based mangement* System dominiert, indem die Armen, Frauen und Machtlosen von der Gewinnverteilung eines verbesserten Management der natürlichen Ressourcen ausgeschlossen werden (Agrawal und Gibson, 1999; Leach et al., 1999; Meinzen-Dick und Zwarteveen, 2001). Deshalb wird in Indien und andernorts *conservation intervention* in CBNRM, aufgrund der Rolle verschiedener Akteure, die von der ‚Gemeinde' und Institutionen umfasst werden, die die Ergebnisse der CBNRM-Interventionen beeinflussen, formen und tranformieren, stark diskutiert, sowohl in wissenschaftlichen Kreisen als auch in der Politik. Auf diese Weise kommen Fragen über die Besonderheiten und Parameter zur Identifikation von Gemeindegrenzen auf; so wie: Wo liegen diese und wo enden sie? Wer ist innnerhalb und wer außerhalb der Gemeindegrenzen? Was konstituiert die Gemeinde?

Um die Probleme zu überwinden, die auftreten, wenn eine stark zentralisierte öffentliche Behörde verwendet wird, um natürliche Ressourcen an verschiedenen Orten zu verwalten, wurde Dezentralisierung empfohlen (Ostrom et al., 1993). Dezentralisierung koinzidiert mit dem Etablieren partizipatorischer Ansätze in der Entwicklungstheorie und –praxis, die dafür plädieren, dass lokale Gemeinden eine größere Rolle im Management natürlicher Ressourcen spielen sollen (Chambers, 1995, 1993). In letzter Zeit haben CBNRM-Studien damit begonnen die Heterogenität von Gemeinden und wie die Dezentralisierung des Ressourcenmanagements die verschiedenen *Gruppen innerhalb von Gemeinschaften* wie die Landlosen, die unteren Kasten, religiös-ethnische Gruppen und Frauen beeinflusst werden, zu untersuchen (Meinzen-Dick und Zwarteveen, 2001; Mehta, 2005; Mosse, 1994).

Im Licht der oben genannten Diskussion verschiedener kontextabhängiger und umstrittener Themen, die die dezentralisierten CBNRM-Interventionen charakterisieren, habe ich die speziellen Themen untersucht, die für die Partizipation der Gemeinschaften durch dezentralisierenden Interventionen entstehen.

Diese Studie greift die Kaste, Klasse und Genderdynamiken auf, die die Funktionsfähigkeit verschiedener *Gruppen*, wie dem *ex-watershed committee*, Nutzergruppen, Gruppen von Wasserverkäufern und –käufern der

Grundwassermärkte, sowie *collectively-borewell*[1] *ownership groups* beeinflussen und analysiert sie aus einem akteursorientiertem Ansatz[2] heraus. Mit Hilfe des akteursorientierten Ansatzes sollen in dieser Studie die verschiedenen Gruppen, die in Mathnaa durch Interventionsprozesse und –praktiken gebildet wurden, untersucht werden. Diese Studie bildet die aufkommenden sporadischen Interaktionen zwischen den Akteuren ab, wie sie auf die Interventionsprozesse reagieren, in dem sie sich auf ihre informellen Netzwerke stützen, indem sie ihre informellen Netzwerke aufziehen. Diese Arbeit macht den Versuch die Rollen und Strategien, die von den Schlüsselakteuren in den verschiedenen Gruppen in Mathnaa angewendet werden, aufzuzeichnen, indem eine ethnographische Untersuchung als Methode eingesetzt wird. Es werden die Interaktionen und Verhandlungen der Schlüsselakteure, die ihre Teilhabe im formal geschaffenene Raum des *watershed development project* charakterisieren, dargestellt. Die Arbeit beschäftigt sich mit dieser Untersuchung um ein besseres Verständnis des vielfältigen Wesens der ländlichen Sozialstruktur und ihrer Implikationen für gegenwärtige und zukünftige CBNRM-Interventionen zu erlangen. Es wurde der Versuch unternommen, die alltäglichen Interaktionen, Verhandlungen und sozialen Beziehungen, die eher in den informellen Arenen und Netzwerken erfolgen, zu beleuchten. Dafür wird der Zugang zu und die Kontrolle des Wassers in den Nutzergruppen rund um *check dams, collective borewell ownerships* und auf Kastenzugehörigkeit basierender Austausch von Grundwasser definiert.

Darüber hinaus argumentiert diese Studie, dass das oft gezeichnete Bild einer „Gemeinschaft und ihrer Partizipation“ im Kontext von CBNRM unvollständig ist, da es das komplexe Netz von Interaktionen, informellen Institutionen und Streitfragen über Ressourcenkontrolle und –zugang innerhalb der Gruppen der partizipierenden Gemeinde, übersieht. Weiterhin besteht die Hoffnung, dass diese Studie an der Debatte über *Entstehung und Partizipation von Gemeinschaften* in Entwicklungsprojekten beitragen kann, indem die sozio-kulturellen Faktoren, die den Zugang zu Wasser und das Wassermanagement regulieren, mit Hilfe des akteursorientierten Ansatzes, ermittelt werden. Die Forschungsziele dieser Studie

[1] *Borewell* ist eine Quelle bestehend aus einem Rohr, das in einem Bohrloch plaziert wird, um einen oder mehrere Grundwasseraquifere anzuzapfen.

[2] Der akteursorientierte Ansatz ermöglicht Beobachtungen aus der Akteursperpektive, welche nicht notwendigerweise auf das Verhalten des Akteurs in einer *rational choice theory* fixiert ist (Long und van der Ploeg, 1989).

sind: a) die sozio-kulturellen Bedeutungen, die mit Wasser im *community based* Wassermangement verbunden werden zu untersuchen. b) die Verbindungen zwischen formellen und informellen Institutionen, die die Teilhabe der Akteure im *community based* Wassermanagement bestimmen, zu untersuchen. c) die Hauptakteure, ihre Rollen, Interessen und die Macht in den formellen und informellen partizipatorischen Arenen im *community based* Wassermanagement, zu identifizieren.

Das Kapitel diskutiert außerdem den methodischen Ansatz dieser Studie, welches o ethnographischer Natur ist. Vier Schlüsselmethoden wurden verwendet: Haushaltsbefragungen mit strukturierten Fragebögen, Diskussionen mit Fokusgruppen, teilnehmende Beobachtung inklusiveinformeller Interviews.

Kapitel 2: Wassermanagement über Zeit und Raum in Indien

Indien hat eine lange Geschichte menschlicher Interventionen im Wassermanagement, da es markante klimatische Bedingungen, mit intensivem Monsun, gefolgt von ausgedehnten Dürren, aufweist. Wassermanagement war in Indien, aufgrund von sozio-ökonomisch-politischen und ökologischen Gründen, die die Politik des Wassermanagements quer über verschiedene soziale Gruppen betraf, immer ein heikles Thema. Deshalb ist es das Ziel dieses rückblickenden Kapitels zu erklären, wie eine Gemeinde als Institution die Bewässerungssysteme, im historischen Kontext vom vor- bis zum nachkolonialen Indien, verwaltet hat, und wie das Konzept des *community management* sich im Laufe der Zeit aufgelöst hat. Darüber hinaus wurde der Versuch unternommen die Institutionen des Wassermanagements in den Gemeinden wiederzubeleben. Ihre erfolgreiche Anwendung wird wird im folgenden Abschnitt ebenfalls behandelt.

Der Abschnitt über Wassermanagement in der vorkolonialen Phase in Indien beschreibt wie Könige, Feudalherren und lokale Gemeinden Wasser als Ressource verwaltet haben. Es wird die Relevanz von Karl Wittfogels ‚hydraulischer Gesellschaft' in Bezug zu Wassermanagement im vorkolonialen Indien in Frage gestellt. Weiterhin wird die Multidimensionalität des Wassermanagements im vorkolonialen Indien erklärt. Im Abschnitt über Wassermanagement unter der Kolonialherrschaft wird ausgearbeitet, wie Wassermanagement im kolonialen Indien mechanisiert und zentralisiert wurde; und wie Indien ein Bannerträger der Welt in der

Anwendung moderner Wissenschaft und Ingenieurwesens bei der Gestaltung riesiger und vielfältiger Bewässerungsstrukturen wurde. Der Abschnitt über die Politik des Wassermanagement im unabhängigen Indien illustriert die Tragfähigkeit des kolonialen Vermächtnisses im Wassermanagement. Abschließend wird argumentiert wie Faktoren wie die Unterschiede zwischen verschiedenen Kasten und Klassen, die Heterogenität der Bauern, städtisch-ländliche Dichotomien, Gender, instituionelle Ausrichtungen der Regierung und extreme Unterschiede in den ökologischen Bedingungen das Wassermanagement beeinflusst haben.

Erschwerend kommt hinzu, dass das Wassermanagement durch *vote bank politics*, fehlender Koordination zwischen der Bewässerungsbürokratie, der Politikgestaltung und verschiedenen sektoralen Abteilungen, die ihr eigenes Wasserprogramm realisiert haben, in vielfacher Hinsicht beeinflusst wurde. In dieser vielfältigen Ordnung hat Indien sein Wassermanagement in seine Waserpolitik aufgenommen, aber es bleibt bei der bloßen Absicht. Das wird durch Ministerien, die verschiedene, oft konkurrierende und widersprüchliche Programme einbringen, verkompliziert. Infolgedessen ist Wassermanagement in Indien eine verzwickte Angelegenheit, weshalb es erforderlich ist, in Indien ‚smartere' Methoden des Wassermanagements einzuführen.

Kapitel 3: Konzeptioneller Rahmen zur Analyse des ‚Community-Based Natural Resource Management'

In diesem Kapitel wird der konzeptionelle Rahmen von Gemeinden und ihrer Teilhabe an CBNRM erarbeitet und die Grundlage zur Erkundung der Natur der Interaktionen der verschiedenen Akteure im CBNRM unter Verwendung des akteursorientierten Ansatzes gelegt. Das Kapitel erklärt wie in der sozialwissenschaftlichen Literatur das Erfassen der Essenz des Begriffs ‚*community*' eine unerfüllte Aufgabe geblieben ist (Gauld, 2000). Gemeinschaft als die unterste Ebene von Verdichtung zu verstehen, auf der die Menschen in gemeinsamer Anstrengung z.B. kleine, homogene, harmonische und territorial gebundene Einheiten organisieren (Kumar, 2005), hat eine Debatte in den Sozialwissenschaften ausgelöst.

Dieses Kapitel erklärt weiterhin wie unlängst CBNRM-Studien begonnen haben die Heterogenität von Gemeinden zu untersuchen und wie Dezentralisierung von

Ressourcenmangement die verschiedenen *Gruppen innerhalb von Gemeinschaften,* wie z.B. Kasten (Sangameswaran, 2008) oder Frauen (Mainzen-Dick und Zwarteveen, 2001) beeinflusst hat. Man muss vorsichtig sein, wenn man dieses Konzept der Partizipation als ein Mittel zur Gewährleistung einer besseren Einbeziehung von Gemeinden in CBNRM verwendet, da Partizipation viele Formen Ausmaße hat. Es gibt eine Debatte unter Autoren, wer das Konzept der Partizipation, unter Berücksichtigung der Natur und des Ausmaßes oder der Mittel und Grenzen von Partizipation, theoretisiert hat. Eine Zeit lang hat der Begriff ‚Partizipation' verschiedene Bedeutungen erlangt und ist weiterhin ein unscharfes Konzept (Ibid).

In dieser Studie wird Agrawals Typologie angewendet, um zu untersuchen wie verschiedene Teile der Gemeinden partizipieren um die Machtverhältnisse innerhalb der Gemeinde Mathnaa hervorzuheben, und ihren Einfluss auf partizipatorische Prozesse innerhalb des Kontextes der Intervention. Diese Arbeit verwendet einen akteursorientierten Ansatz, um die Wege und Formen zu bemessen, mit denen die Akteure versuchen Kontrolle über natürliche Ressourcen (wie Wasser in dieser Fallstudie) erlangen, im Verhältnis zu anderen Akteuren, inklusive der Art wie schwächere Akteure ihren mächtigen Gegenüber im Dorf widerstehen. Dies hilft zu verstehen wie verschiedene Akteure in heterogenen Gemeinden arbeiten, um ihre Wünsche und Interessen zu erreichen.

Der akteursorientirte Ansatz, zusammen mit dem Konzept von *agency* und Macht[3] ist nützlich für diese Studie, da es den Akteur ins Zentrum des Diskurses um das Management natürlicher Ressourcen stellt, unter Anerkennung der Tatsache, dass es eine Vielfalt an verschiedenen Akteuren gibt. Abschließend ergänzte der akteursorientierte Ansatz meine Studie, die von ethnographisch Natur ist, in dem sie die Orte und Rollen aufdeckte, die Akteure (als Gruppen oder Individuen in Interaktionsprozessen) spielen und am besten ihre Möglichkeiten unter den gegebenen Umständen koordinieren. Dies sind einige der signifikantesten Beobachtungen, die ich gemacht habe, um den methodischen Ansatz hinsichtlich des verwendeten Modells und politischer Dynamiken unter denen ich gearbeitet habe zu untermauern.

[3] Alle Akteure üben eine Art von ‚Macht', Einfluss und manipulativen Strategien aus, wohingegen solche, die in untergeordneter Position sind auch Spielmacher im Spiel sind (Long, 2001).

Kapitel 4: Wasser Resourcen Management in Gujarat: Ein Überblick

Gujarat war führend bei der Debatte über Wasserknappheit und der Absenkung des Grundwasserspiegels. Um die Wasserressourcen Gujarats zu entwickeln und das Problem der Wasserknappheit, was sowohl die Bewässerung als auch die Grundwasserversorgung betrifft, zu lösen, hat die Regierung Gujarats verschiedene politische Strategien und Pläne angewendet. Wasserknappheit ist sowohl ein Problem der Verteilung als auch der Beziehungen, da es sich auf verschiedene soziale Gruppen unterschiedlich starken Einfluss hat. Deshalb ist es das Ziel des Wasserressourcenmanagements in Gujarat Wasser auf eine effiziente, gerechte und nachhaltige Art und Weise für ganz Gujarat anzubieten. Grundwasser *governance* ist zu einer ernsten Angelegenheit für die Regierung geworden, da Gujarat in einer Reihe mit anderen indischen Bundesstaaten mit schwacher Grundwasser *governance* steht, da sie gescheitert sind eine wertvolle Ressource gut zu verwalten.

Dieses Kapitel führt in das Wassermanagementszenario im Staat Gujarat ein und arbeitet die Anstrengungen der Regierung aus *community-based* Wassermanagement voranzubringen, um Wasserknappheit zu bekämpfenund die Wasserressourcen in Gujarat zu verwalten. Weiterhin erarbeitet dieses Kapitel die Grundwasserhydrologie Gujarats und den Grund für die Beliebtheit der Grundwassernutzung in diesem Staat, sowie die Entwicklung privater Brunnen und Grundwassermärkte. Es diskutiert die *governance* -Krise in Gujarat, indem die Politik der Regierung, Maßnahmen und Projekte erklärt wird, mit der versucht wird das Bewässerungs- und Trinkwasserproblem des Staates zu lösen, und wie weit man in Fragen der Effektivität (Ineffektivität) im Wasserressourcenmanagement vorangekommen ist. Abschließend diskutiert das Kapitel die Faktoren wie die Politik Gujarats, Kaste, Klasse und Machtverhältnisse, die die Wasser *governance* Gujarats beeinflussen und es wird argumentiert, dass das Wassermanagement eher von sozio-politischen, institutionellen und ökologischen Faktoren beeinflusst wird, als nur eine Frage zu Politik zu sein. Demzufolge betreffen soziale Unterschiede Wassermodelle in Gujarat sowohl auf Makro- als auch auf Mikroebene.

Kapitel 5: Die Wasserwelt in Mathnaa

Dieses Kapitel führt empririsch in die Region und das Dorf, in dem die Fallstudie durchgeführt wurde ein: seine sozialen Strukturen, sein Kastengefüge und die Rolle, die die Kastenhierarchien in der Wasserregelung spielen Wasser nimmt eine zentrale Rolle im Leben der Menschen in Mathnaa ein, da die Nutzung der verschiedenen Wasserquellen des Dorf durch die sozialen, ökologischen und institutionellen Grundlagen geregelt werde, die in diesem Kapitel erklärt werden. Zusätzlich müssen die Thematik des Wassers in diesem Dorf zusammen dem Kastensystem, der Genderfrage, dem Wohlstand, der Politik und Macht gesehen werden. Die Sozialstruktur, das Kastensystem und die Hierarchie innerhalb des Kastensystems spielen eine wichtige Rolle bei der Wasserordnung in Mathnaa. Betrachtet man die Sozialstruktur des Dorfes kann die Dorfgemeinschaft nicht als eine *‚whole unified community'* bezeichnen, da diese aus vielen verschiedenen Ebenen besteht, wie der Kaste, der Klasse, dem Geschlecht, der Ethnizität, des Wohlstandes etc. Die Genderhierarchie bedingt durch die Kastenzugehörigkeit führt zu einer Ungleichheit in Fragen des Zugangs und des Managements von Wasser in Mathnaa. Belege, die in der Diskussion angeführt wurden, zeigen, dass Entscheidungen in Bezug auf Wassermanagement in Form des *watershed committee*, den Preisen für Wasser auf dem Grundwassermarkt oder den Erhalt der *check dams* zeigen die Unterordnung weiblicher Entscheidungen über alle Kastengrenzen hinweg.

Schließlich wird das Wassermanagement in Mathnaa vom Kastensystem dominiert, sowohl bei Fragen des Zugangs, als auch bei der Verteilung, dem Besitz und der Teilhabe bei Entscheidungen zur Regelung von wasserbezogenen Fragen. Unabhängig davon, ob es sich um Maßnahmen der Regierung oder von NGOs handelt, wie z.B. Handpumpen, Bohrbrunnen, Schachtbrunnen, *watershed* oder Wasserversorgung durch Pumpen, alles folgt dem gleiche Schema von Beanspruchung und Konkurrenz des Besitzes. Das Kastensystem wiederum beeinflusst alle anderen Aspekte, wie Gender, Landbesitz, Eigentum der Bohrbrunnen, Zugang zu Technologie, den Grundwassermarkt, das *watershed* Projekt, Nutzergruppen etc.; es beeinflusst das gesamte Wassereigentums und –managementsystem in Mathnaa.

Kapitel 6: Soziale Organisation im *Watershed Development Project* in Mathnaa

Oft wird die Partizipation lokaler Gemeinden als Mittel angesehen *equitable goals* zu erreichen, Es wird jedoch die Frage aufgeworfen, was eine Gemeinschaft ausmacht und und wie Faktoren indentifiziert werden, die ihre Partizipation im *watershed developement* ermöglicht. Dieses Kapitel stellt empirisch Qualität und Form von kommunaler Partizipation innerhalb der *watershed community*, die in großem Maße von den Charakteristiken der lokalen Gemeinden abhängt. Das Kapitel zeigt auf, dass die Dorfgemeinschaft vom Kastensystem, der Klasse, von Gender, Ethnizität, Wohlstand etc. beeinflusst wird und Akteure mit unterscheidlichen Interessen beinhaltet, die in das Ergebnis der Gestaltung einiger Entwicklungsinterventionen, wie dem *watershed* Projekt im Falle Mathnaas, involviert sind. Darüber hinaus erklärt das Kapitel wie Geschlechterbeziehungen in Mathnaa, im Kontext von Partizipation am *water development project*, charakterisiert und sozial durch Normen, Bedeutungen und Praktiken konstruiert sind. Weiterhin wird erklärt wie formelle Arenen der Partizipation, die für die Partizipation geschaffen wurden, die erwünschten Resultate gerechter Teilhabe verfehlt haben.

Das Kapitel illustriert weiter wie der Austausch von Grundwasser in die lokalen Institutionen eingebettet ist und von diesen geregelt wird. Diese Institutionen sind wiederum, zusammen mit anderen sozialen Faktoren, die den Wasseraustausch und das Grundwassermanagement in Mathnaa beeinflussen, tief im Kastensystem verankert. Dieses Kapitel erklärt außerdem die sozialen, hydrologische und politischen Faktoren, die die Entwicklung und das Management des Grundwasser durch Bohrbrunnen Elektrizitätssystem (vor und nach Jyotirgram Yojana) und *check dams* beeinflussen. Überdies zeigt das Kapitel wie die Gemeinde intelligent die bereits bestehenden verschiedenen Eigentumsrechte kombiniert, um Zugang zu Wasser zu erlangen.

Kapitel 7: Zusammenfassung, Fazit und zukünftige Forschung

Aspekte des Schutzes und des Erhalts in Entwicklungsprojekten in den 1980ern und 1990ern führten zur Entwicklung des *community-based natural resource management (CBNRM)*. In CBNRM-Interventionen haben Dezentralisierung ein prominenten Platz

eingenommen. Dabei gibt der Staat die Verantwortung für das Management der natürlichen Ressourcen, über Institutionen wie das *watershed committee* und *water associations*, an die lokalen Gemeinden ab. Die Verfechter von Dezentralisierung rechtfertigen dieses Konzept damit, dass es zu mehr Teilhabe, Effektivität und Gleicheit führt, wobei andererseits die meisten Anstrengungen ohne eine Verbesserung der Verhandlungsmacht der lokalen Gemeinden endeten (Agrawal und Ribot, 1999). Die Akteure, die die Verantwortung für diese Institutionen übernahmen neigten dazu sich an andauernden Verhandlungen zu beteiligen, während sie sich gleichzeitig direkt und indirekt sowohl an formellen Institutionen wie dem *watershed committee,* als auch an informellen instituionellen Strukturen wie den lokalen sozialen Netzwerken beteiligten.

Die Ergebnisse bestätigen die Behauptung der akteursorientierten Wissenschaftler, dass soziale Tätigkeiten sowohl akteursorientiert, als auch gleichzeitig in größere soziale Gegebenheiten, die die Entscheidungen des Akteurs beeinflussen, eingebettet sind (Long, 1992; Long und van der Ploeg, 1989). Einige der wichtigsten theoretischen Erkenntnisse dieser Studie werden um die Thematik von Gemeinscahften , Kosmologie des Wassers, Wasser und Macht und dir Koexistenz verschiedener Regime des Eigentumsrechtes herum, unten detailliert diskutiert, um die die gefundene Antwort durch die Linse der Forschungsziele zu konkretisieren.

a) Konzeptionalisierung von Gemeinschaft

Es wurde durch diese Arbeit gezeigt, dass die *community-based* Akteure Mathnaas, aufgrund ihrer unterscheidlichen sozio-ökonomischen und politischen Hintergründe, sehr unterschiedlich sind und verschiedene Wahrnehmungen, Fähigkeiten und institutionelle Eigenschaften haben. Geschlechterunterschiede existieren in Mathnaa in Fragen der Kastenhierarchie und Geschlechterbeziehungen werden als, durch Normen, Bedeutungen und Parktiken, sozial konstruiert charakterisiert. In Mathnaa agiert ein Set von sozialen, ökonomischen, kulturellen und machtolitischen Dynamiken in einer vorgegebenen Gesellschaft, die die Verhältnisse zwischen formellem und informellem Institutionen des Ressourcenmanagements beeinflussen.

b) Kosmologie des Wassers

Wasser besetzt einen zentralen Platz im Leben der Menschen von Mathnaa. Darüber hinaus ist Mathnaas *water world* in Fragen von wasserbezogenen Praktiken tief in der

Religion und Kosmologie verwurzelt. Der Grundwassermarkt in Mathnaa hängt von sozialen Strukturen, sozialen Normen und Praktiken Mathnaas ab, die tief in das Kastensystem eingebettet sind. Dabei wird bei Bewässerung und der Trinkwasserversorgung auf Dorfebene auf Sakrales und Profanes Rücksicht genommen.

c) Wasser und Macht

In Mathnaa wird jeder Aspekt des Wassermanagements vom Kastensystem dominiert, bei Zugang, Verteilung, Eigentum und Teilhabe an der Regelung. Wasser ist in Mathnaa ein von Männern dominierte Arena, alle wasserbezogenen Fragen und Bereiche werden von Männern kontrolliert. Des Weiteren können *community-based* Wasserprojekte nicht losgelöst von lokaler Machtpolitik betrachtet werden. Weiterhin sind Wasserfragen in Mathnaa Fragen von Kaste, Klasse, Gender, Wohlstand, Politik und Macht.

d) Die Koexistenz von verschiedenen Eigentumssystemen

Im Falle von Wasserressourcen variieren der Besitz und die Nutzungsrechte bei Wasserquellen und –nutzung. Die Anstrengungen einer Gemeinde bei der Speicherung von Regenwasser, das durch *check dams* frei zugänglich ist, ist ein gemeinschaftliches Eigentumssystem und hat geholfen die Bohrbrunnen wiederaufzufüllen. Dies resultierte in dem Aufbau eines privaten Eigentumssystem an Grundwasser, das nicht gerecht unter allen Mitgliedern der Gemeinde aufgeteilt wird. Das bedeutet, dass das Auffüllen der Bohrbrunnen, die in privatem Besitz sind, durch das öffentlich bezahlte *watershed development programme*, dazu führt, dass eine öffentliche Investition privater Besitz wird.

Dadurch ist Grundwasser in Mathnaa eine ‚*restricted open access*' Ressource und wird zu einem privaten Besitz, sobald der Besitzer des Pumpe es gefördert hat. Darüber hinaus sehen wir in Mathnaa die Koexistenz von drei Eigentumssystemen[4], die gleichzeitig funktionieren und die Gemeinde nutzt sie, um Zugang zum Wasser zu erhalten, indem sie verscheidenen Technologien wie Bohrbrunnen und *check dams* nutzt.

[4] Allgemeiner Besitz, privater Besitz und freier Zugang.

Politische Implikationen

Oft wird in Regierungs- oder NGO-Projekten den Themen ‚Dorfgemeinschaft' und ‚Partuizipation' große Bedeutung zugemessen. Die Teilhabe- und die Dorfgemeinschaft neigen rhetorisch oft dazu die soziale Zusammensetzung der Dorfgemeinschaft und Interessenkonflikte innerhalb und zwischen den Gemeinden zu ignorieren. Das hat ernste Implikationen für den Erfolg des Projektes und auf seine Akteure, die die wahren Partizipierenden des Projektes sind. Es ist nicht gesagt, dass ein an einem Ort erfolgreiches Projekt an einem anderen ebenfalls erfolgreich sein muss. Die sozialen Gegebenheit an jedem ländlichen Ort Indiens sind einzigartig. Mit dem Aufstieg einer neuen dominanten Kaste im 21. Jahrhundert in Indien haben sich neuere Definitionen und Paradigmen, neben den traditionellen patriarcharlichen im Feudalismus begründeten, entwickelt. Obwohl Indien eine aufsteigende Macht ist, ist seine Gesellschaft auch heute noch stark vom Kastensystem beeinflusst. Das war einer der Erwägungspunkte der indischen Regierung, 2011 einen Kastenzensus durchzuführen.

Nachdem das Konzept der Gemeinschaft aus verschiedenen Perspektiven betrachtet und diskutiert wurde, ist es evident, dass die Vorstellung der Gemeinschaft in der Politik der CBNRM eine Reflektion der schlecht empirische erfassten Realität ist und damit ein in die Irre führender Orientierungspunkt für praktische Interventionsstrategien ist. Eine Dorfgemeinschaft setzt sich aus verschiedenen kleinen sozialen Gruppen mit jeweils eigenen Interessen und Inspirationen zusammen. Es muss nicht diskutiert werden, dass sie eine Wert im aktuellen Kontext weiterer Debatten zur Erreichung der Ziele nachhaltigen Management natürlicher Ressourcen besitzen. Es gibt mehrere Studien, in denen ‚romatisierende' Repräsentationen von des Begriffs Gemeinschaft und seiner Anwendung erfolgreiche Resultate aufgewiesen haben. Die Anwendung von CBNRM ist unvermeidbar kontrovers und verschiedene Beispiele haben gezeigt, dass Fortschritt schwerfällig ist. Die Schwachstellen kommen von der zugrundeliegenden Annahme, dass Gemeinden homogen sind und zusammenarbeiten, um allgemeine Entwicklung der ganzen Gemeinde zu erreichen, sodass Gleicheit erreicht wird. Damit das Projekt jeden Teil der Dorfgemeinschaft berücksichtigt, muss sich das partizipatorische Management entlang verschiedener Linien in unterschiedlichen ländlichen und kulturellen

Gegebenheiten entwickeln; immer die besondere Zusammensetzung der Dorfgemeinschaft beachtend. Daüber hinaus ist *community-based* Besitz und Verständnis sozialer Unterschiede, im Zusammenhang mit Ressourcenzugang, die Hauptdeterminante für ein erfolgreiches Funktionieren der formellen partizipatorischen Institutionen, das Management natürlicher ressourcen im allgemeinen und CBNRM im speziellen.

Zukünftige Forschung

1) Dies ist eine Studie auf Mikroebene, die den sozio-kulturellen Kontext der Dorfgemeinschaft mehr beachtet, als das Gesamtbild des Staates Gujarat. Deshalb wäre es ein wichtiger Versuch nicht nur die sozio-kulturellen, sondern auch die ökologischen Bedingungen Gujarats in den theoretischen Rahmen zu integrieren. Zum Beispiel würde der Effekt wasserbezogener Legislative verschiedener Staaten auf verschiedene ökologische Zonen Gujarats eine fruchtbare Forschung darstellen.

2) Es wäre ebenfalls eine wertvolle Untersuchung, eine vergleichende Studie auf Basis von zwei oder mehr Dörfern zu machen und auf die unterschiedlichen Mechanismen, bei denen Kaste, Gender und religiöse Zugehörigkeiten eine Rolle spielen für die Erklräung von Grundwassermanagement zu schauen.

3) Es wäre interessant für eine weitere Analyse zu untersuchen, welche sozio-kulturellen Praktiken sich um Wasserknappheit herum zentrieren, sowie den Effekt, den es auf lokale Gemeinden in Hinsicht auf Gesundheit und sanitären Bedingungen und anderen Aspekten menschlicher Entwicklung hat, die aufgrund von Wasserknappheit entstehen und jenseits des Rahmens dieser Dissertation liegen.

Die Idee des Wassermanagements mit seinen weitreichenden und deskriptiv beträchtlichen Schlussfolgerungen kommt zusammen mit seinen eigenen Hindernissen und einem Wesen der Ungleicheit. Deshalb sollte die Rolle des Wassers im seiner Gänze und Realität gesehen werden, die Dynamiken Durkheims, der in der Kultur spezifischen gesellschaftlichen Gegebenheiten, bezeugend.

Abstract

Failure of the state-led development projects and the growing concerns for participation, in the 1980s and 1990s gave rise to community-based natural resource management (CBNRM). This in turn led to a paradigm shift in natural resource management from centralised state control towards CBNRM, in which the local communities now play actively and have direct control over resource use and management. These community-based approaches are a departure from the state-centered government polices of natural resource management. But the mixed successes and failures of these approaches have led to a question in the Indian development policy context, namely why CBNRM projects fail to achieve their expected level of results and equity. Academics and activists have criticised participatory interventions, for their inherent vulnerability due to power imbalances, which in turn affect various actors' capacity to participate in a development project. Using the case study of the Mathnaa watershed development project in the Sabarkantha district of Gujarat, this study aims to understand how socio-cultural factors influence participatory institutions and community formation created in CBNRM interventions in rural communities. In addition, it examines how the formal participatory arena is able to give space to the vulnerable and less powerful groups in the village.

Due to the widespread notion that CBNRM project would be successful and egalitarian in nature which would lead to a true representation and the participation of all sections of society, functioning on the principle of democracy and equity. This thesis takes up the analysis of socio-cultural aspects affecting actors' participation and strategies in various water-related community groups in the formal and informal participatory arenas of managing water. Caste, class and gender dynamics are focused upon, and their influence on various water-related community group. In pursuit of these aspects, the thesis examines the role of power relations in the linkages between the formal and informal institutions operating in Mathnaa society, as well as shaping the participation of the key actors in the formal participatory arenas.

The thesis demonstrates that the formal participatory arenas and institutions created by the process of decentralisation do provide the opportunities for marginalised

community members to participate, although the power imbalances in a given community are less likely to guarantee 'equitable participation' as an intervention outcome. On the contrary, for actors participating in these formal invited arenas, such as a watershed committee or user group, their social life does not simply consist of formal relations, interactions and negotiations alone; hence, there is a need to understand what the 'informal' holds in the functioning of 'formal participatory arenas'.

Therefore, a need to acknowledge the central role played by any kind of community water-related intervention involves building on and feeding into existing social and power relations and any inequity in the benefits of the CBNRM project through formal participation.

Keywords: Water Management, CBNRM, Gender, Decentralization, Formal and Informal Institutions, Groundwater, India, Gujarat

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for having faith in my dreams

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Glossary

Adivasi	Tribal
Ahar-Pyne	Floodwater harvesting system
Ahars	Rectangular catchments basin with embankments on three sides
Ankada	Revenue paid to the State by the villagers in pre-colonial Gujarat
Arthashastra	Book written by *Kautilya* the chief adviser to India first emperor Chandragupta Maurya (321-297 B.C) on politics and statecraft
Ayacut	Distributary/command area of irrigation system
Bae	Numerical two in Gujarati language
Ben	Sister
Bhai	Brother
Bhathi Dada	Local Deity
Brahmins	Priestly Upper and Learned Class
Chak	Outlet
Chamar	Leather Worker
Chopaal	Main square of the village, where village common meetings take place
Dalit	Oppressed, politically correct term for the so called untouchables
Darbar	Ruler
Eik	Numerical one in Gujarati language
Gauchar	Pasture Land
Goam	Collective system in which every cultivator had to supply one person per plough to carry out the physical work for constructing ahars and pynes
Gram Panchayat	Council of elected or nominated villagers (officially all are elected, though in some cases they are nominated)
Gram Sabha	Assembly of all inhabitants of a village
Harijans	Literally meaning children of God, term used for so-called untouchables
Hariyali	Greenery
Izzat	Honor/Pride
Jadeja	High Rajput caste in Sabarkantha
Jagirdars	Feudal Chief
Jati Samaj	Caste Council

Jati	Sub-Caste
Jyotirgram	Lighted Village
Kalpa Vriksha	Wishing Tree
Kanku Mata	Village Local Deity
Kharif	Summer or monsoon crops usually sown beginning July of the year
Kos	Traditional irrigation system in which water is drawn through a large leather bag from a well by which bullocks
Kothi	Concrete structure used to store water for domestic needs
Kshatriyas	Warrior/Ruling Class
Kudimaramat	Voluntary Labor
Kuhls	Farmer-managed gravity flow irrigation/diversion canals
Kumari Kanyas	Virgin or Unmarried Girls
Kutumb	Joint/Extended Families
Lotas	Drinking Vessels
Manusmriti	(The Laws of Manu) is the foundation of Hindu religious law and social conduct written by Manu, and is popularly known as Manu code
Moksha	Salvation
Motobahi	Elder Brother
Paap	Sin
Pani Panchayat	Water Council
Pavitra	Pure/Holy
Phad	Community managed irrigation system in which series of dams are built on rivers to divert water for agriculture use
Puja	Form of Hindu worship in which chosen deities are honored
Punya	Holy Reward/Benediction
Pynes	Channels constructed to utilize the water flowing through the hilly rivers
Rabi	Winter Crop usually sown in October
Rajput	Higher caste in Sabarkantha
Rig-Veda	Is one of the ancient primary texts of Hinduism which consist of sacred Sanskrit hymns, written during the period 1500 B.C. but there is often a debate on the exact duration of its period
Sahukar	Merchant–usurer
Samaj	Community
Sarkari	Government

Sarpanch	Village Headman
Sudras	Service Class often considered as untouchables in rural India
Talab	Pond
Talati	Village Revenue Officer
Taluka	Sub-district revenue division. This may sometimes be a development block, or in some states each of the sub-district division will have more than one development block
Tank	Man-made reservoir created by a simple earthen construction (the bund) that captures surface run-off
Tantrik Baba	Shaman
Tehsildar	Head of the sub-district level
Tempu	Carrier Rickshaws
Tota	Capacitors
Trind	Guajarati number meaning three
Tulsi	Queen of Basil considered sacred
Vaishya	Trader or Business Class
Varna	Four ‘classes’ of the Hindu society
Was	Living quarter/area in the village
Yojana	Scheme
Zamindari	Rule of Landlords
Zamindars	Landlords

Abbreviations

APMs	Adjustable Proportional Modules
BJP	Bharatiya Janta Party
BKS	Bharatiya Kisan Sangh
CADP	Command Area Development Programme
CBNRM	Community-Based Natural Resource Management
CBWM	Community-Based Watershed Management
CDP	Community Development Programme
CGWA	Central Ground Water Authority
CGWB	Central Ground Water Board
COWDEP	Comprehensive Watershed Development Project
CPR	Common Property Resource
CSO	Central Statistical Organization
DDP	Desert Development Programme
DFID	Department for International Development
DPAP	Drought Prone Area Programme
DTWs	Deep Tubewells
EAS	Employment Assurance Scheme
FGD	Focus Group Discussion
FYP	Five Year Plan
GEB	Gujarat Electricity Board
GIZ	Deutsche Gesellschaft Fur Internationale Zusammenarbeit
GoG	Government of Gujarat
GRACE	Gravity Recovery and Climate Experiment
GSLDC	Gujarat State Land Development Corporation
GWRDC	Gujarat Water Resources Development Corporation
IC	Irrigation Commission
ID	Irrigation Department
IDRC	International Development Research Centre
IMT	Irrigation Management Transfer
IWDP	Integrated Wastelands Development Programme
IWRD	Integrated Water Resource Development
JFMP	Joint Forest Management Programme
JGS	Jyotirgram Scheme

JnNURM	Jawaharlal Nehru National Urban Renewal Mission
MoA	Ministry of Agriculture
MoEF	Ministry of Environment and Forest
MoRD	Ministry of Rural Development
MoWR	Ministry of Water Resources
NABARD	National Bank for Agricultural and Rural Development
NASA	National Aeronautics and Space Administration
NASDORA	National Authority for Sustainable Development of Rainfed Areas
NBA	Narmada Bachao Andolan
NGO	Non-Government Organization
NIRD	National Institute of Rural Development
NSSO	National Sample Survey Organization
NWDPRA	National Watershed Development Project for Rainfed Areas
NWDT	Narmada Water Dispute Tribunal
NWMP	National Water Management Project
NWP	National Water Policy
PIA	Project Implementation Agency
PIM	Participatory Irrigation Management
PWD	Public Works Department
RAS	Reclamation of Alkali Soils
RCAI	Royal Commission on Agriculture in India
RVP	River Valley Projects
SC	Schedule Caste
SCA	Special Central Assistance
SCSP	Schedule Caste Sub Plan
SGWA	State Ground Water Authority
SHGs	Self Help Groups
SPPWCS	Sardar Patel Participatory Water Conservation Scheme
SSNNL	Sardar Sarovar Narmada Nigam Limited
SSP	Sardar Sarovar Project
ST	Schedule tribe
UGC	Upper Ganga Canal
UNCED	United Nations Conference on Environment and Development
UNDP	United Nations Development Programme
UP	Uttar Pradesh

WA	Watershed Association
WDP	Watershed Development Programme
WEM	Water Extraction Mechanism
WRO	Water Resources Organizations
WUAs	Water Users Associations

Chapter 1 Introduction

1.1 Introduction

The paradigm shift in natural resource management intervention from state-centered to community-based participatory approaches has been credited to facilitating people's participation over resource use and management. Although these community-based approaches are a departure from earlier state-centered government policies (Pretty and Shah, 1997), contradictory responses have emerged on their successes and shortcomings. There have been concerns in the international development policy context about why community-based natural resource management (CBNRM) projects fail to achieve their expected level of equity (Ellis and Allison, 2004; Saint, 1995; Tyler, 2006). Academics and activists alike have criticised participatory interventions for their inherent vulnerabilities, due to power imbalances, which in turn affects various actors' capacity to participate in a development project. In developing general and natural resource management (NRM) in particular, the word 'participation' has become a motto over the last two decades. Terms like "collective action", "community driven development", "community-based natural resource management", decentralised governance" and "bottom-up-approach" suggest that the inherent processes are participatory in nature (Joy et al., 2004).

Using the case study of the Mathnaa (a pseudonym)[5] watershed development project in the Sabarkantha district of Gujarat, India, this study aims to understand how socio-cultural factors influence participatory institutions and community formation created through CBNRM interventions in rural communities. Further, it reveals that the formal participatory arena,[6] created for the purpose of facilitating people's participation, results in social groups with diverse interests, which by default integrate diverse resources for their livelihood.

[5] As an ethical responsibility towards the general welfare of my respondents their real identities have been withheld in order to protect the confidentiality while writing this thesis. Thus to ensure their safety, pseudonyms are used for the people and the study village. Mathnaa is a pseudonym given to the village understudy in Sabarkantha district.

[6] Arena is the social location or situations where actors contests over issues, values, representations and resources; (Oliver de Sardan, 1995). In Mathnaa, the arena was the Watershed Development Project where various actors involved had varied interests.

1.2 Movement towards Community-Based Natural Resource Management

In the late 1980s, a gradual movement toward understanding local communities' ability to manage natural resources started to emerge (Agrawal, 2001; Agrawal and Gibson, 2001; Baland and Plateau, 1996; Berkes, 1989; Chambers, Pacey and Thrupp, 1990; Mckean, 1992; Murphree, 1991; Ostrom, 1990, 1992; Ostrom et al., 2002; Wade, 1987), which replaced the worldwide propaganda holding 'communities' responsible for the irrational exploitation of natural resources for selfish needs, widely known as the 'tragedy of commons' (Hardin, 1968). This evidence led to promoting CBNRM (Agrawal and Gibson, 1999) as a solution to the 'tragedy'. Ostrom's work on common pool resource management (1990) in particular established how collective action could uplift poor communities and sustainably manage the natural resources (McCay, 1995; McCay and Acheson, 1987; Ostrom, 1990; Rose, 1994).

However, a new wave of research findings in the late 1990s highlighted the need to understand the power equation amongst rural communities, so that rural local elites would not dominate the community-based management system by excluding the poor, women and powerless from the benefit of improved natural resource management (Agrawal and Gibson, 1999; Leach et al., 1999; Meinzen-Dick and Zwarteveen, 2001). The resultant effect of these findings specifically pointed out CBNRM's aggregation problems on two fronts: firstly, the communities are not essentially visibly bounded social or geographic units; secondly, they are not likely to be homogenous entities with single or agreed interests (Uphoff, 1998). There is inadequacy in the conceptualisation of communities as a spatial unit, a homogenous structure and a set of shared understandings leading to equality, democracy and reciprocity in public transactions, commonly put forward by the advocates of 'community'-based conservation (Agrawal and Gibson, 1999; Mosse, 1998).

Another important factor which is often overlooked is that natural resources are also heterogeneous such as water, forest etc. Thus for example, the conceptualisation of 'community' for the management of harvested resources such as timber, pastures and fisheries will be different from that of wildlife conservation (Kumar, 2005). In the same way, 'community' in managing the watershed poses challenges to upstream and downstream communities' who have diverse interests (Ibid). Hence, the way in which 'community' is conceptualised and interpreted for implementation in CBNRM has a major drawback. As a result, questions arise on the specifics and parameters of

identifying 'community' boundaries such as: Where do they begin and end? Who is inside and outside 'community' boundaries? Who makes up the 'community'? Moreover, the questions of inequality, repressive social hierarchies and discrimination are overlooked in CBNRM (Guijt and Shah, 1998). Nonetheless, communities are not always homogeneous entities but socially differentiated and dissimilar on the grounds of gender, caste,[7] class, wealth, age and origins, which divide and cut across so-called 'community' boundaries (Leach et al., 1997a), breed conflicting values and involve them in struggles and bargaining over limited resources (Carney and Watts, 1991; Leach, 1994; Moore, 1993). This might not involve true participation by the community, as a project might continue to be top-down with just token involvement from community members (Sangameswaran, 2008). The actual and potential fissures within communities along the lines of caste, status, religion and gender – and the ensuing inequalities –are often ignored in CBNRM (Leach et al., 1999; Sangameswaran, 2008). Therefore, in India and elsewhere, conservation intervention in CBNRM is highly debated in both academic and policy circles due to the roles of various actors comprising 'the community' and institutions which influence, shape and transform the outcomes of CBNRM interventions.

1.3 Decentralisation, Participation, Institutions and Power[8] in the CBNRM

Decentralisation in various forms since the 1970s has been recommended as a way of reducing problems of development, resource management and poverty alleviation; that occur when a highly centralised public agency is used to manage natural resources in different localities (Ostrom et al., 1993). The decentralisation process aims to empower local communities by involving them in resource conservation and management through active engagement in decision making processes. The advocates of decentralisation argue that when local actors, are involved in the decision making

[7] Caste system is a pan-Indian phenomenon. Caste system is based on social inequality and in principle all castes within a locality can be ranked within a single hierarchy. Moreover castes are endogamous and segmentary in nature, as all castes are normally divided into sub-caste.

[8] Power is considered to be a strategy as it constituted in social relationships such as networks, alliances and conflicts (Foucault, 1979). The concept of power is explained in detail in chapter 3: Conceptual Framework for Analysing Community-Based Natural Resource Management. In this thesis power, participation and institutions are seen within the framework of CBNRM and this framework helps in recognizing that actors (as individuals or groups) may wield power and exercise of such power is usually mediated by a variety of factors grounded in the contexts in which power operates.

process, they tend to invest substantial as amounts of time and labour in ensuring the sustainable utilisation of those resources (Cernea, 1985). In the decentralisation process, existing power roles, responsibility for planning and implementation and administrative capacity are redefined by the state at various levels in order to ensure that regulation, management and control over decision making within the scope of the conservation intervention are transferred to local communities (Agrawal and Gibson, 1999).

In worldwide CBNRM programmes various forms of decentralisation have been recommended as way of reducing the problems that occur when extremely centralised state machinery is used to manage natural resources (Ostrom et al., 1993). Decentralisation is defined as the transfer of powers from central government to lower levels in a political-administrative and territorial hierarchy (Agarwal and Ribot, 1999:3-4), and occurs in two forms, either through 'deconcentration' or 'devolution'. In the former style, central government transfers some of its power to lower levels, but these remain responsible and accountable to central government, which reserves the right to supervise, overturn or withdraw the entrustments (Ostrom et al., 1993). Ostrom et al. (1993:164) refer to deconcentration as the 'temporary devolution' of authority within a bureaucracy to lower level officials, combined with enhanced opportunities for citizen participation.

The form of decentralisation where authority is transferred to the representative, and downwardly accountable actors have autonomous, discretionary decision making power and resources to make decisions significant to the lives of local people, is known as 'permanent devolution'. In this form, entrustments are transferred more or less completely to the local authorities or users (Ostrom et al., 1993). Most CBNRM initiatives aim at devolving entrustments to local communities.

The prominence on communities as an instrumental medium for the conservation and maintenance of natural resources has happened recently (Agrawal and Gibson, 1999; Chambers and McBeth, 1992; Etzioni, 1996). Furthermore, decentralisation has coincided with the mainstreaming of participatory approaches in development theory and practice, advocating that the local community should play a greater role in the management of natural resources (Chambers, 1993, 1995). The participatory development model led by Chambers (1994) advocated 'participation' as the foremost technique for achieving equitable resource management goals, which would help poor

and the marginalised sections of the community to have greater access and control in the decision making process regarding natural resource management (Mansuri and Rao, 2003). Hence, the creation of an arena enabling people's involvement presumes that everyone will have an equal opportunity in the local community to participate and benefit accordingly. Often, development practitioners believe that community-based management interventions will lead to conservation, sustainable use and the development of a wide spectrum of actors. It is only recently that CBNRM studies have begun to look into the heterogeneity of communities and how resource management decentralisation has affected different community groups such as the landless, lower castes, religious-ethno groups and women (Mehta, 2005; Meinzen-Dick and Zwarteveen, 2001). The danger involved in the direct transfer of power to communities in participatory interventions results in diverse and often counterproductive outcomes for the participating community. As power imbalances in a given community or among diverse actors often lead to powerful elitism within a community, they use this opportunity to consolidate their own positions.

The belief behind participatory approaches in CBNRM is that they address inequalities by helping to sell and distribute the benefits of local management initiatives within the community. Moreover, the concept of 'participation' has not been foolproof, as the social reality of rural societies is complex and can have negative connotations for the people involved (Agarwal, 2001; Agrawal and Gibson, 2001; Guijit and Shah, 1998).

In fact, participation itself is a socially embedded phenomenon and not something that can be elicited at will (Nemarunde, 1995:11), hence unequal relations need to be assessed in relation to the power that each actor commands and how they influence CBNRM outcomes. Participation may take many forms, as it occurs along a continuum from tokenism (nominal participation) to interactive participation[9] and there are different perspectives on who is expected to participate, what exactly is to be achieved and how it should be brought about (Pretty, 1995). Often, though, donor-funded CBNRM facilitators, while designing community base management interventions attach 'participatory tags' as rhetorical gesticulation, as a matter of formality to acknowledge the concerned community's role, empowerment of the

[9] The concept, nature, ranges and form of participation is discussed in detail in the chapter 3: Conceptual Framework for Analysing Community-Based Natural Resource Management.

concerned community and to demonstrate the state machinery's commitment to the devolution of power.

In the decentralisation of resource management discourse, there has also been a renewed debate on the role of institutions in natural resource management in the context of CBNRM. Within the literature on institutions, differences between institutions and organisations come to the fore. Institutions represent the 'rules of the game' while organisations are taken to be "players", or the groups of actors are "bound together by some common purpose" (North, 1990:5). This thesis takes into account the role of both formal and informal institutions within CBNRM. Informal institutions are not legally recognised by the state through cultural norms, beliefs, practices, values or social network and kinship ties; instead, they are upheld by mutual agreement (unwritten), which is enforced endogenously (Cousins, 1997). Informal institutions themselves shape and are shaped by the everyday negotiations and power relations between diverse actors, whereas formal institutions represent rules that require third party enforcement and apply to law courts (Leach et al., 1999). As a result, the image of 'community institutions' in the context of CBNRM is incomplete if it overlooks the complex webs of interactions, informal institutions and contestations over resource control within groups from participating communities. Therefore, in everyday practices formal and informal boundaries often become blurred,[10] as the actors' who are positioned in formal and informal institutions, their participation is directly influenced by the power dynamics operating at grassroots level.

In the light of the above discussion relating to various contextual and contested issues characterising decentralised, community-based natural resource management interventions, I now proceed to investigate the specific issues arising from community participation in these decentralised interventions. The 'Mathnaa watershed project' provides an ideal case for examining the influence of caste, class and gender on actors'[11] participation in managing water to overcome water scarcity in the village.[12]

[10] The term 'formal' i.e., modern, bureaucratic and organizational and 'informal' i.e., social and traditional institutions are expedient but misleading, as traditional and social institutions may be highly formalized though not necessarily in the bureaucratic forms that are often recognize (Cleaver, 2001).

[11] The term actor in the study is used here to refer to an individual human being who is actively doing something and/or group of actors who are capable of performing actions as a cohesive unit (Magadlela, 2000).

This thesis aims to analyse socio-cultural aspects affecting actors' participation in and their strategies concerning water management by various community groups, and how their capacity to participate is determined directly by their agency and relative power position within their communities.

The present study considers caste, class and gender dynamics[13] which influence the functioning of various water-related community groups such as ex-watershed committees, user groups, groups of water sellers and buyers in the groundwater market, as well as borewell[14] ownership groups. These will be analysed using an actor-oriented approach.

1.4 Actor-Oriented Approach

The actor-oriented approach is concerned primarily with mapping relationships and flows of information to provide a basis for reflection and action (Biggs and Matsaert, 2004). The actor-oriented approach given by Long derives from an internactionist social anthropology whose injunctions have been buttressed both by the failures of structuralist/interventionist approaches and by the early rise of postmodernist thought (Preston, 1996:302). The fundamental claim in the actor-oriented approach is that those involved in the interaction must be seen as agents, with their own understandings of situations, expectations of change and strategies for securing objectives (Preston, 1996). The approach also helps in making observations from actors' perspectives, which is not necessarily fixed to the behaviour of actors in a rational choice theory (Long and van der Ploeg, 1989), and is interpretative and helps in understanding the role of actors in CBNRM.[15]

There have been a number of studies related to CBNRM within the context of developing countries, which significantly examine the various analytical aspects of efficacy and the rationale behind community formation and participation in water

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[12] Thus by examining the watershed project related activity, ex-watershed committee, maintenance of check dams, and development of groundwater market; I will be analyzing how the power, institutions and participation work in Mathnaa in the thesis.

[13] This is explained in detail in chapter 6: Social Organisation in Watershed Development Project of Mathnaa.

[14] Borewell is a well consisting of pipe placed in hole bored into the ground to tap groundwater supplies from one or more aquifers.

[15] The actor-oriented approach and its advantages are described in detail in chapter 3: Conceptual Framework for Analysing Community-Based Natural Resource Management.

conservation interventions across actor-oriented lines.[16] Through the actor-oriented approach, the present study aims to investigate the various water-related community groups formed in Mathnaa through intervention processes and practices. This study maps the emerging sporadic interactions between actors as they respond to the intervention processes while drawing on their informal networks.[17]

In addition, I attempt to adopt ethnographic enquiry[18] as a methodological tool to map the roles and strategies taken on by the key actors in the various water-related community groups in Mathnaa.[19] This thesis maps the interactions and negotiations which characterise their participation in the formal invited space of the watershed development project. The informal everyday cultural practices and local traditions that are followed at Mathnaa community level are also mapped to gain insight into the immediacy and meanings attached to water in everyday occurrences. This thesis also engages with these inquests in order to gain a better understanding of the multifaceted nature of the rural social fabric and its implications for contemporary and future CBNRM interventions through informal arenas and networks – thus defining access to and the control of water in user groups around check dams, collective borewell ownerships and in caste-based groundwater market exchange practices.

The study makes a contribution, theoretically, to the problematisation of assumption attributed to a homogenous community – as portrayed through development agencies which consequently ignore the presence of socially differentiated stakeholders with different priorities, benefits and losses. Social identities are also multiple and overlapping – as in the case of caste in user groups, groundwater markets and watershed committee or self-help groups. Hence, the community should not be considered as a set of passive recipients; rather, it comprises various social actors who have diverse interests and shape the outcome of an intervention, by using opportunities to further their best interests. Moreover, this study argues that the image

[16] Some of the studies contributing to the CBNRM knowledge pool in context of water conservation interventions are Ahluwalia, 1997; Chhotray, 2004; Leach et al., 1999; Mosse, 1997a; Sangameswaran, 2008; Saravanan, 2010a, 2010b.

[17] This is discussed in detail in chapter 6: Social Organisation in Watershed Development Project of Mathnaa.

[18] Ethnography enquiry is an act of direct observation of the activity of members of a particular social group, and producing a written description thereof (Marshall, 2001).

[19] The various activities of people in Mathnaa in relation to water have been described in detail in chapter 5: The World of Water in Mathnaa.

often portrayed of "community and community participation" in the context of CBNRM is incomplete, as it overlooks complex webs of interaction, informal institutions and contestations over resource control and access within the groups within participating communities. More so, this study hopes to contribute to the debate on community formation and community participation in a development intervention project, by determining the socio-cultural factors that regulate access to water and water management and by using the actor-oriented approach.

The case study focused on a community-based micro watershed development project at Mathnaa, a small village highly characterised by sharp social differentiations along the lines of caste, tribe and gender, in the Sabarkantha district of Gujarat and implemented by a local NGO based in Ahmedabad. The case study demonstrates that Mathnaa, which is a rainfed village, faces water problems, and how various actors in the village make use of different water-related programmes in the form of watershed projects (check dams), flat electricity tariffs, JGS (*Jyotirgram* Scheme)[20] and borewell technology for devising strategies to manage water and combat water scarcity at community level. However, natural resource management remains an arena of conflict, and in the case of Mathnaa, it is water scarcity in particular which leads to various social actors trying to monopolise the situation for their own vested interests through user groups, collective borewell ownership or groundwater market exchange.

1.5 Research Aim and Objectives

This study intends to focus on the micro realities of the everyday lives of Mathnaa community members, by examining how socio-cultural factors influence the various water-related community groups to negotiate, gain access to and control the benefits of community-based water management. The research objectives of this study are as follows:

i) To examine the socio-cultural meanings attached to water in community-based water management.
ii) To examine the linkages between formal and informal institutions that shape actors' participation in community-based water management.

[20] Under this scheme separate electricity supply is provided to domestic and agriculture related activity in the villages in Gujarat. This scheme is discussed in detail in chapter 4: Water Resource Management in Gujarat- An Overview.

iii) To identify the major actors, their roles, interests and power in formal and informal participatory arenas in community-based water management.

The state of Gujarat was selected, as it has many sorts of soil and water-related problems, and the majority of the population survives on rainfed agriculture for their livelihood. As a result, the watershed development approach holds key importance for the state of Gujarat. Moreover, Gujarat has predominately dry land conditions and is one of the five major states where the Watershed Development Programme (WDP) has a significant presence and in particular a strong NGO base, which is reflected in their significant involvement as project implementing agencies (PIAs) for the projects (Shah, 2001). Gujarat was one of 11 states[21] in which the first watershed guidelines of 1995-96 were implemented. The Sabarkantha district of Gujarat has been selected as the study locale based on the fact that research pertaining to community involvement in watershed impact assessment in Gujarat so far has focused mostly on districts which are either totally tribal or based on caste groups. In contrast, the present study aims at understanding community participation in various water-related community groups between actors belonging to highly stratified social communities like Mathnaa, the demographic composition of which boasts of tribes constituting a significant percentage of the village population, along with a few other caste groups.

A case study is an empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident (Yin, 2003:13). Some of the particular features that distinguish the case study method from other qualitative research methods are: i) the fact that only one case is selected, although it is also accepted that several may exist; ii) the fact that the study is detailed and intensive; iii) the fact that the phenomenon is studied in context and iv) the use of multiple data collection methods (Ritchie and Lewis, 2003:52). I adopted this method in order to make my study and empirical inquiry deep and substantial. The strength of the case study approach lies in its contextual exploration of a problem, traded off against the limited capacity of other

[21] The 11 states in which watershed programme was implemented under the1995-96 guidelines were Andhra Pradesh, Bihar, Gujarat, Karnataka, Madhya Pradesh, Maharashtra, Orissa, Rajasthan, Tamil Nadu, Uttar Pradesh and West Bengal.

cases, since sampling is small and purposive, rather than purely random (Ragin, 1992:3). The Mathnaa village was selected for the following reasons:

i) It has a highly stratified village community bearing a composition of Hindu multi-castes and tribes, thus making it appropriate to study social differences between various communities in the village in relation to water.

ii) It is a semi-arid village, having irrigated as well as non-irrigated farming; thus, most of the potential users of water could be covered.

iii) It was one of the villages having heterogeneous population composition where watershed project has been completed, thus making it suitable for studying the sustainability of institutions in tandem with water management after the project ended.

1.6 Research Methods

Qualitative data collected through observation, semi-structured interviews and focus group discussions were analysed manually.[22] According to Long (1992: 38), "social sciences have always been characterised by a multiplicity of paradigms", so no method or technique can be foolproof and totally reliable. For the present inquiry, multiple research methods and techniques (both qualitative and quantitative method) were used in order to collect the data in triangulated format, which would leave less scope for error. The value and nature of the research findings significantly depend on the richness of information proffered by the cases and informants (Layder, 1998; Miles and Huberman, 1994). Therefore, entire households in Mathnaa were taken into consideration in order to gain a holistic picture, while purposive sampling was carried out on groups engaged in groundwater market exchange.[23]

The ethnographic study of the village on water management was based on four key methods of data collection: household survey with a structured questionnaire, focused group discussions, participation observation including informal interviews. The main objective of the household survey, which covered 200 households,[24] was to generate quantitative evidence of the characteristics of rural households in terms of caste and

[22] 99 semi-structured interviews and 9 focus group discussions were conducted to get a broad understanding of the water management problem in the region and to identify the actors' strategies to manage water.

[23] 200 heads of household were surveyed, in order to understand the household perspective on the water problem. 25 farmers from each water buying and selling groups were purposively selected in order to understand the working of groundwater market exchange in Mathnaa.

[24] This has been elaborated in detail in chapter 5: The World of Water in Mathnaa.

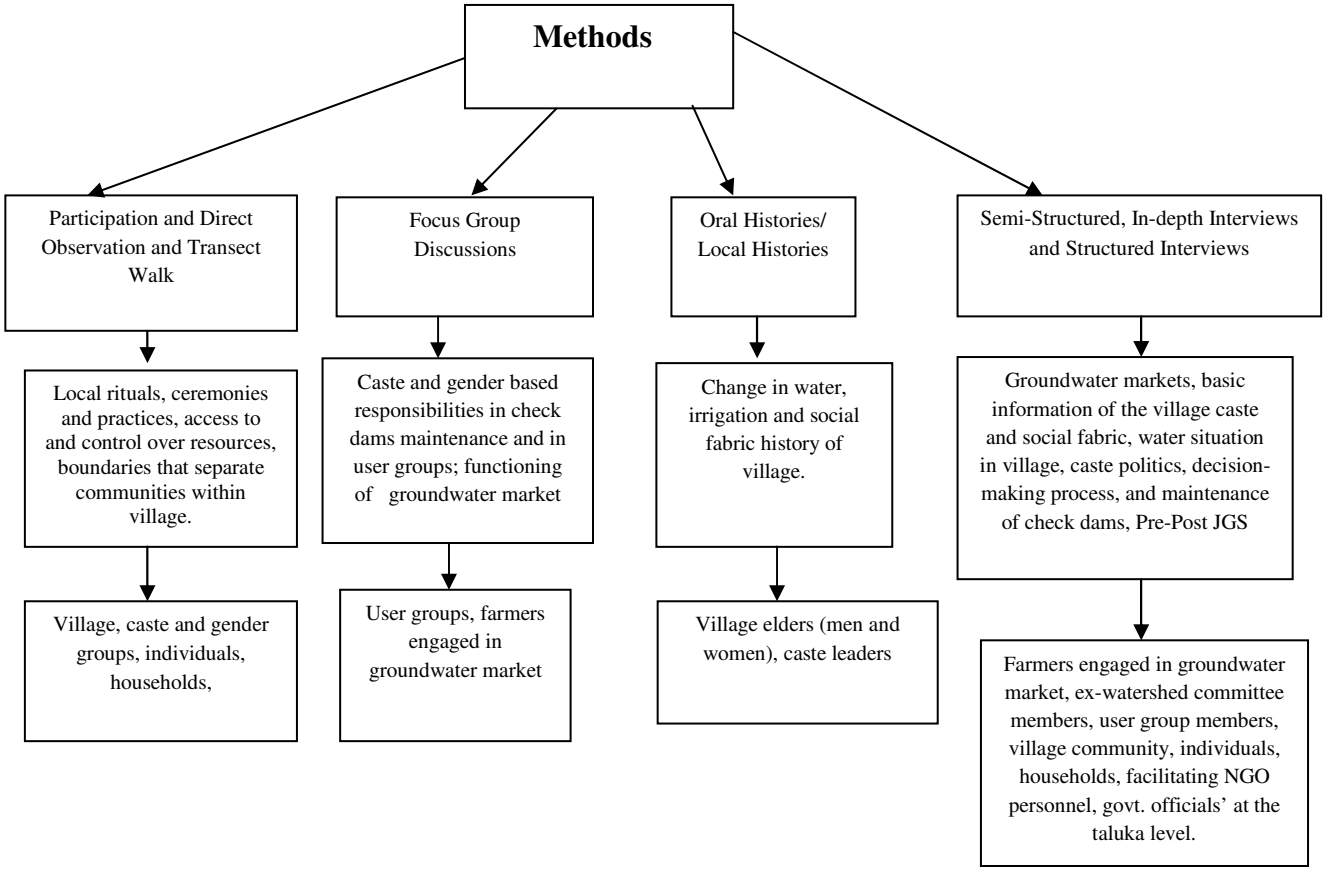
tribe ratio, kinship lineage and level and scope of knowledge about the watershed project. The main reason for carrying out this baseline survey was to introduce the researcher to the villagers and to explain the purpose of my visit and how it related to the rural economy. This was done while keeping in mind the insider-outsider suspicions attached to the researcher from the villagers' perspective. Nonetheless, I could not afford to risk the multiple identities which I carried with great precaution and trust. I wanted a clear understanding between the researcher and subjects being studied.[25]

The participation observation[26] comprised composite techniques such as informal interviews, observation of the physical and social settings and participating in local events and sub-cultures. Focus group discussions helped in understanding the historical aspects of various issues. While conducting informal interviews, I placed particular importance on the cadence, emotion and non-verbal reaction of the respondent, which helped me to understand their worldview and the meaning they attached to objects in their social interaction. Figure 1, below, gives an overview of the research methods, variables and units of analysis.

[25] Subjects here mean the people of Mathnaa.

[26] The method of participation observation is integral to anthropological and ethnographic research because it provides "direct experimental and observational access to the insiders' world of meaning" (Jorgenson, 1989:15).

Figure I: Summary of the Research Methods



The thesis also maps an element of construction of the recent past through local histories spanning ten years. Living within the Mathnaa community proved very helpful, as it played a significant part in gaining acceptance and access to the local social network.[27] Staying with the community also proved helpful for observing the everyday interactions and strategies adopted by the various social actors while engaging in various formal and informal arenas. The ethnographic study helped me to understand that water, which is natural resource, can become a contested commodity, as various meanings are attached to it over a given period of time. For different social actors during their social interactions, water is interlinked with caste and becomes central to everyday social life.

The findings from the present study depend totally upon the data collected over a period of ten months during 2008-09 in Mathnaa village. Moreover, my initial efforts

[27] For the detail on the politics of carrying out the fieldwork, see Annexure I.

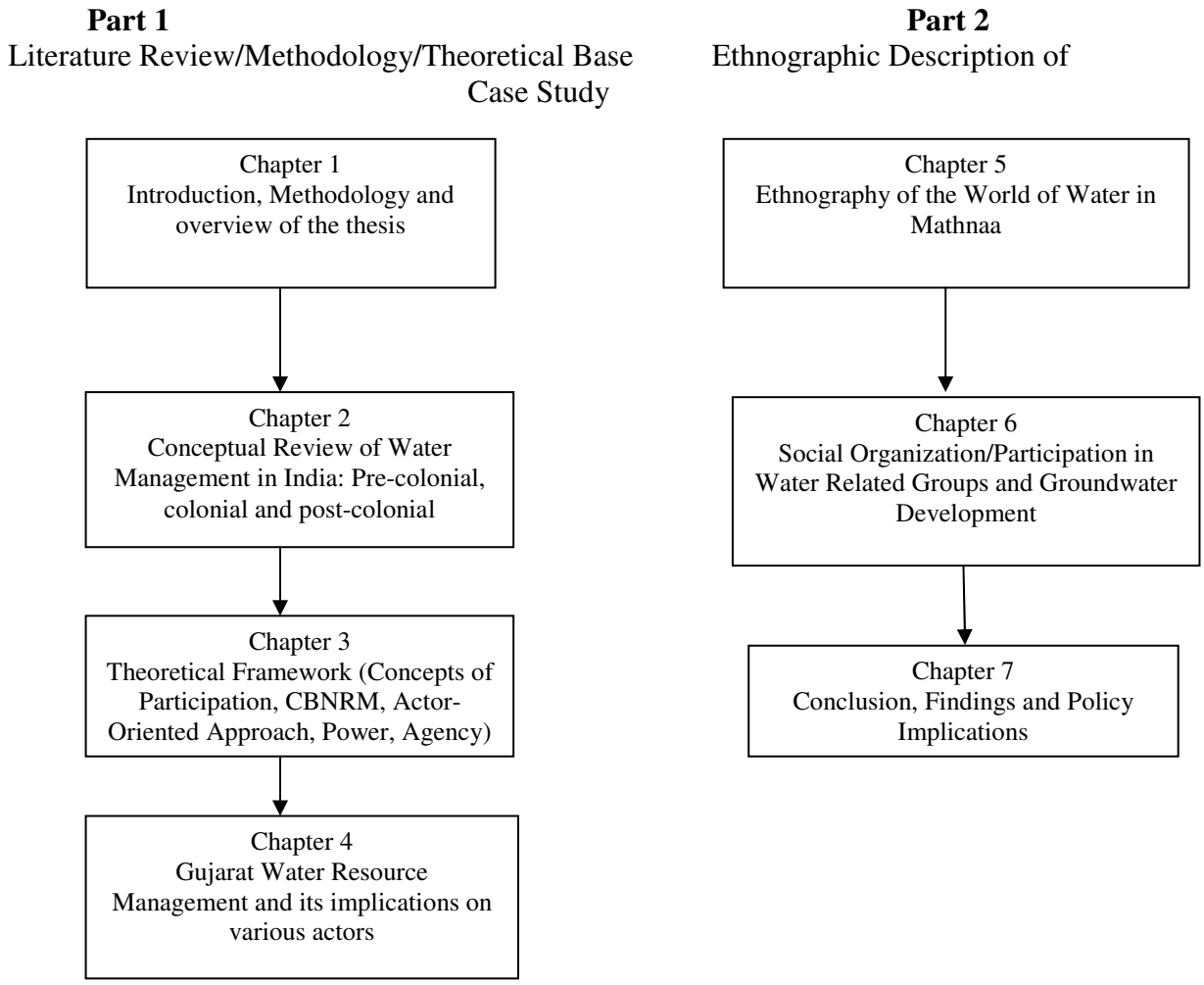
to tape record the interviews proved to be counterproductive, so making notes on a daily basis of the observations became an imperative and regular activity. Nonetheless, the data I collected during my stay 2008-09 in Mathnaa represents only a small snapshot of the multiple realties existing in Mathnaa people's lives.

1.6.1 Limitations of the Study

The limitations of the study on methodological level include its specific focus on the micro realties of water around the everyday lives of the Mathnaa people, which renders it partially blind to the larger picture of water management at the Gujarat state level. Moreover, a case study methodology does not allow for making impact assessments, as possible through statistical methods, but it does offer an outstanding portrayal into the nuances and contextualised meanings around water management, which would otherwise not be possible through the adoption of quantitative methods. Consequently, this study uses qualitative and ethnographic modes of enquiry, and simultaneously provides an entry point for building triangulation into data collection and analysis processes to ensure validity and the ability to generalise.

1.7 Organisation of the Thesis

Figure II: Thesis Structures



The thesis is organised into two parts, as depicted by Figure II. The first part has four chapters (1-4). The first chapter serves as an introduction to the thesis by outlining the study and setting out the research agenda. It briefly explores the relevant concepts used in the present study such as decentralisation, power, institutions, participation and CBNRM. It also discusses the theoretical framework of the actor-oriented approach in brief. Moreover, this chapter illustrates the methodological approaches used in the study and also explains the research questions and objectives.

The second chapter gives a conceptual review of the spatial and temporal management of water in India. This chapter explains how community as an institution has managed irrigation systems in the historical context, from pre- to post-colonial

India, how the concept of community management has disintegrated over time and what attempts have been made to revive the institutions for community water management – and how far have they been successful. This chapter further argues why water management in India has been a tricky affair and how community-based water management is multidimensional in nature, as it is driven by socio-cultural factors such as caste, class, gender and institutions. Finally, we reveal a gap in the research regarding understanding the ability of a community to integrate by default a number of diverse technologies to achieve their social goal of survival.

Chapter 3 is devoted to the theoretical base and discusses the various theoretical trends of understanding community in policy debates. It uses the concept of community as an entry point for discussing CBNRM and critiques the global literature on community composition and participation in CBNRM, by highlighting the variety of models of common property resource management. This chapter further discusses theoretical concepts such as participation, power, agency and the relevance of, for example, an actor-oriented analytical approach for investigating the role of actors (as individuals or in groups) in the interaction process.

Chapter 4 offers a brief overview of Gujarat Government measures related to groundwater and surface water management in terms of policies, projects and schemes. Furthermore, it gives details of how water management in Gujarat is influenced by socio-political, cultural, institutional and ecological factors. The chapter also highlights the issue of 'communitarian ideal attachment' by policymakers and social researchers, i.e. the notion that people cooperate to take over the participatory and democratic management of anything, whether it is watersheds, groundwater, irrigation systems or river basins. The chapter explains how the policy makers use this issue of 'communitarian ideals' for making the design of major programs of institutional reforms. But on contrary, fact such as local politics, caste, class, power relation affect the water governance of Gujarat which affect the ground reality of water management is discussed.

Part 2 of the thesis consist of Chapters 5-7. Chapter 5 sketches the ethnographic picture of the Mathnaa village community and presents in detail 'The World of Water in Mathnaa' and how various water-related aspects are negotiated in the day-to-day practices and interactions of social actors. This chapter empirically introduces the village, its social fabric, caste arrangement and the role that caste hierarchies play in

water arrangements. Moreover, the chapter also illustrates the village's social structure, while a socio-cultural matrix centered on water arrangements and ownership is also typified and power dynamics in terms of wealth, land ownership and access to water are elucidated.

Chapter 6 explores how local communities participate in the watershed development programme and how different social actors voice and stake their claims in the negotiation process to secure mutually beneficial interventions. This chapter also explores how gendered power relations and social exclusion influence the roles of women and other marginalised groups within the formal and informal participatory arenas, and how participatory arenas created through watershed committees and user groups are occupied and managed. This chapter further highlights the diversity of communities in these water-related groups and how they benefit the households, whose borewells are within the command area of the check dams. Moreover, it concentrates on the changes in groundwater development in relation to the groundwater market, brought about by watershed development, borewells and the *Jyotirgram* electricity scheme in the village, and how various actors use these interventions in the context of a diverse property rights regime to manage water.

Chapter 7 synthesises the findings by summarising the whole thesis and discussing how various water groups manage water in highly stratified communities (along the lines of caste, class and gender) such as Mathnaa, when policies and development interventions happen together by default, and present the possible angle of further research. It also offers policy recommendations for a contextual and more adaptive community-based participation in Gujarat.

This work aims to carry forward the hypothesis results and other dependent variables in order to focus sharply on the exigencies of water and its surrounding location of power apparatus in everyday social life. In a way, it is the 'Baudrillardian' approach which offers a cultural critique of the commodity (water) in a consumer society. The rural hinterland is not detached and oblivious to the complexities this commodity has to offer in the micro world of Mathnaa. Hence, the subsequent chapters will elaborate on the issues highlighted in this introductory chapter.

Chapter 2 Water Management across Space and Time in India

2.1 Introduction

India is credited with having a long history of human intervention in the management of water because of its distinctive climatic conditions, such as intense monsoons followed by prolonged droughts. Furthermore, rainfall is confined to a few months in the year, while uncertain, erratic and uneven traits make Indian agriculture dependent on different sources of irrigation. This dependence has led people and the successive ruling regimes, from pre-colonial to colonial and the post-colonial times, to make choices across space and time from a wide range of technologies[28] for water control and distribution. Moreover, two major political and policy positions shape questions around water resources and their development in the country. The first is an environmentalist critique of the modernising strategies of the centralised state and the dominance of 'western' technical over indigenous community perspectives on irrigation and water resources (Mosse, 2007:218). The second is a reformist policy for the devolution of irrigation management responsibilities from the state to communities of users, which forms part of an international consensus on public sector reform, underpinned by ideologies of privatisation, the free market and a reduced role for development (Ibid:219). Therefore, this review chapter aims to explain how water management has interplayed between cooperation and conflict in India.

Water holds binding ties to culture and is spirituality laden with economic value. Water management has been a sensitive issue in India due to socio-economic-political and ecological issues across diverse social groups. This chapter explains how the community as an institution has managed irrigation systems in the historical context and how the concept of community management has disintegrated over time. Furthermore, the attempts that have been made to revive institutions for community water management and their successful implementation are also dealt with in the following paragraphs. The next section describes water management during the pre-colonial period in India, explaining how kings, feudal lords and local communities managed water as a resource. It questions the relevance of Karl Wittfogel's 'hydraulic

[28] Here the word technology is used in sociological sense. It means machines; equipments, productive techniques associated with them, and type of social relationship dictated by the technical organization and mechanization of work (Oxford Dictionary of Sociology, 2004).

society' to water management in this particular era[29] and explains how it was multidimensional. The second section elaborates on water management under colonial rule and how this was mechanised and centralised. It is striking and surprising to know that community conception found no place in colonial water management policies. Nevertheless, as a matter of fact and paradox, India became a standard bearer for the world in the use of modern science and engineering in the design of huge and multifarious irrigation structures. The third section illustrates the carrying forward of the colonial legacy in independent India's water management policies and programmes and aims to study the attempts that have been made to revive community-based water management and its successful implementation by the government. Finally, the chapter argues why water management in India has been a tricky and cautious affair, as well as how community-based water management is multidimensional in nature.

2.2 Water management in pre-colonial India

Karl Wittfogel published his classic work 'Oriental Despotism' in 1957, in which he elaborated how, in many parts of the world; a specific form of social order had been prevalent since pre-historic times due to large-scale water management. Wittfogel (1957) argued that "oriental societies are characterised by strong centralised control over water resources which gave rise to despotism, as the state was seen to embody the community of users". He studied the ancient hydraulic societies of Egypt and China and propounded the theory that control and knowledge over water resources went hand in hand with state control and domination.[30] He further stated that in order to regulate water for irrigation, and to cope with natural disasters, hydraulic structures such as canal embankments were built, which created a social order characterised by a strong organisational structure of rule. Hence, considering such civilisations as hydraulic or agro bureaucratic in nature because they possess a great ability in organising, coordinating and managing water regulation for agricultural production;

[29] Karl Wittfogel in his book 'Oriental Despotism' (1957) mentions that in oriental societies, in order to regulate water for irrigation and to cope up with natural disasters, hydraulic structures like canals, embankments were build. This created a social order which were characterized by strong organization structure of rule, making it a hydraulic society or state.

[30] Certainly, it is wrong to assume that all large hydraulic works are despotic. The case of the Balinese water temples in Indonesia (Geertz, 1972) is an excellent case to be pointed out here. These are centralized, but certainly not despotic. And have flexibility for decentralized forms of religious and cultural organization.

indicates the existence of a strong state bureaucracy required for water management and building heavy hydraulic works (Evers and Benedikter, 2009).

In the context of India, however, there were various forms of irrigation in pre-colonial India; thus it could not be characterised as a 'hydraulic society' in the sense used by Karl Wittfogel (Hardiman, 2008). Wittfogel's work characterised societies by their material base, arguing that hydraulic systems created particular kinds of social, economic, political, religious and cultural structures (Ibid). In India, claims of sovereignty and ideologies of total control were annulled, time and again, by the realities of local water distribution according to the political power of different groups within the local communities (Ibid). Therefore, in ancient and medieval India, farming was, effectively, 'hydro-agriculture,' involving the strong role of village communities, rather than hydraulic farming under state domination (Shah, 2009).

Evidence of water management in pre-colonial India can be found in ancient texts, inscriptions, local traditions and archaeological remains (Agarwal and Narain, 1997). Moreover, ancient religious texts, commentaries and stone inscriptions provide references to governing principles such as ethical, moral, spiritual, social and ecological values, which were applied to water management during pre-colonial Hindu and Muslim rule in India (Vani, 2009a). The *Arthashastra*,[31] one of the ancient historical canonical works written by Kautilya in the 3rd century BC, gives a clear account of water management in the Mauryan Empire. It states that the local communities were very well aware about rainfall regimes, soil varieties and irrigation techniques in the specific micro-ecological context. Furthermore, the *Arthashastra* mentions that the state rendered help and support and promoted small water harvesting structures (Agarwal and Narain, 1997).

Traditional Indian[32] irrigation/water structures were large in nature[33] and built at the behest of kings seeking agricultural prosperity and to increase state revenue, along with religious sentiments attached to the building of such constructions (Agarwal and Narain, 1997). Indian kings also encouraged nobles, ordinary people and temples to

[31] *Arthashastra* was the book written by *Kautilya* the chief adviser to India's first emperor, Chandragupta Maurya (321-297 B.C) of the Mauryan dynasty, on politics and statecraft.

[32] In this chapter, for the pre-colonial India, the word traditional India is being used: that is ancient and the medieval history time period of India.

[33] Such as tanks, wells and canals.

construct water harvesting structures by giving grants in the form of revenue-free lands, provided local communities were willing to invest in the construction and maintenance of the structures (Ibid). Let us take the example of the *tanks*[34] development, where for centuries work was done through the support of local chiefs with technical guidance from specialist surveyors and craftsmen. The villagers made their own arrangements for the construction, maintenance and operation of the *tanks* as a common property resource (Bottrall, 1992). Often, the *tanks* were built in a chronological manner, with smaller systems upstream of a catchment and moving with increasing size downstream. Each successive *tank* was built in a chain/cascade, and by maintaining the respective rights of upstream and downstream users the height of each was calculated. Thus, a way of regulating the amount of catchment runoff and its flow on to others was devised (Ibid). In some areas supra-village organisations existed, which had the power to mediate over inter-*tank* water disputes (Bottrall, 1992; Agarwal and Narain, 1997). The political systems of the pre-colonial state generated resource flows and delineated authoritative positions in this matter (Mosse, 1999); nonetheless, the investment and operation of *tank* systems were linked to the legitimate political overlordship, thereby establishing a link between the honour-linked caste hierarchy and *tank* irrigation works in the articulation of authority at different layers of administrative levels. In total, this made it one of the most significant community management systems in contemporary times (Ibid).

Whereas in the larger delta systems of South India major finance and organisation derived from the kings, day-to-day management was entrusted to local cultivators (Ludden, 1978; Sengupta, 1991). Small community-managed schemes were also developed in other parts of India, for example *tanks* such as the *ahar-pynes*[35] of South Bihar (Pant, 1998). The *pynes*[36] fed many *ahars*[37] and spawned numerous tributaries. Irrigation organisation was designed in such a way that all the irrigators needed to cooperate in order to get water from a single tributary (*ayacut*) (Sengupta, 1985). The landholding of each farmer was fragmented, leading to the formation of small groups of people (*goam*) for the maintenance of the *ahar-pynes* (Ibid). Pant (1998) argues

[34] Tank is a man-made reservoir created by a simple earthen construction (the bund) that captures surface run-off.

[35] Ahar-Pyne is a floodwater harvesting system.

[36] Pynes are channels constructed to utilize the water flowing through the hilly rivers of Bihar.

[37] Ahars are rectangular catchments basin with embankments on three sides.

that *zamindars*[38] maintained the *ahar-pyne* system, as they had the capital and vested interest. In the river diversion system of Himalayan *kuhls*, descent and affinity, as well as local customs, played a key role in their management (Coward, 1990). In multi-village *kuhls,* inter-village coordination for channel repairs, maintenance and water distribution was practiced (Baker, 2003).

In water-managed agriculture, wells played an important role in supplementing the surface water irrigation systems of Northern and Western India. Open-lined and unlined wells were used for domestic water needs and for complementing irrigation needs, about which evidence in the Vedic literature is available. It was the *Satwahanas* of ancient India who introduced ring wells – dug wells for irrigation use (Shah, 2009), whereas privately owned open wells operated manually or were powered by animals in the high water table areas of the Upper Gangetic Basin (Whitcombe, 1972). During the Mughal period, some large-scale canal constructions were undertaken, but their contribution to irrigated agriculture was relatively irrelevant (Habib, 1982); in fact, irrigation through wells was far more important at that time (Habib, 1970).

The productivity-enhancing potential of well irrigation was acknowledged in the revenue calculus of ancient and medieval rulers; therefore, well construction was encouraged through incentives and tax remissions. From the time of *Arthashastra* (third century B.C.) to Mughal rule through the sixteenth to the eighteenth centuries, and later on even during the colonial era, land irrigated with wells was assessed at a higher rate than rainfed lands (Hardiman, 1998). Wells were mostly owned and constructed by individual peasant families, usually from dominant castes. Their control over water enhanced their local power, predominantly over lower castes and untouchables (Hardiman, 2008), while in the flood-prone Eastern Gangetic Plains agriculture was largely rainfed, although there was some partial additional irrigation from surface sources, known as 'overflow irrigation,' through small, private low-lift devices (Willcocks, 1984). River embankments in the Gangetic delta were built by *zamindars* in the pre-colonial period for flood protection during monsoons through deliberate post-monsoon breaching for flood irrigation (Ibid).

[38] Zamindars are the landlords.

Hence, in pre-colonial India, community-based irrigation structures such as *tanks*, *ahar-pynes*, *kuhls* enjoyed significant technical sophistication, with decentralised institutional arrangements, aimed at water management, and well-defined local water rights (Bottrall, 1992), but not in a simplified way of functioning. Whether it was in the case of *tanks*, where relations of power and authority existed in the form of caste dynamics or honour-linked caste hierarchy, its symbiotic relationship with the wider set of political relations of the decentralised or segmentary pre-colonial state was pivotal (Mosse, 1999). In the case of *ahar-pynes*, they required a system of cooperation and consensus between landholders willing to benefit from the *ayacut* and form groups and the power dynamics of large landholders (*zamindars*), who had the capital to invest in the maintenance of the *ahar-pyne* system (Pant, 1998). Conversely, the *kuhl* system constituted a dense web of interlocking irrigation systems and channels, whereby one village used water from several different *kuhls* to irrigate fields at different elevations, or concurrently one *kuhl* irrigated fields in as many as 30-40 different villages, therefore requiring inter-village coordination for channel repair and water distribution (Baker, 2003). Moreover, networks of inter-*kuhl* social relations, set up to address environmental shocks such as flooding and earthquakes, led to joint *kuhl* management and inter-*kuhl* water transfer (Ibid). Thus, in the pre-colonial community-based water structure, wider networks of cooperation and conflict were embedded in the individual systems of water management, and local community leaders facilitated the process of water governance at the local level.

As a result, water was a multifaceted resource in pre-colonial India, and its relationship with society has had many dimensions, such as cultural, spiritual and symbolic[39] meanings for local communities, apart from economic significance. Therefore, simply viewing water through an economic lens can undermine its embeddedness in the everyday symbolic, cultural and social contexts within which communities live their lives. And through social institutions,[40] water was controlled and regulated in pre-colonial India. The next section deals with water management during British rule over India.

[39] By symbolic dimension it is meant: the social status and power in this study.

[40] Social institution forms an element in a more general concept, known as social structure (Wells, 1970). Social structure will include all sets of social relations (Hodgson, 2006).

2.3 Water management in colonial India

> 'Environments' are in essence models of the relationship between communities and the natural world around them, and as such, they are, like all models, 'made by humans for specific communities' (Gudeman, 1986:37).

A quantum leap in irrigation was initiated in the 1830s through the works of Sir Arthur Cotton and Major Cautley in Southern India and Northern India, respectively. By this time the East India Company ruled most of India and realised the immense opportunity in irrigation of combining the interests of charity and commerce (Whitcombe, 2005) in repairing one of the greatest irrigation works of pre-colonial times, the Grand Anicut in Tanjore[41] and the Jamuna canals[42] in the Delhi region. The canal systems of Tamil Nadu and the East Jamuna Canal, which were improved and extended in the 1820s, were the only exceptions to this rule (Hardiman, 2008). In order to gain quick economic returns from water development, the colonial government attempted to instigate large-scale irrigation projects in the Deccan region, which were not successful. This initial debacle provoked the British Raj to look towards the reintroduction of the traditional irrigation *tanks* system. Attempts to facilitate this scheme collapsed due to a failure to understand the complex social system involved over its management. One of the efforts was the revival of the *Kudimaramat*.[43]

Other factors which added to the demise of *tanks* in South India were (a) the colonial commercialisation of dry agriculture in the late nineteenth and early twentieth centuries; (b) the establishment of a centralised colonial government and build up of technocratic irrigation bureaucracy from the 1850s; (c) the consolidation of British power, its revenue systems and property law by the 1840s and (d) the dismantling of South Indian 'old regimes' around 1800 (Mosse, 1999: 307-308).

In Bengal, the traditional irrigation system of building embankments along flood-prone rivers served the purpose of irrigation as well as flood protection. Peasants who

[41] This refers to the repair of Grand Anicut on river Cauvery by the Colonial Government.

[42] These canals were originally dugout in the regime of Firoz Shah Tughlaq about 600 years ago (Habib, 1982:49).

[43] The term *Kudimaramat* is a amalgamated of the Tamil word *kuti*- meaning 'inhabitant' or 'subject' and the Arabic word *maramat*- meaning 'repairs' (Mosse, 1999). For detail on *Kudimaramat* , see annexure-II.

required water for irrigation would simply breach the embankment and divert water, which was termed 'overflow irrigation' by Willcocks (1984). However, with the *zamindari* settlement of Bengal presidency, colonial engineers were less concerned with water issues, and due to their indifferent attitudes they were not able to understand the principle and prohibited breaching in 1855, and later brought it under their direct control (Sengupta, 1985). For railways, roads and for flood control the British Government constructed many new embankments, which only led to water logging, drainage problems and loss of irrigation benefits (Ibid). When agricultural production started declining rapidly in prosperous Bengal, the British Government invited William Willcocks, a British irrigation expert, to advise them on a development programme. In a series of lectures delivered in Calcutta in the 1920s, Willcocks astonished everyone by arguing that the best the government could do was to revive Bengal's ancient flood irrigation system (Willcocks, 1984).

Thus, the colonial rulers redefined property relationships and took absolute control through ownership of all resources such as land, water, forests and minerals, without understanding the dynamics of how irrigation systems functioned. Furthermore, the government levied taxes of all kinds such as land taxes, water taxes, well taxes, subsoil water taxes, canal charges, etc. (Hardiman, 2008), which imposed an immense burden on the communities.

The failure to understand traditional irrigation systems, in order to fill the coffers of the British regime, paved the way for India's colonial rulers to resort to large-scale, publicly funded irrigation development. For example, in the Southern Deltas, operational responsibility for structural renovation work started by Sir Arthur Cotton on the Grand Anicut on the Cauvery River could not be left to long-established local institutions (Bottrall, 1992). Grand Anicut's reconstruction in 1838, and the redevelopment of the Jamuna canals, launched a phase of massive canal construction activity by the colonial rulers, which led to a paradigm shift in irrigation thinking (Shah, 2009).

In the lower rainfall territory of the Upper Ganges Region, colonial engineers started constructing a vast network of new canals, which later became the mode of development (Stone, 1984). The British Raj focused first on 'productive' canal irrigation works that could generate annual revenues equal to the interest on their capital cost (Stone, 1984: 25) In 1880, the Indian Famine Commission made visible

the indirect returns of irrigation work in the form of the curtailment of famine relief expenditure (Stone, 1984). This judicious ruling led the British Raj to shift to 'protective' irrigation works in the form of constructing large-scale storage dams and canals in the Bombay Deccan (Attwood, 2007).

The completion of the Upper Ganga Canal (UGC) in 1847, the first great northwestern scheme, led to the establishment of the fact that artificial irrigation was best suited for the topography of the area (Stone, 1984), as its simple operational design went hand in hand with the homogeneity of the physical environment (Bottrall, 1992). The rational supply of water by proportional flow through an uncontrolled watercourse to as many farms with strict upstream control was possible, due to the design layout of the water distribution pattern of the canals (Berkoff, 1990). This was best suited to the three main colonial objectives: a) financial (low operational costs, high revenue), b) socio-political (famine and drought preclusion) and c) administrative (limited field staff with little possibility of conspiring with farmers in manoeuvring the centrally determined water schedules) (Bottrall, 1992).

As a consequence, a new specialist cadre of irrigation engineers was created in order to govern canal management with the passing of 1873 North India Canal and Drainage Act. In the canal irrigation system, the Irrigation Department (ID) was vested with all rights such as control over the regulation of water supplies and the power to withdraw water supplies to non-cooperating farmers (Stone, 1984). British colonial policy in the nineteenth century drew from an international discourse of water engineering, which had its roots in the transformation of water into a commodity (Worster, 1985). The outlook of British irrigation engineers towards the environment was that of seeing it as a mathematically modelled system, which included the modelling of flow, distribution and the use of water (Gilmartin, 1995). The capitalist state promoted science and technology "to extract from every river whatever cash it can produce" and thus transformed water into a commodity (Worster, 1985). The mathematical creation of an integrated hydraulic environment gave its colonial colour to colonial India. Moreover, the British regarded local communities "in a language of 'naturalism' that defined them as parts of the 'natural' environment to be modeled and controlled" (Gilmartin, 1995). In 1860s and 1870s, British irrigation policy, though principally inclined for larger strategic, financial and

political concerns, endorsed local initiatives in private or semi-private canal building by local landlords and tribal chiefs (Ibid).

For the first time under British rule, water was carried on a vast scale from one river to another. "For some engineers (and other administrators), the effective control of the state over the larger environment simply empowered the state to frame rules of proper irrigator behaviour[44] that would enable them to control people as canal controlled water" (Gilmartin, 1995:224). One of the finest examples of the colonial irrigation policy is that of Punjab's 'canal colonies', as these lands were called, which were brought under cultivation by the interlinked irrigation canals.[45] The other was the Nira Left Bank Canal,[46] where a 'block system'[47] was introduced and turned out to be successful with the introduction of sugarcane cultivation along with food crop rotation.

On the one hand, northwestern canal schemes were outstandingly successful during the British period. The Raj enormously increased agricultural production and incomes in what were viewed as 'backward' areas, and the Punjab settlement later became the pioneer of modern agriculture and irrigation (Stone, 1984). The widespread layout of the canals made it possible for the government to earn massive profits, thus leading to high standards of operation and maintenance of the canals (Stone, 1984). On the other hand, canal schemes have been criticised on environmental grounds (Whitcombe, 1972; Stone, 1984).

Although the canal schemes were highly centralised and bureaucratically controlled, they did serve the interests of their users[48] for three main reasons. Firstly, the physical

[44] Here 'proper irrigator behavior' means farmers following a) the correct rules of irrigating the fields, b) not wasting water, c) following the rules of proper construction and clearance of village watercourses, and d) not growing crops which were forbidden like rice in certain areas etc (Gilmartin, 1995).

[45] Series of interlinked irrigation canals in Western Punjab brought about 14 million acres of arid land under agricultural colonization and settlement (Gilmartin, 2003).

[46] Nira Left Bank Canal was constructed in the Deccan region of Bombay Presidency as a famine relief work during 1876-85 and was initially conceived for the purpose of 'protective irrigation' (Attwood, 2007; Bolding et al., 1995).

[47] In the course of time, 'block system', was introduced in the Nira canal which was based on the traditional crop rotation system, the *phad* system (Phad was a community managed irrigation system in which series of dams were built on rivers to divert water for agricultural use), which was practiced in Northern district of Bombay Presidency (Bolding et al., 1995).

[48] Users here are the farmers who were getting water for irrigation from the Northwestern canal schemes (Bottrall, 1992).

and technical: the environment of the northwestern plains was best suited for the adoption of a supply-driven water rationing system which was cheap, efficient and equitable, but in practice it was difficult to manipulate. Secondly, political and social factors: there was a lack of strong political forces capable of challenging the authority of the colonial government on the issue of water rates throughout that period. Thirdly, the source of inducement to perform: although ID staff were not legally accountable to the water users, they were under constant pressure from higher authorities in the colonial government to ensure that the canals' financial and famine prevention goals should be fruitfully met (Bottrall, 1992).

Thus, the canals' design and management systems were the products of a long and continual process of learning, adjustment and refinement over a long period of time – a full century after the completion of the Upper Ganga Canal (UGC) and up to India's independence. In fact, many serious canal design mistakes were made, and with the introduction of adjustable proportional modules (APMs) in the 1920s a strictly controlled management system became widespread (Bottrall, 1992; Stone, 1984).

From 1900 onwards, colonial engineers began to realise that low cost canal development sites for run-of-the-river schemes were slowly declining in the northwest of India, although new work continued in the Punjab province and was extended into Sind in the 1920s and 1930s (Stone, 1984). The construction of the Sharda canal in central Uttar Pradesh (UP) in the1920s highlighted that in the Gangetic Plains the expansion of canals and their management would be difficult due to higher rainfall and higher water table areas vulnerable to water logging (Ibid).

In order to carry forward their agenda of profit making through water development for irrigation, the colonial administration started identifying new areas such as upper river valleys of southern India and Deccan. They were identified for constructing large and medium canal schemes, and small surface systems such as *tanks* and mechanised groundwater development schemes were considered a viable option for water development (Bottrall, 1992). Uncertainty surrounding economic returns because of the high construction costs of canals due to uneven topography and rainfall conditions led to only modest upstream canal development in the south and west of India (Ibid). The rehabilitation of *tanks* by the colonial government was very much undertaken, but with little success and insignificant impact (Sengupta, 1985).

Consequently, the British had established the commercial viability of canal irrigation by the end of colonial rule (Whitcombe, 2005), but the performance of Indian agriculture, thanks to canal irrigation facilities, has been controversial, with scholars such as Mason (2006) glorifying that the canal irrigation curtailed famines in India. Conversely, others were of the opinion that the 'unbalanced irrigation development' of irrigation projects and investment in Punjab, Madras and United Provinces failed to feed the rest of India and could not prevent the Bengal famine of 1942, which led to the death of four million people through starvation (Shah, 2009).

The colonial government was more interested in canal construction for obvious reasons, but in the state of Gujarat they encouraged well construction through tax exemptions, as they believed that irrigation could only be effectively carried out in Gujarat through wells (Hardiman, 1998). In Gujarat (as in Uttar Pradesh and Punjab), well irrigation was the most important source of irrigation, even during colonial times, as there were no major colonial canal projects in this part of India (Ibid). During the 1930s, about 78 per cent of the irrigated area of British Gujarat was irrigated by wells and only 10 per cent by the canals (Desai, 1948), whereas in the northwest the use of groundwater started increasing slowly through bullock-powered lifts from small private open wells during the 1900s, although the cost per unit of water lifted was high due to higher labour and energy costs (Stone, 1984; Bottrall, 1992). This resulted in low crop yields, and cheap surface water in the canal areas became a hindrance in the expansion of groundwater development (Ibid).

In the provinces of Uttar Pradesh (UP) and Punjab, mechanised tubewells were promoted by the Agricultural Department, but due to the availability of cheap energy sources, tubewell costs remained high in comparison to the returns. Colonial research led to the conclusion that the best option for developing groundwater was to promote large-capacity deep tubewells (DTWs) rather than shallow wells. With the passage of time, a large capacity deep tubewells (DTWs) scheme was promoted by the colonial government and around 1,500 public tubewells were installed in Western UP in 1934, with each well irrigating 150-200 hectares of land (Dhawan, 1982). With the aim of increasing irrigation in all possible ways, significant steps were taken by the colonial government in the context of research and development (R&D) at the turn of the century by creating the Provincial Agriculture Department, which would provide professional expertise on issues relating to water and agriculture. Furthermore, in

1928, the Royal Commission on Agriculture in India (RCAI) provided a 14-volume report about irrigation issues (Bottrall, 1992) in order to set priorities for the overall development of water issues in the country.

It can therefore be summarised that the main interest of the colonial government was to maximise revenue generation, which led to a massive canal construction programme. A highly centralised system of irrigation management, with a huge bureaucratic structure extending even to Britain, emerged, laying the foundations for a new irrigation ideology that would open up vast – often unpopulated – areas for farming, by manipulating the large untapped rivers and reconfiguring the basin hydrology. For example, the history of Punjab's 'canal colonies' depicted a complex character of a relationship between the state, science and nature in a colonial context, by linking science and the colonial empire in a manner that controlled and commodified Nature in order to tap its productive powers (Gilmartin, 2003). Moreover, an unbalanced irrigation development without regional equity was initiated through centralised structures for constructing and managing large irrigation systems on commercial lines.

Water in colonial India was not seen as having multidimensional meanings. The particular use of water in terms of economic profits was the primary goal of colonial rulers. Water for irrigation had had many meanings and relationships attached to it, for example in the case of 'overflow irrigation', where embankments built by local *zamindars* had a crucial role in flood management for the local communities, which the British engineers failed to understand. Similarly, in the case of *tanks* and *kudimaramat*, the British Government failed to understand the community mobilisation of funds for managing and maintaining the *tanks*. Colonial India's water governance was mechanised and centralised, with very little or no role for local water users/communities. Developing water as a resource was considered critical and pertinent to the enhanced British government income, and also to the new forms of state power. Thus, increasingly, state control over water – and then over land – led to a new framework of control over the local 'communities'.

Colonial irrigation in India successfully advocated that the state, in partnership with science, could tame rivers and subsequently improve human welfare. This ideology survived until the end of British reign and began dominating the water management discourse in post-colonial, independent India. The last two decades before India's

independence were marked by economic recession, the approaching end of colonisation and World War II. Each of these factors contributed to a slowdown in irrigation development, and the country became a standard bearer for the world in the use of modern design engineering techniques for huge and multifarious irrigation structures only during the colonial era. The modern epoch of constructing big dams had its roots in nineteenth century India (Postel, 1999), and it was only in the colonial period that India experienced its role as a hydraulic society with strong, centralised bureaucratic control over water development and its management. India's independence resulted in partition, which brought about new forms of water management and strategies to manage water for irrigation. The next section deals with this in detail.

2.4 Water management in independent India

India attained its independence from British rule in August, 1947. With independence came partition and the loss of a huge swathe of productive irrigated lands to Pakistan. In addition, the bulk of the public irrigation networks that the British had created ended up in Pakistan (Shah, 2009). The new Government of India's main aim after independence was to accelerate development and address the regional disparity of investment, as it was facing serious food grain shortages and rapid rates of population increase. The slow pace of irrigation development during the last decades of colonial regime had also aggravated the current problem of food shortages.

2.4.1 Large-scale irrigation schemes as 'temples of modern India'

To overcome grain shortages, a huge investment in a large-scale irrigation project was considered the best option. This was apparent from the Five-Year Plans (FYPs), which started in 1951. Investment in the large-scale surface irrigation was targeted under the first two plans, and giant projects like Bhakra-Nagal, the Damodar Valley and Hirakud were undertaken during that time. Minor irrigation projects[49] did receive some attention, but the major focus was afforded to major[50] and medium[51] irrigation projects after independence. The large-scale irrigation schemes were multi-purpose

[49] Minor irrigation schemes is the one in which the arable command area is less than 2000 hectares.

[50] Major irrigation schemes is the one in which the arable command area is more than 10,000 hectares.

[51] Medium irrigation schemes is the one in which the arable command area is more than 2000 hectares but less than 10,000 hectares.

and depended on reservoirs, unlike the run-of-the-river irrigation schemes of colonial India.

The early post-independence era took pride in launching these vast new projects, and large dams were seen as 'modern temples of modern India', keeping in view the vision of Pundit Jawaharlal Nehru, the first Prime Minister of the newly independent country. More than 90 per cent of public investments in agriculture were allocated for large-scale projects during the first 40 years after independence (Kishore, 2002). The post-independence era has seen an impressive increase in irrigated areas by large surface systems under state management, and since independence the expansion of irrigated area by canals has been significant, from 8.3 million hectares in 1950-51 to 18 million hectares in 1999-00 (Government of India, 2006a). This also led to lobbyism by engineers, irrigation bureaucrats and contractors who had vested interests in the construction of large dams in the Hydel projects. This led to further severe deterioration in the quality of programme planning and project design during the second five-year plan from 1955-60 (FYP) (Hanson, 1966).

These 'temples of modern India' were flawed on three counts. Firstly, the construction of big projects at many places led to major delays in project completion due to budget constraints (Hanson, 1966; Bottrall, 1992). Secondly, these projects failed to take into consideration the complex topographic environmental conditions that deemed it was not viable to build and extend canals in areas such as eastern floodplains or in Deccan (Bottrall, 1992). Finally, the old colonial legislation of giving unlimited powers to the government and the ID continued to be practiced in all matters relating to surface water development and management, leaving no rights for water users (Ibid).

Although there were very few exceptions, the new schemes introduced in the northwest of India led to the disappearance of the centralised bureaucratic canal management system introduced during colonial times (Bottrall, 1992). The northwest supply-driven rationing principles, and the delta water management of the south, were neither appropriate nor implementable due to the rigidly designed and often incomplete delivery systems. The strict formal allocation rules issued by ID officials, vulnerable to pressure from influential farmers to mismanage the distribution of water to their mutual advantage, led to a large network of corrupt actors, including local politicians, farmers and contractors, influencing the planning and construction phases

of surface water development as well as its management (Pant, 1981; Wade, 1982). Falls in water rates and the squeezing of budgets corresponding to the fall of the salary levels of ID staff further added to the mismanagement and poor performance of big irrigation projects (Chambers, 1988).

Widespread official acknowledgment of large schemes having severe water management problems began from the early 1970s, after the second Irrigation Commission (IC) report was released by the Ministry of Irrigation and Power under the Government of India. Nevertheless, for a long time ID professed that the main problems with water management happened because of farmers, so the need of the hour was to educate them on how to use water effectively and properly (Chambers, 1988). Thus, in 1974-75, the Central Government initiated the Command Area Development Programme (CADP) for water management in the command areas, but the programme did not take account of studying the vital central issue of system design and management practice (Bottrall, 1992).

To summarise, India's peak years of dam construction were from 1970-89, when 2256 out of a current total of 4291 dams were built, according to the study on India prepared by the World Commission on Dams (Attwood, 2007). Instead of becoming technically and economically more efficient though, canal systems have been wasteful in terms of cost and financial mismanagement, which fits the picture of massive waste and inefficiency generated by India's state-managed "development projects in the period from 1950-1991" (Rangachari et al., 2000). Hence, India's ability to feed its growing population in the future now depends to a large extent on how it can make significant improvements in the efficiency of poorly designed and irresponsibly managed irrigation systems (Attwood, 2007).

2.4.2 Small-scale revolution

Independent India's water management can be further divided into small-scale, community-based management and groundwater revolution. In the 1980s, attempts were made to bring about reform in the management practices of the ID through the World Bank-supported National Water Management Project (NWMP),[52] but none of these programmes made an effort to address the issue of the department's legal

[52] For detail see 'Irrigation Management in South India: The Approach of The National Water Management Project (Berkoff, 1988).

powers, lack of accountability in system management and the monopolistic control of public funds assigned for surface water development (Bottrall, 1992). During the early 1990s in India, participatory irrigation management (PIM), through irrigation management transfer (IMT) to farmers, was officially acknowledged as the best method to bring about the efficient utilisation of irrigation water, its equitable distribution and a sustainable irrigation service (Swain and Das, 2008).

The concept of PIM in India has evolved through three distinct phases. Firstly, in the early 1980s, the concept was limited to farmers' participation through their representatives in project management committees, but this was not very successful. In the latter part of the 1980s, farmers' organisations such as *chak* (outlet) committees were formed, but many of these remained only on paper and became dysfunctional after a while. Finally, in the early part of the 1990s, the concept of creating farmers' organisations and was adopted through the World Bank-funded Water Resources Consolidation Project, through which thousands of water users associations (WUAs) were formed to take responsibility for the operation and maintenance of the downstream parts of irrigation systems, distribution of water among water users and collection of water rates from the farmers (Maloney and Raju, 1994; Swain and Das 2008). Nonetheless, the implementation of PIM has been a bumpy ride in India because of the heterogeneity of farmers, caste-class differences, physical system inefficiency, half-hearted support from irrigation bureaucracy, inadequate capacity building and a lack of proper incentives and committed local leadership (Swain and Das 2008).

Furthermore, in regard to community participation in irrigation management, the Government of India also launched the National Water Policy (NWP) of 1987, placing emphasis on farmers' participation in the management of irrigation systems, especially in water distribution and the collection of water charges (Randhawa and Sharma, 1997). The NWP of 2002 emphasises a participatory approach for the management of water, by encouraging cooperation between various governmental agencies and other stakeholders. This includes including women in various aspects of the planning, design, development and management of water resources schemes. Moreover, involving local bodies such as municipalities and *gram panchayats*[53] in the

[53] Gram Panchayat is the council of elected or nominated villagers.

operation, maintenance and management of the water infrastructure was achieved, keeping in view the eventual transfer of management rights to user groups (Government of India, 2002a).

Conversely, in the post-colonial era, small water surface systems under community management continued to decline due to the low level of public investment and government measures designed to increase legal and administrative control. For example, the *kuhl* system (farmer-managed gravity flow irrigation) of Himachal Pradesh ranges from *kuhl* regimes which operate independently of any state involvement to regimes which are totally managed by the Himachal Pradesh Irrigation and Public Health Department[54] (Baker, 1997). The *phads*[55] of Maharashtra have been physically absorbed into large new canal schemes, whereas in the *tank* systems, population pressure on the upper catchments has resulted in rapid siltation, denudation and erosion of the areas on which they depended for their run-off. Secondly, the expansion of modern groundwater extraction technology, along with the Green Revolution of the 1960-70s, acted as key factors in the demise of the *tanks* (Mosse, 1999).

The micro-watershed-based approach to natural resource management has been hampered due to the compartmentalisation of various government programmes and the centralisation of various programmes meant for water development. For example, the Community Development Programme (CDP) was started in 1952 with the aim of community participation in the development of the village (Neale, 1983), but it resulted only in the administrative and developmental functions of a centralised state in the form of replacement by introducing from the 1960s centrally sponsored programmes and schemes for individual departments (Jain, 1985).

Indian watershed development programmes had begun in the 1970s to increase land productivity by concentrating on soil and water conservation issues, but up to this point watershed development had held no special significance for the development

[54] Tensions have been generated within *kuhl* regimes due to increasing nonfarm employment. As those who have access to new economic opportunities are not very keen to contribute labor in voluntarily cleaning of canals and other resources, required for the upkeep of *kuhl* irrigation, as that time spent could be used in earning a wage (Baker, 1997).

[55] Phad was a community managed irrigation system in which series of dams were built on rivers to divert water for agriculture use. The Phad system was prevalent in northwestern Maharashtra and came into existence 300-400 years ago; the Phad system operated on three rivers in the Tapi basin- Panjhra, Mosam and Aram in Maharashtra (Agarwal and Narain, 1997).

community (Yoganand and Gebremedhin, 2006). Indian watershed projects started spreading wider in the late 1980s and 1990s, with the aim of developing semi-arid areas that the Green Revolution had circumvented (Government of India, 1990, 1994a; World Bank, 1990). Watershed project approaches evolved from the highly technocratic, large-scale top-down approach to greater local participation and use of local technologies, which resulted in better performance in terms of conservation and productivity (Farrington et al., 1999; Hanumantha Rao, 2000; Hinchcliffe et al., 1999). Three extremely successful village-level projects initiated in the 1970s were: *Sukhomajri, Ralegaon Siddhi* and *Pani Panchayat*, which focused on the link between soil conservation and water harvesting. These are seen as having the modern roots of the centuries old assortment of soil and water conservation efforts in India (Kerr, 2002).

In order to replicate the success of these three projects several large-scale projects were started in the 1980s.[56] All of these projects operated in relatively poor degraded areas and adopted the technological approaches of *Sukhomajri, Ralegaon Siddhi* and *Pani Panchayat*, but none of them adopted institutional arrangements, with no or little effort made to organise communities, as benefits and cost were unevenly distributed in the watershed development project (Government of India, 1990, 1994a; World Bank, 1990). The projects failed to take note that collective action to manage the common pool was tough because benefits were gradual, incremental and unevenly distributed (World Bank, 2007).

In 1994, the Ministry of Rural Development (MoRD) produced a set of guidelines for implementing its watershed programmes and for making watershed development people-centered. This paradigm shift was aimed at gaining decentralised governance and increased participatory approaches to natural resource management, which would strengthen the capacity of the local community (Yoganand and Gebremedhin, 2006). Thus, a significant step for participatory and decentralised forms of decision making and fund allocation started with the comprehensive common guideline evolved for all

[56] Such as, Government of Maharashtra initiated a major watershed scheme called the Comprehensive Watershed Development Project (COWDEP) for water harvesting (Pangare and Gondhalekar, 1998). Ministry of Rural Development (MoRD) reorganized its Drought Prone Area Programme (DPAP) around water harvesting in 1987 (Government of India, 1994a). World Bank supported Pilot Project on Watershed Development and the Model Watershed Program of the Indian Council of Agricultural Research (World Bank, 1990; Kerr, 2007). And in late 1980s the Ministry of Agriculture began the National Watershed Development Project for Rainfed Areas (NWDPRA) which was also on the lines of World Bank projects (Government of India, 1990).

programmes, with the recommendation of the Hanumantha Rao Committee in 1994 (Kerr, 2002, 2007; Kerr et al., 2000). The watershed guidelines of 1994 advocated the need for different institutional arrangements at various levels to fulfill the task of community-based watershed management. The guidelines aimed to begin a state-NGO partnership oriented approach to address environmental problems, in order to achieve the best possible utilisation of natural resources, employment generation, the restoration of ecological balance and to alleviate poverty through community-based watershed management (CBWM) (Government of India, 1994b). The 1994 guidelines were revolutionary in the fact that they went hand in hand with the literature on community-based natural resource management (CBNRM), which at that time focused on local people's ability to manage their own natural resources under some enabling conditions (Kerr, 2002).

Over the years many modifications have been made to the 1994 Common Guidelines. In 2001, for instance, the Revised Watershed Guideline was introduced, which placed importance on seeking a combination of the government and NGOs as a project implementation agency (PIA) (Government of India, 2001). *Hariyali*[57] guidelines launched in 2003 gave importance to *Panchayati Raj* by recognising it as the implementing authority, rather than forming a watershed committee, thus placing the watershed programme directly under the supervision of the village *panchayat*[58] (Government of India, 2003)

Again, some changes in *Hariyali* guidelines were made in 2006 under the name of the *Neeranchal* Guidelines (Government of India, 2006b), which aimed at establishing the series of institutional structures to govern watershed management in the country. The National Authority for Sustainable Development of Rainfed Areas (NASDORA), a quasi-independent authority, was created to manage the central government-funded watershed programmes. Recently, again in 2008, modifications were made to the New Common Guideline of 2008 (Government of India, 2008), which gives prime importance to community participation, by involving all the stakeholders at the centre of planning, budgeting, implementation and management of watershed projects. Hence, the New Common Guideline of 2008 emphasises making community

[57] Hariyali means greenery.

[58] Village panchayat is the elected village governing council.

organisations more closely associated with and accountable to *gram sabha*[59] in project activities.

Hence, participatory[60] watershed development in India is widely advocated by governmental and non-governmental organisations alike, with the additional support of various donor agencies. There is no doubt that significant progress has been made over the years in bringing greater convergence in the historically different approaches of the central Ministry of Agriculture (MoA) and the Ministry of Rural Development (MoRD). Nevertheless, partial success only has been achieved and the imperative questions are frequently raised about participation and the distribution of benefits in highly socially stratified local settings.

2.4.2.1 Groundwater Revolution – Taming the Anarchy

With an estimated usage of around 230 cubic kilometres per year, India is the largest groundwater user in the world (Pahuja, 2010). Groundwater plays a key role in the country's agrarian economy, as it accounts for 53 per cent of net irrigated area (Vaidyanathan, 1999) and around 70-80 per cent of irrigation value added to agriculture (Dains and Pawar, 1987 cited in World Bank, 1998). Moreover, groundwater provides 80 per cent of the water required for domestic use in rural areas (Government of India, 2002b) and is a vital resource for rural areas, as more than 60 per cent[61] of irrigated agriculture and 85 per cent of drinking water supplies depend on it (Pahuja, 2010). Furthermore, the development of groundwater has been predominantly achieved through the individual or cooperative efforts of farmers, mainly in the case of groundwater structures such as dug wells, shallow tubewells and public tubewells (Vani, 2009b).

The National Commission on Integrated Water Resources Development (IWRD) has estimated that 431 billion cubic metres of groundwater is available in India, of which 396 billion cubic metres is annually recharged and could be used (Phansalkar and Kher, 2006). Groundwater distribution in India is not uniform and is subject to wide

[59] Gram Sabha is the assembly of all inhabitants of a village.

[60] Moreover participation can be conceptualized at two levels in the watershed context; firstly in terms of attempt to involve local communities in the watershed management process; secondly to examine the individual actors' participation in the watershed related management process.

[61] Based on the estimate made by Government of India in 2005; but other estimates are higher for example India's National Sample Survey Organization (NSSO) in 2005 designated that 69 percent of *kharif* and 76 percent of *rabi* irrigated areas depended on groundwater (Pahuja, 2010).

spatio-temporal variations, as it is a huge country with diverse hydro-geological areas resulting from a varied geological, climatological and topographic set-up (Government of India, 2002). In spite of a favourable situation with regard to the availability of groundwater in the country, the depletion and scarcity of groundwater has developed through 'over-exploitation' (Vani, 2009a). Around 5.4 per cent of a total 4,272 blocks in the country have been categorised as 'over-exploited', whereas 2.5 per cent are categorized as 'dark'[62] (Vani, 2009b). The Gravity Recovery and Climate Experiment (GRACE) satellite mission, launched in March 2002 as a joint effort by NASA and the German Aerospace Center, has provided a better picture of Indian groundwater. GRACE's determined depletion rate implies that it has been pumped out 70 per cent faster in this decade than the Central Ground Water Board of India estimated in the mid-1990s (Kerr, 2009).

Mechanised lift irrigation with groundwater started in the mid-1960s with the advent of new pumping technology, which made it possible to bore deep wells and extract water in large quantities. With the advent of the Green Revolution, a voracious demand for water was created for high-yielding hybrid crop varieties (Hardiman, 2007). Green Revolution agrarian technology and the groundwater revolution played a significant role in increasing the productivity of India's irrigated agriculture. Furthermore, the promising aspects of deep borewells in water-scarce hard rock areas made groundwater technology popular, because of its capacity to provide water on demand, twice as high production levels than canals, per unit of water provided and three times higher than the *tanks* (Chambers et al., 1989).

The total number of groundwater structures estimated by the Third Minor Irrigation Census of 2001 was 18.5 million, out of which 9.6 million were dug wells, 8.3 million shallow tubewells and 0.05 million public tubewells (Vani, 2009b). In addition, well-irrigated areas have increased from 6 million hectares to 34 million hectares during the last 50 years (Government of India, 2006a). In 1999-2000, well irrigation accounted for nearly 59 per cent of the total irrigated area as compared to only 29 per

[62] The Central Ground Water Board categorizes the groundwater blocks according to the decline in water level and the stage of groundwater use (the stage of groundwater use is the annual groundwater draft expressed as a percentage of net annual groundwater availability). Semi-critical or grey (stage > 70% and < 100%; significant long-term decline in pre- or post monsoonal water level); critical or dark (stage > 90% and < 100%; significant long-term decline in both pre- and post monsoonal water levels); overexploited (stage > 100%; significant long-term decline in pre or post monsoonal water level or both).

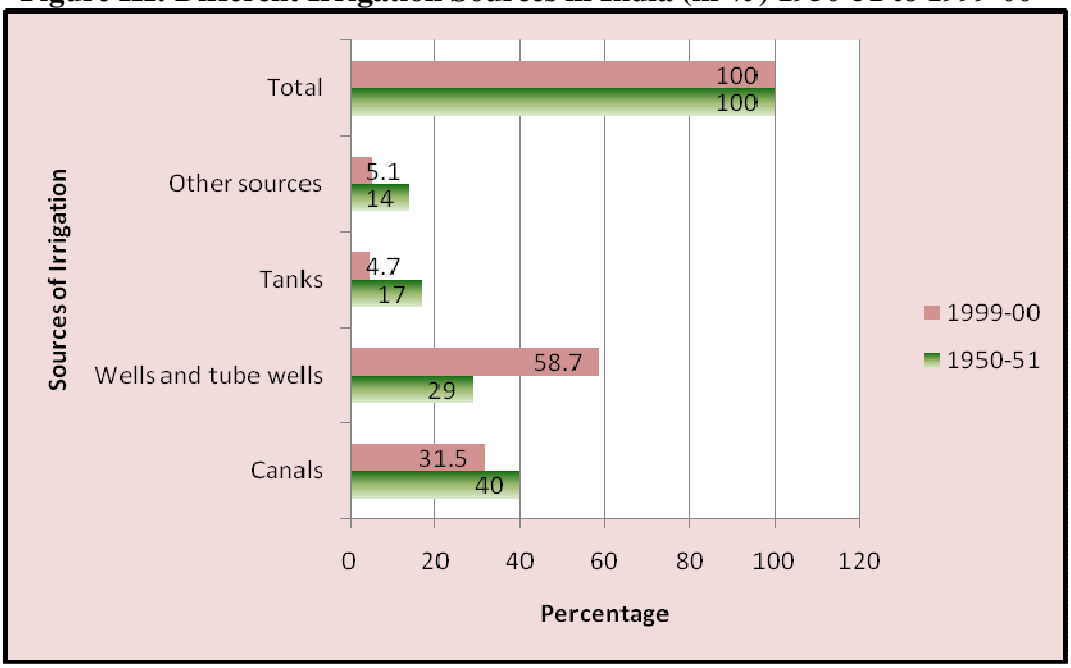
cent in 1950-51 (Ibid). Wells and tubewells constitute the major share of this figure (58.7 per cent) followed by canals (31.5 per cent) (Ibid). Table I, below, depicts the change in the area share of different irrigation sources in India from 1950-51 to 1999-2000. Figure III illustrates the share of various irrigation sources as a percentage in India from 1950-51 to 1999-2000.

Table I: Irrigated Area under Different Irrigation Sources in India

Sources of Irrigation	1950-51 Area (m.ha)	1999-00 Area (m.ha)
Canals	8.3	18
Wells and tube wells	6	33.6
Tanks	3.6	2.7
Other sources	3	2.9
Total	20.9	57.2

Source: Central Statistical Organization (CSO), Statistical Abstract, India, 2002

Figure III: Different Irrigation Sources in India (in %) 1950-51 to 1999-00



Source: Central Statistical Organization (CSO), Statistical Abstract, India, 2002

The expansion of groundwater irrigation has been largely due to improved drilling and lifting technologies, liberal credit provision, a lower per unit cost of water pumping and an enormous, subsidised rural electricity programme (Marothia, 2003). Unfortunately, the absence of effective institutional control measures and checks has led to severe over-exploitation of groundwater. Farmers with adequate resources have constructed deep tubewells with submersible pumps, and in the process have been

more interested in their private gains and ignored the social cost of over-exploitation (Dhawan, 1995; Joshi and Tyagi, 1991; Vaidyanathan, 1996).

Further, under the private property regime, water markets have developed in many parts of the country (Shah, 1993). Various empirical studies have highlighted the exchange of groundwater in, for example, Punjab (Tiwari, 2007), Bihar (Pant 1992; Shah and Ballabh, 1997; Wood, 1995), Uttar Pradesh (Pant, 1992), Tamil Nadu (Janakarajan, 1993, 1994), West Bengal (Mukherji, 2007) and Gujarat (Aggarwal, 1999; Dubash, 2002; Prakash, 2005; Shah, 1993). In places like Gujarat 'tubewell companies'[63] can be found, the 50-100 members of which are mostly richer farmers who own huge amounts of land. These tubewell companies work like 'joint stock companies' and are mostly found in the Mehsana and Banaskantha districts of Gujarat. The large amount of investment and the risk of failure associated with installing deep tubewells, which are fitted with 90 to 120 horsepower submersible pumps and underground pipeline networks for water distribution, have led to farmers coming together to form 'tubewell companies,' thus doing away with individually owned tubewells (Shah and Bhattacharya, 1993).

Groundwater markets in India are informal, as they are not based on well defined property rights and are actually regulated by informal institutions rather than formal bodies (Singh, 1990). Groundwater use is governed by a legal framework that ties rights to groundwater to land ownership, and there is no legal limit to the amount of water a landowner can draw from the ground. Groundwater is neither a true open access resource, because the ability to extract water is limited by well ownership, nor is it a common property resource (CPR), because it lacks an identifiable group of users with equal rights (Ciriacy-Wantrup and Bishop, 1975).

In order to prevent the over-exploitation of groundwater, the Indian Government drafted a Model Bill in 1970 for adoption by state governments. The Model Bill empowered them to tackle the drinking water situation, and the Bill was further revised subsequently in 1972, 1992 and in 1996. The latest version, unveiled in

[63] Tubewells are organized as 'companies' where farmers own shares, contribute capital, get water, bear profit and loss all in proportion to the land they have in command. (For more details on Gujarat Tubewell Companies see Capitalism: Groundwater Development and Agrarian Change in Gujarat by Navroz K. Dubash, 2002).

2005,[64] has more influence on legislative activity because groundwater regulation has become a priority in many states. The Bill gives state governments power and authority over groundwater control by imposing the registration of all groundwater infrastructure and providing a basis for introducing permits for groundwater extraction in regions where groundwater is over-exploited (Cullet and Gupta, 2009; Phansalkar and Kher, 2006). Some states have adopted many groundwater Acts over the past decades.[65] The Model Bill included the constitution of State Ground Water Authority (SGWA) and the modalities for regulating groundwater resources. The Central Ground Water Authority (CGWA) was created under subsection (3) of the environment (Protection) Act, 1986 on 14th January 1997 for the purpose of groundwater development and management.[66] The authority has the mandate to regulate and control groundwater withdrawal in 'over-exploited' and 'critical' areas, but does not have a broad mandate to regulate groundwater in general and is therefore unable to make much difference to groundwater management (Shah, 2008).

To summarise, the groundwater institutions we find today in India were embryonic in the early years of the nineteenth century and are now fully operational. The jointly owned wells in nineteenth-century Punjab (Islam, 1997) operated like the tubewell companies of North Gujarat (Shah and Bhattacharya, 1993) and Punjab (Tiwari, 2007) of today. In 2003, India's National Sample Survey Organisation conducted a study on the source of irrigation used by cultivators in *kharif* (rainy season crops) and *rabi* (winter crops), by surveying 51,770 cultivators from 6,770 villages. The study found that 69 per cent of *kharif* acreage and 76 per cent of *rabi* acreage were irrigated by wells or tubewells (Shah, 2009). Therefore, mechanised tubewells with small pumps have transformed irrigated agriculture in India, thereby giving a whole new meaning and dimension to water management.

[64] For detail see 'Model Bill to Regulate and Control the Development and Management of Groundwater 2005', available at http://www.ielrc.org/content/e0506.pdf.

[65] Andhra Pradesh, Goa, Tamil Nadu, Kerala, West Bengal, Himachal Pradesh and Union Territories Lakshadweep and Pondicherry have enacted and implemented groundwater legislation.

[66] For detail see 'Groundwater Management and Ownership - Report of the Expert Group (Planning Commission, 2007, Government of India, New Delhi).

2.5 Conclusion

Water management has been a contentious and tricky affair in India due to socio-economic, political and ecological reasons. Factors such as caste-class differences, farmer heterogeneity, the rural–urban dichotomy, gender, institutional government arrangements and extremely different environmental conditions have influenced water management. To complicate the matter further, vote bank politics, a lack of coordination between irrigation bureaucrats, policymaking and various sectoral departments carrying out their own water programmes have affected water management in many ways. In this diverse regime, India has been embracing water management in its water policies, but they remain a mere proposition. This is complicated further by ministries proposing different policies and programmes, which often compete and conflict with one another.

Issues such as the conceptualisation of 'community' in community-based water management are a matter of debate in India. One important factor which is often overlooked in the community-based water management discourse is that communities are not always enclosed, homogeneous entities but are socially differentiated and dissimilar on the grounds of gender, caste and class, which divide and cut across so-called 'community'. The participation and implication of water management has to be examined by disaggregating the 'local community' in terms of different social sections, i.e. class, caste, gender and ethnicity, and then assessing the subsequent differential impacts. The following paragraphs address these factors individually.

Equity: Class, caste and gender contribute almost exclusively to how inequity manifests itself in access to natural resources. To elaborate on this point, I cite the example of watershed management. The aspect to note here is that a watershed is a hydrological unit rather than a natural unit of human social organisation (Rhoades 1999; Swallow et al., 2001). In the case of community-based watershed management, watersheds pose challenges to upstream and downstream communities' diverse interests. In the case of water, one's location (upper reaches versus valley positions) often determines access, as people who own land in the valley benefit most from the augmented resource.

Costs and benefits are unevenly distributed, which results from spatial variations and the conflicting use of natural resources in the watershed. A large proportion of uncultivated common land is often found in the upper watershed areas, and re-

planting crops requires protection against erosion, which in turn leads to cordoning off areas which would otherwise be used for grazing and firewood collection (Farrington et al., 1999). The poor, women, landless and lower castes who are heavily dependent on these lands are severely affected, whereas the water harvesting benefits are also disproportionately benefiting those whose land is near the check dams (mostly wealthy farmers who own the majority of irrigable land). Hence, watershed projects are unlikely to result in conservation and productivity benefits due to the uneven distribution of these fringe benefits, where conformity cannot be achieved or where downstream users and upstream users do not work in close harmony and cooperation (Kerr, 2002).

Similarly, in the forming of water user associations in the PIM, various dynamics are at play, which often act to hinder the smooth functioning of the PIM. There are often different levels of access to water for the farmers who are at the 'head reach, middle reach and tail end' of the command area of the canal. Usually, the lands at the 'head reach' are owned by the rural elite, who have more access to canal water, often illegally, by installing pumps in the channels. This results in different access opportunities to canal water, which is often a source of conflict between farmers.

In the case of groundwater extraction, farmers with adequate resources construct deep tubewells by making use of credits and subsidies provided by public agencies, although this inevitably means that they are more interested with private gain than the social cost of over-exploitation. This course of action places them in an excellent position to drill wells and sell the water for personal gain, leading to wider scarcity. As Singh (1997:53) indicates, "once again, like the canal and dam technology, affluent sections of society benefited from the tubewells". Hence there exists inequity in accessing water resources, even within so-called 'village communities'. Therefore, groundwater irrigation has promoted private property rights, as it is not a public resource leading to differentiation in the access of water between the rich and the poor.

Caste-class dynamics: In a heterogeneous and stratified society there exist several layers of caste and class cleavage, and community-based water management in these societies is often confronted with the problem of caste politics. It is often difficult to inculcate community feeling and facilitate people's participation in water management within a socially and economically differentiated spectrum.

Manipulation by the rural elite, often by upper castes, to turn any water-related project to their own benefit is quite rampant, whether it is found in a watershed committee or in water user associations. Often, different castes have varied political affiliations, and differences in opinion play a role by influencing the smooth functioning of any development project in the village. Caste loyalties also play a significant role in selecting group members and at times rampant potential candidates are persuaded in various contrived ways not to contest the election/selection process. Moreover, most watershed development involves land-based programmes, in which case the lower castes (Harijans/untouchables) are invariably left behind, as class and caste convergence produce a situation in which lower castes (Harijans/untouchables) do not have access to resources, especially land. Even in the rare cases where they do own land, it is generally degraded and located in the upper catchments, and they have separate wells/ponds to access water. Hence, class and caste map on to locational advantages and disadvantages in the context of water accessibility.

Gender: gender cuts across households and other dimensions of intra-community differentiation and hierarchy such as class, caste and ethnicity (Meinzen-Dick and Zwarteveen, 2001:66). Female social identities are myriad.[67] Overlapping is the manner in which women are involved in natural resource management, as gender relations in a community are also influenced by the same identities they complement. The caste system is often articulated by gender in terms of hierarchies and boundaries in how members participate in water management groups and associations. Farmers are mostly men, as women do not own land formally because India is a patriarchal society where land is owned by the male. In addition, women are invisible in formal the decision making structure due to caste-based seclusion norms. Even if participation takes place in formal water committees, it is done to fulfill government criteria, as any power rests in the hands of male family members. Hence, despite the efforts that have been made to improve women's participation and positions through the processes of empowerment, their presence remains highly constrained and contested (Agarwal, 1997; Cleaver and Elson, 1995; Mosse, 1994).

[67] Women having multiple social identities have been explained in detail in chapter 5: The World of Water in Mathnaa and in chapter 6: Social Organisation in Watershed Development Project of Mathnaa respectively.

Institutional Organisation: Water management-related policies, laws and programmes in post-colonial India have been shaped largely by the legacy of colonial times, which has resulted in disjointed programmes for large-scale irrigation projects.

The existing institutional arrangement for water resource management in the country is fragmented, with a number of independent organisations dealing with water at central and state levels. At the union level, water affairs are run by the Ministry of Water Resources (MoWR), agriculture is under the rubric of the Ministry of Agriculture (MoA), rural development is conducted through the Ministry of Rural Development (MoRD) and forestry affairs are handled by the Ministry of Environment and Forest (MoEF). Each of these ministries has its own research and development sections and policies to guide specific programmes. Interestingly, the MoWR only lays down policy guidelines and programmes for the development and regulation of the country's water resources[68] (Government of India, 2003). As such, it has no institutional structure to support implementation at state level, thus creating a vacuum at the level of policy implementation between central and state government. The exception to this lies with inter-state and international water issues. While the Ministry of Water Resources remains mainly an advisory body and performs a monitoring role, other ministries (agriculture, forest and rural development) and agencies (state irrigation departments) related to water play an additional regulatory role through delegated responsibilities. The vacuum created illustrates the drawbacks in the mechanisms employed by the Ministry of Water Resources, which does not have much validity beyond making policies and generating information. The ministries seize the opportunity presented by the all-encompassing concept of 'integrated' and 'community-based water resource management' to push their objectives forward and to overcome financial deficit, together with their proclaimed adherence to democratic commitment. State governments have exploited the concept to remain at the forefront of ecological and social transformation, by using a vehicle of centralised single focus technology mission.

Although water management is the overall responsibility of the state government, as per the constitutional provision of India, it falls under the state subject (Dhiman,

[68] Though the MoWR has about 8 federal-level organizations performing different functions along with 10 ad-hoc boards and commissions having responsibilities for the execution of specific engineering objectives within river basins (Pitman, 2002:5).

2007). State agencies play a major role in the development and management of water resources under their jurisdiction through water-related sectoral units (agriculture, forest, rural development, urban development) other than those provided by the Ministry of Water Resources. Though there are diverse departments and agencies involved over water resource management, their roles remain fragmented (World Bank, 1998). Irrigation uses the largest amount of water in all states. Interestingly, there is no separate department for irrigation; rather, it comes under the state department of public works (PWD), which is mainly entrusted with constructing roads and governmental buildings, and provides materials and the construction of infrastructure for drinking water and irrigation water needs. In a way, the PWD is strongly oriented towards civil works construction, resulting in limited attention to water planning and management. Though a few states have created a water resources organisation (WRO), like Tamil Nadu and Orissa, they have merely remained in renaming the existing PWD with specialist function of irrigation management (Thakkar, 1998*)*.

India has no separate water legislation, which instead is dispersed across various sectors between central and state provisions (Saleth, 2004). The legislation governing water issues fails to recognise the structural system and process for providing secure, defensible and enforceable surface water rights. The Indian legal system accepts the riparian rights of the individual to extract surface water from natural systems, without disturbing the similar benefits of other riparians, as natural rights.[69] As such, socially embedded rules are left in legal limbo, with individuals seeking the time-consuming and expensive Indian court system for their grievances. The problem is further compounded by an increasing demand for new water resources, such as industrial and environmental needs.

Of the various sources of water, groundwater is purely a private good, with rights linked to land ownership. All groundwater existing and found beneath private property (land) is fully under the control of the owner, who is free to extract and use it as he or she sees fit. The process of groundwater development has been institutionally (not hydrologically) independent from surface water development, which is controlled by CPR or state agencies, whereas groundwater is governed by minimal legislation, as

[69] This does not apply to waters flowing in irrigation canals and stored in man-made reservoirs, in which case water can be drawn only with a governance-issued permit.

it remains an open access resource and provides pump owners with unlimited rights to extract water from aquifers under their land.

The regulation of groundwater is limited[70] to a few states and metropolitan cities. However, regulations through indirect means via the National Bank for Agricultural and Rural Development (NABARD) and state electricity boards have been adopted, while providing electrical connections and credit for investment in wells and pump sets. Such acts have been frequently overlooked, often affecting the poor. For instance, the *Jyotirgram* scheme has shrunk the water markets in Gujarat and had a direct impact on the livelihoods of many people.[71] To sum-up, groundwater is largely governed by farm size, the depth and number of wells, pumping capacity and economic power (Saleth, 2004:11).

In view of these complexities, legislations and regulations put forth by the national government are only a small part of the motivation for actors' behaviour. These conventional forms of legislation co-exist and interact with multiple legal orders such as customary, religious, project and local laws – all of which provide the basis for actors to claim access to water (Von Benda-Beckman et al., 1997), especially in countries like India that have centuries-old, archaic management practices. These multiple legal institutions existing at various levels in the social spectrum help actors in "forum shopping" for one or another of these legal frameworks to access water (Spiertz, 2000:191). Essentially, institutions through which these legal forms are negotiated and renegotiated are crucial for water resource management (Bruns and Meinzen Dick, 2000).

Finally, research on cooperatives in the rural areas of India has revealed that widespread inefficiency and inequities stem mainly from top-down management by state bureaucracies. Hence, to counter this, participatory management has started, although 'participatory' rhetoric often tends to ignore conflicts of interest within and between communities, political divergences and water management government policies with regard to the compartmentalisation of the administrative structure. Moreover, in highly differentiated communities, the straightforward transfer of

[70] Only Chennai Metropolitan area, state of Maharashtra, Karnataka and Gujarat have enacted ground water regulation acts (Saleth, 2004).

[71] For detail see 'Groundwater Governance through Electricity Supply Management: Assessing an Innovative Intervention in Gujarat, Western India (Shah et al., 2008).

decision making power to the 'community' often turns out to be the handing over of decisions to dominant sections within the local community. This participatory approach may backfire, especially if technocrats take a successful experiment in one location and seek to replicate it by top-down planning and regulation elsewhere, without taking into account social differences existing in any given community. Hence, water has not been treated in a multidimensional sense in community-based water management in India. Additionally, interventions have failed to understand the complex interaction of factors such as caste, class, gender, inequity and existing fragmented institutional arrangements.

Hence, the way in which community is conceptualised in community-based water management ignores the individual differences in a village, assuming that the common good for the village will override these differences. Moreover, it is believed that the new-institutionalist perspective will facilitate the cooperation of the village community by developing institutions which will enable differences to be resolved. Thus, the way community construction is conceptualised in the implementation of various government-backed programmes and policies has serious drawbacks. As a springboard, questions arise for identifying 'community' boundaries: Where do they begin and end? Who is inside and outside the 'community' boundaries? Who constitutes the 'community'? The questions of caste, class, gender and institutional governance and inequity require careful study and usage in community-based water management. Consequently, the need of the hour is to adopt 'smarter' water management techniques and practices by making better use of water appropriated through existing systems.

The demand and supply mechanism attributed to commodity market forces can be applied routinely to the dictum of water management. It is no surprise that the Jawaharlal Nehru National Urban Renewal Mission (JnNURM),[72] which is being presently used in city space, is witnessing a paradigm shift towards involving private players in water supply and management. For example, in Mysore, under JnNURM the entire water supply has been contracted to JUSCO, a TATA company. Private firms make no investment and the state has to pay these companies many times more than it ever spent when it managed these services. The state is contractually obliged to

[72] For detail on JnNURM see http://jnnurm.nic.in/nurmudweb/toolkit/Overview.pdf.

provide brand new infrastructure, purified bulk water, overhead tank filling and to allocate its staff to work for the private company – and pay them as well (Urs, 2011). It is these private players who might call the shots in the long run if the implementation is sketchy and irreconcilable at government level.

The next chapters will deal with the issues highlighted in this chapter, with caste rabidity as a reference point.

Chapter 3 Conceptual Framework for Analysing Community-Based Natural Resource Management

3.1 Introduction

This chapter sets the foundation for exploring the nature of interaction between various actors in community-based natural resource management. Power relations and situated practices of different actors are explained by using the actor-oriented approach. In addition, this chapter elaborates on the conceptual framework of community and its participation in CBNRM.

3.2 Conceptual Framework

Local resources are often creditably considered to be better managed by local communities, and the contemporary policy idea is that the present level of resource degradation is the result of traditional institutional arrangements for sustainable resource use (Bromley and Cernea, 1989). The principal cause of the demise of traditional systems for sustainable resource use is often attributed to intervention by the state – and particularly the colonial state's assertion of proprietary rights over non-private resources such as water and forests (Gadgil and Guha, 1992). The growing popularity of this approach was advocated by the argument that traditional communities possess local knowledge to conserve and efficiently use resources, as they have a harmonious relationship with nature, which in turn leads to the recovery of lost traditions of community responsibility (Agarwal and Narain, 1997; Gadgil and Guha, 1995). Nonetheless, national governments have failed to make any alternative arrangements for local resource management regimes, which has resulted in a shift towards uncontrolled 'open access' to non-private resources (Bromley and Cernea, 1989).

In order to solve this problem, policy solutions such as the re-establishment of local users' rights and building social organisations have been advocated (Bromley and Cernea, 1989). Consequently, programmes of local institution building and encouraging local organisations such as user groups, village water users' associations and forest protection committees have been established on the premise of recovering traditional management practices (Mosse, 1999). In recent years, the argument for the revival of the community has been put forward because of the increasing use without its exploration and relevance to application, which has led to criticism from the

accepted view about 'community participation' (Cooke and Kothari, 2001). Thus failing to conceptualise 'community', has made the 'community participation' projects ambiguous, in terms of its utility as the 'means' or 'end' to the development programme (Kumar, 2005).

3.3 Defining Community in Various Fields of Study

Many social science definitions exist to describe 'community' in the literature. For instance, sociologists emphasise social interactions and networks, economists emphasise work and markets and geographers place emphasis on spatial aspects. Hillery (1955) found in the scientific literature 94 different definitions of 'community', all using some kind of combination of space, people and social interactions. Within the social science literature, capturing the essence of 'community' remains an unfulfilled aspiration (Gauld, 2000). The way 'community' is currently conceptualised in natural resource management can be traced to the 'community' development movements of the 1950s and 1960s of many third world countries (Midgley et al., 1986). It was with the emergence of 'participatory' methods, primarily in the 1980s (Chambers, 1983), that the concept of 'community' gained eminence. However, although it was central to the issue of participatory development, it was poorly defined (Midgley et al., 1986). As a consequence, thinking of community as the lowest level of aggregation, at which people organise themselves into small, homogenous, harmonious and territorially bound units in the most generic sense (Kumar, 2005), has raised a debate in social sciences.

3.3.1 The Concept of Community in Sociological and Development Policy Debate

Development agencies are often confronted with the question, what defines a community? Although there is a debate on the nationality of community within the spectrum of social and political theory, two approaches define the constitutive aspects of community formation. The first is based on 'consensus' or 'shared' aspects; Durkheim's conscience collective or mechanical solidarity exists on the totality of shared beliefs, rules, morals and sentiments (Durkheim, 1960). Taking into account Durkheim and Talcott Parsons' perceptions on community, it is regarded as having social identity and solidarity. The continuity of community is assured by passing down shared norms, customs and traditions from generation to generation (Rhoads, 1991).

The second definition is Ferdinand Tönnies' concept of community, which is different from civil society because such a distinction is linked with the transition from tradition to modernity. According to Tönnies, real and organic (Gemeinschaft) forms of living together in a community are based upon familiarity of relations, solidarity and belongingness from the mechanical (Gesellschaft) and superficial (the space of civil society or society) forms of coming together –all based on the convergence of interests (Tönnies, 1957). Community in this sense is synonymous with traditional society, which is based on relations of trust, and with the advent of modernity, trust is replaced by contracts (Kaviraj, 2001).

The conflict theory emphasises a clash of interests rather than a consensus of values in the concept of community. Taking into account the conflict theory propounded by Karl Marx and Max Weber, value consensus is an illusion perpetuated by ideology and power whereby structural differences among individuals, groups and communities are subsequently formed from various interest groups with different vested interests, and are often riddled with conflicts (Rhoads, 1991). Thus, conflict theory emphasises a clash of interests rather than a consensus of values.

The development policy for the formation of community-based associations gives significant importance to consensus (Manor, 1998). Keeping in mind social capital, one of the most important aims of development agencies is to support and create shared networks, norms and trust among members of a community to solve common problems. Development planning has also been inspired by the Habermas notion of communicative rationality. Habermas advocated that through arguments and counterarguments, rational and reasoned consensus could be built from amongst opposing viewpoints (Habermas, 1984). As a result, the actions of agents involved are coordinated, not through egocentric calculations of success but through acts of reaching an understanding. "In communicative action, participants are not primarily oriented to their own successes; they pursue their individual goals under the condition that they can harmonize their plans of action on the basis of common situation definitions" (Habermas, 1984: 286).

Other than these aspects, developments that have triggered community-based management issues include the failure of large-scale dams projected as politically-, administratively- and contractor friendly, protests from the people (who have been displaced and alienated) and civil society against dam construction, media reporting

all over the world about a looming water crisis in the twenty-first century, debates about future global wars for water and natural resources and as a result the discovery of the viability of community participation as a means of reviving community-based management.

3. 3.2 Community in 'Community'-Based Natural Resource Management

The irony of the word 'community' was characteristically put forward by Agrawal (1999), who advocated that its complexity and heterogeneity guarantee that it cannot easily be defined or measured simultaneously, yet its centrality to everyday life means that it cannot be displaced or dismissed. According to Young (1990), there is no universally shared concept of 'community'; rather, articulations that overlap in the process complement one another. In the 1980s and 1990s, coalescing development and protection/conservation issues gave rise to 'community'-based natural resource management (CBNRM) projects (Kumar, 2005). Different advocates imagine that 'community' in CBNRM is different, and it has therefore become more of a conceptual idea loaded with complexity in its implementation (Ibid). Many consider the notion of 'community' as a myth and have discarded it, while some critics argue that it is impossible to lose or to reform what we never had (Etzioni, 1996).

During the 1980s and '90s, CBNRM started to gain importance due to several concomitant factors such as dissatisfaction with the results of large-scale, capital-intensive and centrally planned conservation and development projects that excluded local populations from resource consumption (Horowitz and Painter, 1986); the success of participatory projects and growing criticism of non-representative development gave momentum to the CBNRM. Scholars like Li (1996) advocated that rural or traditional communities are in harmony with the environment and have demonstrated long-established patterns of sustainable and equitable use of resources. Local resource management was supported by the developing goals of social justice, environmental health and sustainability, and so gained wider acceptance on these grounds (Brosius, Tsing and Zerner, 1998).

The focus also shifted onto 'community' due to the emergence of analyses which showed that many changes in resource status are not primarily the result of human actions or interventions (Leach and Mearns, 1996; Uphoff, 1998). The further popularity of the concept also came to the fore because of the role played by various

NGOs and an increasing preference for participatory approaches by donor agencies (Agrawal and Gibson, 1999).

Defining CBNRM is not an easy task (Kumar, 2005)[73]. Various governments have demonstrated importance in the 'participation' of 'community' owing to political economic pressure (Lele, 2000; Thompson, 1995). The protection of biological diversity and habitat integrity, and the involvement of local people in wider conservation and resource management, been advocated by conservationists (McNeely, 1995). The agenda of donor agencies is to promote local participation for the 'sustainable' management of natural resources and rural development, through transferring resource management into the hands of local communities (Hecht and Cockburn, 1989; Kothari et al., 1998). On the other hand, representatives of the indigenous people advocate respect for local rights, knowledge and cultures in order to better serve local interests (Croll and Parkin, 1992).

Based on the premise that local people have greater interest in the sustainable use of resources than the state, along with suppositions that local communities are more aware of the details of local ecological processes and practices and in a cyclical manner are more able to effectively manage local resources through traditional forms of access, CBNRM programmes are grounded and endorsed (Brosius, Tsing and Zerner, 1998; Li, 2002). Moreover, in the CBNRM discourse, local communities are usually empowered to run appropriate institutions for natural resource management (Murphree, 1991). Hence, local communities are considered more organisationally cost-effective, as their members are expected to be in everyday social contact – leading to informal peer pressure to mitigate high transition costs – while CBNRM initiatives often draw inspiration from the abovementioned images of a community. Nevertheless, not all 'community' decisions and actions with regard to natural resources are benign (Uphoff, 1998). Many times, 'face-to-face' relationships often considered benign for participation, may lead to 'face-offs' leading to conflicts (Saravanan, 2002:115). Hence, images of the 'community' are central to the issues of project implementation. Literature, policies and projects dealing with the issue of CBNRM have depicted communities as a distinct social group in one geographical

[73] A vocabulary of diverse definitions of CBNRM based on type of resource and practice in various parts of the world is available at www.cbnrm.net.

location, having a common culture and living in harmony (Leach et al., 1999; Li, 1996).

Moreover, common property theorists have propagated in their arguments about the unified homogenous notion of community, the importance of informal institutions, efficiency, equity and sustainability (Agrawal, 2001). By emphasising the role of local institutions in making local communities capable of cooperating with each other, for the access and control of natural resources, the common property theorists have underestimated power dimensions. This reinforces the notions of 'community' further in natural resource management (Baland and Platteau, 1996; Berkes, 1989; Bromley and Cernea, 1989; Olson, 1965; Ostrom, 1990; Wade, 1988).

Common property resources (CPRs) literature was formulated in response to Hardin's (1968) cynical 'tragedy of the commons'. CPRs literature makes a distinction between open access situations (to which Hardin's thesis could be somewhat applicable) and true common situations in which institutions play an important role in regulating resource use and its management (Bromley and Cernea, 1989). A large body of literature on CPR management has been fundamental in establishing the significance of local institutions in natural resource management. Common property theorists have suggested that individuals will collectively manage common resources when the benefits from the institutional set-up (i.e. rules and means of enforcement) are limited to a small and stable community (Berkes, 1993; McCay and Acheson, 1987; Ostrom, 1990). Common property theorists like Ostrom (1990) take their theoretical grounding from game theory to look at the collective action dilemma, and state that institutions or rules can be purposively crafted to produce collective action and to perform certain natural resource management functions. Ostrom, through comparative studies, finds that the successful management of commonly pooled resources by local communities often shares a set of eight 'design principles': i) clearly defined boundaries; ii) rules congruent with local conditions; iii) individuals affected can participate in modifying operational rules; iv) monitors are accountable to the appropriators; v) graduated sanctions against violators; vi) ready access to conflict-resolution mechanisms; vii) recognition of rights to organise by external government authorities and viii) nested enterprises, where the resource is part of a larger system (Ostrom, 1990).

A design principle for Ostrom is "an essential element or condition that helps to account for the success of these institutions in sustaining the CPRs, and gaining the

consent of generation after generation of appropriators to the rules in use" (Ostrom, 1990:90). Most of the CPR literature considers local situations and establishes conditions (widely known as Ostrom principles), which will lead to collective action by indicating clear resource boundaries and socio-economic homogeneity among users (Ostrom, 1990; Wade, 1988). Consequently, historical and contemporary evidence on the 'commons' has shown that resource users often create institutional arrangements and management regimes that help them to distribute benefits justifiably, over long periods and with only limited efficiency losses (Agrawal, 1999; McKean, 1992; Ostrom, 1992). Therefore reversing Hardin's (1968) perspective of the tragedy of the commons.

Although empirical evidence suggests that the design principle sees communities as homogenous entities, in reality there is great diversity in communities in terms of caste, class, wealth, age, gender, ethnicity and religion (Agrawal and Gibson, 1999; Ahluwalia, 1997; Leach et al., 1997a; Mehta, 1997, 2005, 2007; Mosse, 1998; Sangameswaran, 2008). Similarly, and based on empirical evidence, scholars have suggested that only very small groups can organise themselves effectively in the manner suggested by design principles, because they presume that size is related to homogeneity (Agrawal, 2001). In recent years, Ostrom's design has been critiqued by development practitioners and researchers on the basis that it employs "simplistic assumptions of single resource use, a static rationality model, the exclusive analysis of internal dynamics of the collective management system and the assumption that collective management outcomes are determined by predefined principles" (Steins et al., 2000). Moreover, design principles have neglected the role of contextual and external factors such as market demands, technology and population pressures, and how state policies interact with local institutions and natural resource systems in shaping collective action (Agrawal, 2001). Design principles have been criticised as being too limited for analysing dynamic resource management institutions (Steins, 1999). While some studies have critiqued them for romanticising indigenous knowledge systems, whereas in reality these knowledge systems have been comprehensively interfered with and often exist as a shadow of their original form (Balland and Platteau, 1996; Ribot, 1995, 1999).

Taking this homogenous view of 'community' given by property theorists, academic works on institutions have neglected questions concerning the differences and sundry

conflicting interests of resource users (Mehta et al., 1999). Works on collective action theory have neglected the fact that institutions, apart from enhancing co-operation, can also overwhelm conflict, factional divisions and power politics (Ibid). Moreover, common property theorists have focused on local groups, institutions and resource system-related factors, and have ignored the riddle of the local –in conjunction with external and non-local – environment.

3.3.2.1 Local Communities: Caste, Class and Gender Dynamics in CBNRM

Social science debates and empirical works have questioned the stand of common theorists and many of their assumptions on communities, especially rural ones, as homogenous units living and working in harmony with shared knowledge and purpose, and consisting of people sharing common views and agendas. Furthermore, so-called traditional communities may not be in as harmonious a relationship with the environment as often believed, and could be heterogeneous socially, culturally and economically (Agrawal and Gibson, 1999). In addition, if in the past they were harmonious, they might not have the potential nowadays in a vastly changed context (Baviskar, 1996). Often, local politics, local hierarchies and the frailty of human behaviour are ignored (Agarwal, 1994), so the community tends to be glorified. And institutions are seen ahistorically, not taking into account the dynamic interaction between formal and informal networks entrenched in the community's social and power relations (Leach et al., 1997b, 1999; Mehta, 1997, 2005) under its arrangement. Furthermore, social actors in the community have different sets of endowments and interests in natural resource management (Ahluwalia, 1997).

The concept of gender is convolutedly mixed with the concept of community (Meinzen-Dick and Zwarteveen, 2001), both of which are broad analytical categories which incorporate dissimilar groups with differing or conflicting interests. The work of Kabeer and Subrahmanian (1996) highlights that often institutions which seem to be serving a collective good might in fact be shaping and reproducing unequal power and authority relations, and marginalising the concerns of women and poorer people, in the community. Gender cuts across households and other dimensions of intra-community differentiation and hierarchy such as caste, class and ethnicity (Meinzen-Dick and Zwarteveen, 2001:66). Overlooking these socio-cultural issues could jeopardise CBNRM interventions (Agrawal and Gibson, 1999, 2001; Guijt and Shah, 1998). Despite the efforts that have been made to improve women's positions through

processes of empowerment, their participation in formal decision making structures remains highly constrained (Agarwal, 1997; Cleaver and Elson, 1995; Mosse, 1994).

Furthermore, conventional approaches to community-based natural resource management are centered around community organisation as the main vehicle for their activities, and are expected to fulfill and represent the collective interest of 'the community' (Leach et al., 1997b). The social organisation shaped around the project by development agencies is believed to replicate traditional organisations and reproduce the assumed effectiveness of a traditional past (ibid). It is necessary consider carefully the facts before assuming that new formal organisations will reproduce the assumed successes of traditional systems or enhance community involvement effectively (Mosse, 1997a). Many misconceptions about the actual functioning and capabilities of resource management institutions and organisations take place when the traditional past is idealised.

Nonetheless, the images of consensual, ecologically harmonious communities are also invented by the local actors themselves, temporarily, in order to secure benefits from development implementing agencies (Ahluwalia, 1997; Leach et al., 1997b). Thus, the images of consensual communities should be judged more in relation to the policy discourses which produce them, and which they serve, than against empirical reality (Leach et al., 1997a: 5; Li, 1996). New works on CPRs have acknowledged that the early work on 'collective action' assumed the presence of homogenous actors, in order to make analyses more tractable (Keohane and Ostrom, 1995).

Therefore, having an assumption that resource use could be regulated unproblematically by community structures reflects an outdated social theory, contradicted by more recent perspectives and empirical evidence, of people action theory and agency in monitoring and shaping the world around them (Giddens, 1984; Leach et al., 1997a; Long and Long, 1992). In taking this perspective, communities cannot be seen as static and rule-bound, as they are composed of people who interpret and shape the world around them (Long and Long, 1992; Long and van der Ploeg, 1989). Furthermore, linking agency and structure underlines how structures, rules and norms emerge as products of people in the form of intended and unintended actions and practices (Leach et al., 1999). Consequently, routinised action serves to replicate structures, rules and institutions; other actions have agency, which serves to change the system and in the meantime make new rules (Bebbington, 1994; Bryant and Jary,

1991; Giddens, 1984; Leach et al., 1999). On the whole, this perspective sees social change in society differently from CBNRM narratives, which instead talk about external disruption to a community.

The various images and assumptions around communities are basically reducing the notion of community, as generalised, on which policymaking could be based (Brosius, Tsing and Zerner, 1998; Pigg, 1992). In CBNRM, two problems of aggregation are found. Firstly, communities are not actually visibly bounded social or geographic units; secondly, they are not likely to be homogenous entities with single or agreed interests (Uphoff, 1998). There is a certain level of inadequacy in the conceptualisation of communities spatial units, homogenous structures and sets of shared understanding, as commonly put forward by advocates of the 'community'-based conservation (Agrawal and Gibson 1999). They argue on the one hand that, at a representational level, existing communities rarely correspond to the idea of small, harmonious, cooperative entities with shared understandings (Ibid). On the contrary, at the conceptual level, a direct relationship between 'community'-as-shared understanding and 'community'-as-social organisation is not easy to establish (Ibid).

Another important factor which is often overlooked is that natural resources are also heterogeneous; for example, the conceptualisation of 'community' for the management of harvested resources such as timber, pastures and fisheries will be different from that addressing conservation of wildlife (Kumar, 2005). In the same way, 'community' in the management of the watershed poses challenges to upstream and downstream communities' diverse interests (Ibid). Hence, the way in which a community is conceptualised and interpreted for implementation in CBNRM has a major drawback.

Recent CBNRM studies have begun to examine the heterogeneity of communities and how resource management decentralisation has affected different community groups such as castes (Sangameswaran, 2008) and women (Mainzen-Dick and Zwarteveen, 2001). These studies have shown that decentralising resource management to local communities, which consist of multiple actors who have numerous, and often competing, interests goes beyond the mere targeting of appropriate 'communities'. As communities are highly differentiated along several lines that include gender (Mainzen-Dick and Zwarteveen, 2001), caste and class (Mehta, 2005), these studies

highlight the importance of social differentiation within local communities, and thereby challenge the notion of 'community' as a homogenous entity.

Moreover, the questions of inequality, repressive social hierarchies and discrimination are overlooked in CBNRM (Guijt and Shah, 1998). As such, I would like to conclude that considering community as one composite whole is problematic, as it is not a single homogenous entity because it involves various actors with diverse interests and background. Therefore, diverse social groups[74] exist to make a community, where different groups participate in various capacities to achieve their respective goals. It is now a recognised fact that communities are hubs of multiple interests and capacities, establishing heterogeneity across and within various sections (Agrawal and Gibson, 2001). This leads to newer insights and an understanding of the nuances communities composition, and the relative implications for the intervention processes aimed at their development.

In development theory and practice, the concept of decentralisation coincides with the mainstreaming of participatory approaches and advocates that local communities should play an active role in the conservation and management of natural resources (Chambers, 1995, 1996). For CBNRM proponents, community participation in resource management has been considered attractive because of its apparent democratising tendencies, which enable local actors to take charge of the natural resources with which they have day-to-day contact. As a result, and in the light of the above discussion on various contextual and contested issues characterising the concept of 'local community' in CBNRM interventions, I now proceed to investigate specific issues arising through community participation.

3.3.2.2 Community Participation in CBNRM

It is now an accepted argument that the concept of participation has increasingly gained importance over the last two decades in the form of collective action, community-driven development, decentralised governance, etc. in developmental practice, as well as in the CPR research and literature. The need for the participation of local communities and decentralised governance comes from perspectives such as a) critique of the centralisation of power in bureaucracy and the alienation of local

[74] Social groups are collectivities of individuals who interact and form social relationship (Abercrombie et al., 2000).

communities, b) disenchantment with the top-down approach and c) demands from the subalterns for their share in political space and in the development process (Joy et al., 2004). The CPR research community has been made to think about the concept of local community and the question of local community's control, as well as institutional issues about the development of Hardin's 'tragedy of the commons' thesis (1968, 1977), which has generated huge amounts of literature highlighting different stands, trends and nuances.

Community participation has been perceived as an answer for improving the effectiveness of various state development projects. It is felt that the involvement of communities, which have been traditionally associated with resource management, is required for the success of state initiated local resource management projects (Puri, 2004). Participation is defined as "the ability of people to share, influence or control design, decision-making and authority in development projects and programmes that affect their lives and resources" (Peters, 2000:6).

Hence, there is growing consensus about the desirability of a participatory model for natural resource management through community involvement, as it aims to empower local people by increasing their direct access to and control over resources. The fulcrum logic behind participatory approaches to natural resource management is the ostensible reasoning for addressing inequalities, by distributing the benefits of local management initiatives within the community, which will lead to community development through new opportunities (Ribot, 1999). Participation itself is a socially entrenched phenomenon and cannot be elicited at will (Nemarundwe, 1995), which means that the people are not free to participate in created or invited arenas of participation without first entering into the realm of local power dynamics. The success of CBNRM is not possible by taking into account the few certain actors who are involved in resource management, while participatory approaches to natural resource management cannot bypass structural and institutional constraints arising from power relations and interactions in a given community (Admassie, 1995). Therefore, unequal relations need to be assessed in relation to the power that each actor commands on the bases of caste, class and gender, and which actor influences the outcome of CBRNM. One has to be vigilant while using the concept of participation as a means of ensuring better community involvement in the CBNRM, as it has many forms and magnitudes.

Seen from the context of CBNRM, the concept of participation is problematic, as it is variously defined in different contexts. There is a debate among writers who have theorised on the concept of participation regarding the nature and range or the means and ends of the participation. Participation takes many forms such as Agarwal's (2001) drawing from Arnstein participation developed a typology for measuring participation in table II, it occurs along a continuum from nominal to interactive participation.

Table II: Participation Typology and its Characteristic

Form/Level of Participation	Characteristic Features
Nominal Participation	Membership in the Group.
Passive Participation	Being informed of decisions *ex post facto*; or attending meetings and listening in on decision-making without speaking.
Consultative Participation	Being asked for an opinion on specific matters without the guarantee of influencing the decisions.
Activity-Specific Participation	Being asked to (volunteering to) undertake specific tasks.
Active Participation	Expressing opinions whether or not solicited, or taking initiatives of other kinds.
Interactive (Empowering) Participation	Having say and influence in the group's decision

Source: Agarwal, 2001:1624

In this typology of participation, the least desirable form of participation is nominal participation and the highest is interactive. Typology helps us to distinguish between people who were involved just for the sake of it, and those people or groups who had all the powers to make a difference and take decisive and influential courses of action. Thus, it is necessary to study how participation is apparent within the various water-related community groups. Uphoff's (1991) analysis on participation, also reflected in this typology in terms of objectives, is judged almost entirely by its potential efficiency effects and its ability to enhance equity, efficiency, empowerment and environmental sustainability. Besides this, there are different perspectives on who is expected to participate, what exactly is to be achieved and how it should be done (Pretty, 1995).

Agarwal's typology helps to evaluate the quality of participation of actors in a given participatory development intervention, as achieving effective participation would involve a shift from lower (nominal participation) to higher levels (interactive participation). Given the pre-existing socio-economic inequalities and power relations in a given community, there are limits as to what participation alone (interactive participation) can achieve in terms of equity and efficiency (Nemarundwe, 1995), even in community participation in the CBNRM. According to Agarwal (2001), participation in the context of CBNRM depends on the following factors:

i) Rules of entry – the criteria defining membership in the community and institutional structures.
ii) Social norms defining – who should speak and attend the meetings (code of conduct for men and women in public).
iii) Social perceptions regarding disadvantaged groups and women's ability to contribute to CBNRM activities.
iv) Well-established territorial claims.
v) Personal endowments and attributes such as wealth and caste status, educational levels, age, etc.
vi) Household endowments and attributes, which identify where women fall in traditionally structured hierarchies.

In regards to group participation, there are three important dimensions of participation, according to Kolavalli and Kerr (2002), namely a) facilitating collective action, b) transferring meaningful decision making powers and c) making communities share development costs and benefits. As a consequence, the implementing agency needs to play a crucial role in promoting the overall level of community participation in the planning and development of a watershed project (Ibid). Advocates of the participatory model belong to two groups: the first views participation as a means to achieve institutional efficiency, while the other considers participation as a way to achieve empowerment, equity and democratic governance (Puri, 2004). Over a period of time the term 'participation' has acquired various meanings and still continues to be a fuzzy concept, as at one end of the spectrum it could mean nominal membership in a group and at the other end it could imply having an effective voice in the decision-making process (Ibid).

Often, the participation of local communities or resource users is seen as a means of achieving equitable goals. However, the question arises as to what constitutes 'a community' and who participates in community formation for resource management.

In India, rural communities are highly differentiated and stratified hierarchically; thus, at times, the transfer of decision making power to "the local community" leads to handing over decision making authority for the development process to dominant factions (Agrawal, 1997; Li, 1996; Menon, 1999; Mosse, 1997a; Shah, 2003). The quality and form of community participation in democratic local governance depends to a large extent on the characteristics of the local community itself. According to Platteau (2003), community-based development is often open to monopolisation by the elite, especially in localities with high inequalities.

The concept of participation from equity- or agency-based perspectives ends up looking at a community as an undifferentiated, cohesive whole (Puri, 2004). Both views tend to ignore that a community has a space of internal differentiation, contestation and power differentials. Moreover, social capital theorists seem to ignore the existence of 'bad social capital' (Foley and Edwards, 1996), as norms of trust, reciprocity and cooperation also exist in the very coercive, hierarchical and exclusive communal formations. Furthermore, most collective action that takes place at the community and local levels is based on ascriptive affiliations such as caste, religion and tribe (Puri, 2004). This is apparent in the formation and functioning of various water-related community groups such as user groups, collective bore wells and water sellers.

Hence, if advocates of community participation do not capture the dynamics of community participation, they are ignoring the fact that a community could constitute bad social capital and is a space occupied by hierarchies, power differentials and social-economic disparities. Privileging locals in policymaking, without taking into account the important characteristic of community, could mean sanctioning differences between money and social power, which in turn means excluding those who do not have such power (Puri, 2004). As a result, this study uses Agarwal's typology to examine how different sections of the community participate, and throws light on the power relations within the Mathnaa community and their influence on participatory processes within the intervention context. The thesis uses an actor-oriented approach in order to assess the ways and forms that actors seek to exert control over natural resources (like water in the case study) in relation to other actors, including the how weaker actors resist their powerful counterparts in the village. This

helps in understanding the working of different actors in a heterogeneous community in order to achieve their desired and vested interests.

3.4 Actor-Oriented Approach

The focus of the actor-oriented approach is explaining different responses to similar structural circumstances, even if the conditions appear relatively homogenous (Long, 2001). The approach is useful for this study, as it places actors at the centre of the natural resource management discourse, with the recognition that there are diverse actors. As far as the approach is concerned, the persistence of local institutions is not explained through the rational calculations of individuals, but through structures of power in which natural resources are managed and where institutions tend to produce relations of dominance and dependence, and provide the context for political strategy and competition (Mosse, 1997b).

A social actor in the actor-oriented approach is depicted as an active participant who possesses information and strategies in their dealings with various local actors and outside institutions and personnel (Long, 2001). According to this approach, different social organisations emerge from the interactions, negotiations and social struggles that take place between various factions. People involved vary from those who are present in direct encounters and those who influence the situation from 'behind closed doors', thus affecting the actions and outcomes in a given situation (Ibid). This was apparent in the selection of watershed committee members, the watershed secretary and user groups in Mathnaa's watershed development project, which is explained further in Chapter 6.

The advantage of an actor-oriented approach is that it aims to grasp precisely these issues through a systematic ethnographic understanding of the 'social life' of development projects –from conception to realisation – as well as the responses and lived experiences of the variously located and affected social actors (Long, 2001: 14-15). Hence, the approach establishes why people in a community have multiple rationalities, desires, capacities and practices. The approach stresses the dynamic interaction between social agents and institutions. Social actors possess knowledge and capability, solve problems, learn to intervene in the flow of social events and, moreover, monitor their own actions by taking into account how others react towards their behaviour and take into consideration the various contingent circumstances

(Gidden, 1984). Actors always have some alternative ways of formulating their actions, objectives and reasoning for their behaviour, however restricted their choice may appear (Long, 2001). Thus, the significant point to note here is that an alternative discourse used by actors defies the notion that rationality is an inherent property of the individual actor on the one hand, whereas it also reflects the actor's structural location in society on the other hand (Long, 2001). For this reason, the strategies used by individuals depend on verbal and non-verbal discourses, which are shared with other individuals, thus, in this context, understanding the concept of agency as a useful tool. A key concept of the approach's relevance to this study includes the concepts of agency and power as they relate to the framework of resource use and management.

3.4.1 Concept of Agency

Agency theory is based upon the capacity of actors to process their own and others' experiences, and then act upon them (Long, 2001). Agency is based on knowledgeability, where experiences and desires are automatically interpreted and internalised, along with the capability to command relevant skills, have access to material and non-material resources and to engage in particular organising practices (Ibid). Thus, agency is evident when a particular action makes a difference to a pre-existing state of affairs or series of events. As such, agency depends upon the network of actors who are partially, but not completely, involved in the projects of others (Ibid).

More so, agency entails the manipulation of networks of social relations, thus making it necessary to take into account the ways in which social actors engage in or are locked into struggles over the attribution of social meanings to particular events, actions and ideas (Long, 2001). Conversely, the notion of agency is attributed to individual actors who have the capacity to process social experiences and formulate ways of coping with life, even in severe forms of coercion (Long, 1992). Nevertheless, all actors vary in the extent of their control of social relations and in the scope of their transformative powers, but all members of society exercise some degree of agency in the conduct of their daily lives (Sewell, 1992). Therefore, agency involves the ability to organise one's action[75] with others and against others, to form

[75] Social action is not an individual ego-centered pursuit as it involves a network of relations having both human and non-human components, and is bounded by social conventions, values and power relations (Long, 2001).

collective projects, to influence, to intimidate and to monitor the simultaneous effects of one's own and others' activities (Ibid). As such, actors perceive others' actions, and the agency of others shapes the actors' own behaviour. Hence, actors try to give meaning to their experiences through representations, images, cognitive understanding and emotional responses.

3.4.2 Concept of Power

The concept of agency is inexorably associated with power. In order to understand the social interactions in relation to natural resource management, one needs to examine how power is conceptualised. In a social context, power is not just possessed, accumulated and unproblematically implemented (Foucault cited in Gordon, 1980). Indeed, it is not how hierarchies and hegemonic control distinguish social positions and prospects and hamper access to resources (Long, 2001). Power is the outcome of multifarious struggles and negotiations over authority, status, reputation and resources and requires networks of actors and community (Callon and Law, 1995; Latour, 1994). Manoeuvring requires consent and negotiations with power and is manifested in the form of exerting some control, prerogative, authority and the capacity to take direct or indirect action (Villarreal, 1992). Consequently, power unavoidably engenders resistance, accommodation and strategic conformity in the politics of everyday life (Scott, 1985). Therefore, "all forms of dependence offer some resources whereby those who are subordinate can influence the activities of their superiors" (Giddens, 1984:16). All actors exercise some kind of 'power' and influence and manipulate strategies, while those who are in a subordinate position are also key players in the game (Long, 2001). Power is a relational concept which is shaped by different types of relationships that actors engage in and negotiate; moreover, power is viewed as a resource that can easily change hands. As no one particular actor has power at a particular time to the extent that others with whom he/she relates are lacking, the concept of power is a very useful analytical tool for understanding leadership and other struggles among community members in natural resource management.

Therefore, in a social structure,[76] power is the deciding factor which actor will play a decisive role. Structures shape people's practices, but also people's practices

[76] Structures are "both the medium and the outcome of the practices which constitute social systems" (Giddens, 1981:27).

constitute and reproduce structures (Sewell, 1992). Therefore, structures are performed by "knowledgeable" human agents. According to Giddens, "they are the people who know what they are doing and how to do it" (Ibid). Thus, "structures must not be conceptualised as simply placing constraints on human agency, but as enabling" (Giddens, 1976: 161). Consequently, human agents are knowledgeable, and enabling implies that they are capable of putting their structurally formed capacities to work in creative ways. In addition, they are powerful enough, as their actions may have the consequence of transforming the very structures that gave them the capacity to act (Sewell, 1992). Agents are capable of exerting control over social relations and transforming them to some degree, as they have knowledge of the schemas that inform social life and have access to non-human and human resources[77] (Ibid). Hence, the ability to influence others rests on the actions of a chain of agents who translate influence in accordance with their projects (Latour, 1986). This is illustrated through the case study of Mathnaa.

3.5 Conclusion

Community-based natural resource management assumes that communities can be treated as static, relatively homogeneous entities. This assumption traces its roots back to early social theory in sociology and anthropology (Leach et al., 1999). Common property resource management in the development discourse is overridden by concerns about making sustainable institutions which are influenced substantially by the consensus approach. Consensus ensures common good, which advocates that consensus leads to the fulfillment of the common interests of all (Kapoor, 2002).

Thus, state agencies, development agencies and the literature tend to portray communities as unified. And if the project is small, it will be successful and egalitarian, often overlooking the complex social differentiations existing in a given society. The ethea of democracy, equity and participation are promoted by not taking into account existing power and social relations, based on different axioms within a community (Mosse 1997b, 1998).

[77] Non-Human resources are objects, animate or inanimate, naturally occurring or manufactured, that can be used to enhance or maintain power; whereas human resources are physical strength, dexterity, knowledge and emotional commitments which can be used to enhance or maintain power, including knowledge of the means of gaining, retaining, controlling and propagating either human or non-human resources (Sewell, 1992:9).

Consequently, I do not dismiss and negate the notion of community totally, but rather try to conceptualise it in terms of small groups with diverse interests. Hence, community is divided along the lines of caste, tribe, gender, economy class and resource priorities, and portrays itself in terms of the temporary unity of situations, interests and purposes. As such, seeing a community as a whole is problematic, as it consists of various diverse small groups with diverse interests. Therefore, a community exists but not in totality as a uniformly homogeneous entity, but rather as an amalgam of small groups which make up a community.

In this study the actor-oriented approach is used, because it provides a set of analytical tools useful for describing and analysing changes in patterns of social action and interaction, as well as institutional arrangements, where such changes are a function of human agents, the social and material conditions under which they act and interact and agency-structure dynamics (Admassie, 1995:13). This approach is useful in this study because it addresses the question of social differences and provides specific concepts and analytical tools for the study of participation and the role of human agency in the processes involved in social interaction, both of which shape access to natural resources. Finally, the actor-oriented approach complements my study, which is ethnographic in nature, by investigating places and the roles actors (as groups or individuals in interaction processes) play and orchestrate to the best of their ability in certain circumstances. In addition, I investigate how communities were conceived and formed for intervention in order to achieve success in its functionality.

This has to be corroborated in the larger picture of water policy mechanism as the water policy is witnessing varying reactions and efforts. The state of Gujarat claims to be attracting large amounts of foreign direct investment, backed by development and urban progress trumpet, but is still contemplating and vaguely trying to make the rural-urban divide minimal is far from coherent. It should be interesting to explore and demystify lacunae and other pitfalls that have afflicted water policy and its decentralisation in Gujarat and are discussed in the next chapter.

Chapter 4 Water Resource Management in Gujarat: An Overview

4.1 Introduction

This chapter introduces the water management scenario in the state of Gujarat and elaborates on the government's efforts to promote community-based water management to combat water scarcity and manage water resources in the western state. This chapter also elaborates on Gujarat's groundwater hydrology, the reason for the popularity of groundwater exploitation in the state and the development of private tubewells and groundwater markets. It then goes on to discuss the governance crisis in Gujarat by throwing light on government policies, measures and projects initiated to tackle irrigation and drinking water problems, and how far they are effective and ineffective in managing water resources. Finally, the chapter discusses factors such as Gujarat's political, caste, class and power relations, which affect water governance, and argues that water management in the state is influenced by socio-political, institutional and ecological factors, rather than just being a policy matter.

4.2 Gujarat State

The state of Gujarat, situated on the western side of India and covering an area of 196,024 km², accounts for about 6 per cent of the total geographical area of India and came into existence as a separate state on 1st May 1960. It was carved out of the bilingual state of Bombay (Government of Gujarat, 2009a). Gujarat is situated between 20°10´ to 24°50´ N latitude and 68°40' E to 74°40' E longitude and is bounded by the Arabian Sea in the west by the states of Rajasthan in the north and northeast, by Madhya Pradesh in the east and by Maharashtra in the south and southeast (Patel, 1997). It shares a common international border with Pakistan at the north-western fringe and has two deserts, one in the north of Kutch and the other between Kutch and mainland Gujarat. Gujarat has a long coastline of about 1600 km (Ibid), which is almost one- third of the total coastline of the Indian sub-continent. For administrative purposes, Gujarat at present comprises 26 districts, subdivided into 231 *talukas*[78] with 18,618 villages and 242 towns (Government of Gujarat, 2009a). A map of India shows the location of Gujarat, while the administrative map shows the study site.

[78] Taluka is also known as block, it is the political administrative unit between village and the district level.

Map I: Map of India

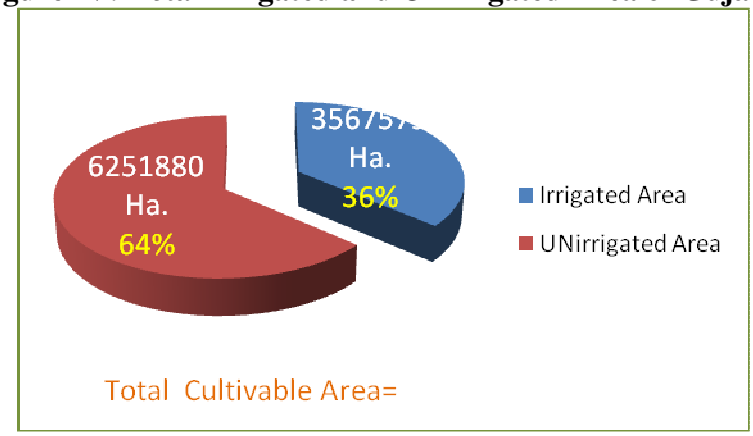
Source:Government of India, 2011 (Map not to scale)

Map II: Adimistrative Map of Gujarat, Showing the Study Site (Mathnaa)

Source: Government of India, 2011 (Map not to scale)

Gujarat's weather has certain characteristics that make it special in the western region of India, namely an arid and dry climate with an irregular and fluctuating monsoon season. The northern part of the state is dry and arid whereas in the southern region, it has moist weather owing to its proximity to the Arabian Sea and Gulf of Cambay. Tropical monsoons dominate provide violent but erratic amounts of rainfall from June/July to September/October. Total levels vary from a meager 340 mm in west Kutch to 1,800 mm in the southern hills of Dangs. Nevertheless, on average, most parts of the state receive about 800 mm per annum. The average number of days of rain varies, from 20 in Kutch to 40-45 in south Gujarat (Hirway, 2000). In spite of having good water potential the state is facing a serious water problem. The exploitation of water resources has been far from judicious and the irrigation infrastructure has not promoted the sustained use of water resources (Ibid). Around 61 per cent of the geographical area of Gujarat is under cultivation (Government of Gujarat, 2010a). Figure IV gives the statistical picture of the total cultivable area of Gujarat, of which 64 per cent is not irrigated.

Figure IV: Total Irrigated and Unirrigated Area of Gujarat



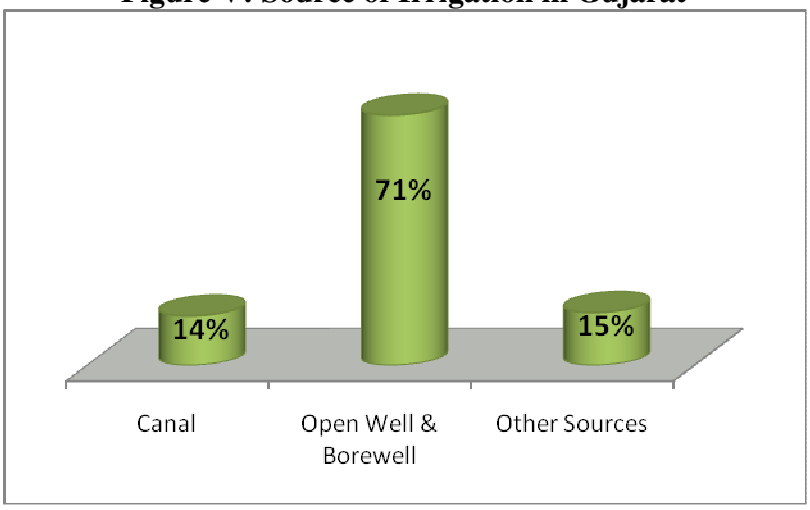
Source: Government of Gujarat, 2010a

4.2.1 Gujarat Water Resources

The state has a very poor provision of water resources and suffers from permanent water scarcity due to uncertain rainfall patterns (Rani, 2004). Gujarat receives very little rain except during the annual monsoon period between June to September and rainfall is less than 1000 mm each year in most areas (Hardiman, 2007). About 78 per cent of the area in Gujarat is subject to erratic monsoons and suffers from large-scale soil erosion of various degrees of intensity, which has reduced land productivity over the years (Rani, 2004). Around 66 per cent of the area is under semi-arid climatic

conditions (Shah, 2000). In addition, twice every five years the state experiences drought conditions (Ibid). Except for Narmada, Tapi, Mahi and Purna in south Gujarat, all other rivers of the state are seasonal, meaning they are dry apart from during the monsoon season (Rani, 2004). The ecological condition of major and minor rivers' estuaries has changed due to the construction of a series of irrigation dams across the rivers (Singh, 2000). In most of northern Gujarat, the hills to the east and the state's peninsular (Saurashtra and Kutch) there are no perennial rivers of much importance, and irrigation has either depended on wells or channels taken from the reservoirs formed by small-scale dams or embankments (ibid). The agriculture of the region has been dependent on the ability to harvest water during the dry months of the year, and over the last thirty years this ability has come under increasing threat. The main source of irrigation in Gujarat (71 per cent) comes from open wells and borewells, with a 14 per cent contribution from canals and 15 per cent from other sources (see Figure V).

Figure V: Source of Irrigation in Gujarat



Source: Government of Gujarat, 2010a

The extraction of groundwater from wells in many areas of Gujarat has surpassed natural replenishment in the subsoil, leading to a fall in the water table at an alarming rate. Due to hard rock conditions, the recharge rate is only 5 per cent to 10 per cent in 56 per cent of the total geographical area (Rani, 2004).

Wells are the most important sources of irrigation. Even during colonial times there were no major canal projects. In the 1930s, about 78 per cent of the irrigated area of

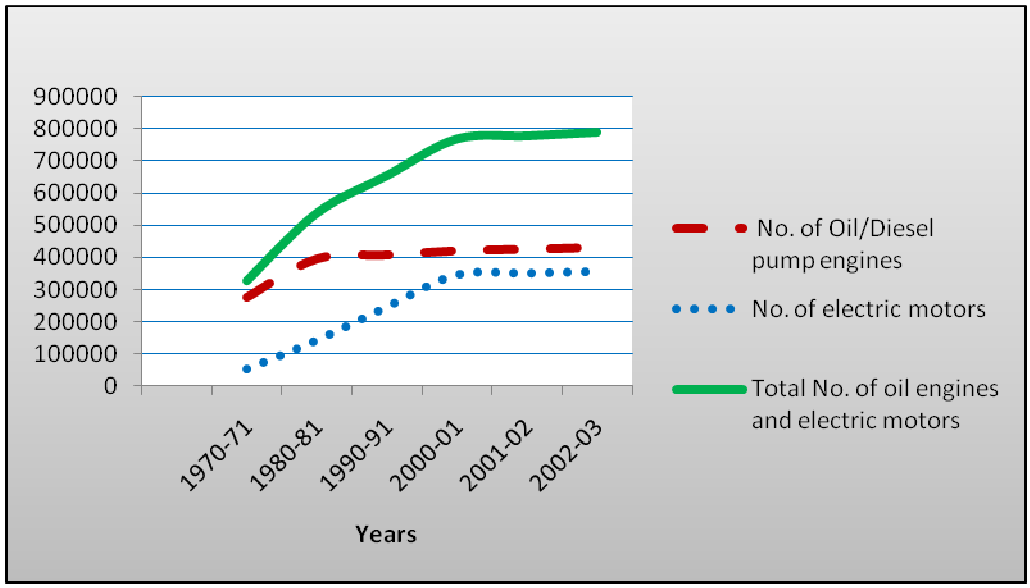
British Gujarat was irrigated by wells and only 10 per cent by canals (Desai, 1948). The colonial government found the cost of building irrigation infrastructure prohibitively high, so left state agriculture at the mercy of the rain and groundwater irrigation. In Gujarat, water was lifted from the wells, which were not very deep, in a large leather bag known as a '*kos*', which was raised by bullocks pulling a rope attached to the bag over a pulley erected above the well (Hardiman, 1998). Construction and maintenance of the masonry or stone-lined well with elaborate water-lifting apparatus was an expensive affair, so peasants had to take loans from wealthy professional usurers (*sahukar*).[79] This in turn led to a vicious circle of debt, which continued for generations, and usurers in this arrangement would take cash crops as repayment and market them for profit (Hardiman, 1998, 2007).

In poorer agricultural areas, although usurers provided the finance to construct wells, local chiefs took the bulk of the produce – leaving only subsistence crops for the villagers (Hardiman, 1998, 2007). In regions like central and southern Gujarat, which were more prosperous, village elites from leading castes had complete ownership of the wells. This is termed 'community control', but benefitted only a small number of elite villagers (Ibid). Due to technical limits caused by the depth of the wells, water had to be raised laboriously through bullock power, which did not lead to any substantial depletion of groundwater resources, and so they never dried up entirely (Hardiman, 2007), even in the years of severe famine (Bhatia, 1992).

With the advent of new pumping technology in the twentieth century, it became possible to bore deep wells and extract water in huge quantities, which caused seasonal drying of the wells. High yielding hybrid crop varieties introduced by the Green Revolution, which demanded water in large quantities, led to the construction of deep tubewells with submersible pumps by those who had the resources. During the 1950s and 1960s, diesel engines were used by the farmers to pump groundwater, but with the spread of rural electrification they began to use submersible electric pumps, as diesel pumps were unable to chase declining water levels. Between 1971 and 2001, the use of diesel pumps in irrigation increased by up to 56 per cent and the use of electric pumps by 585 per cent (Shah et al., 2008). Figure VI illustrates this change.

[79] Sahukar is the merchant–usurer (Hardiman, 1998).

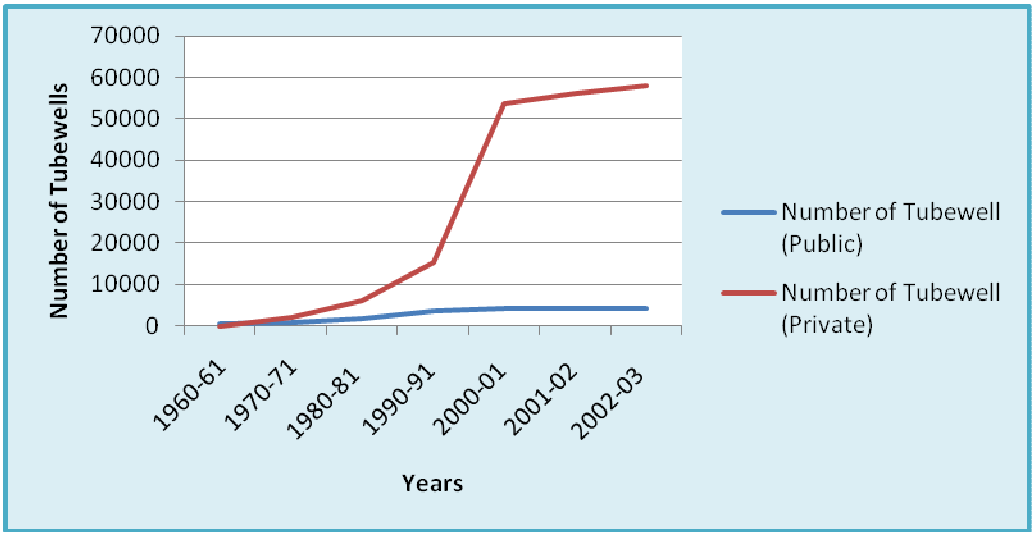
Figure VI: The Trends in the Number of Diesel and Electric Pumps Use for Irrigation in Gujarat 1970-2003



Source: Adapted from Statistical Abstract of Gujarat State, (Government of Gujarat, 2006)

Figure VII, below, depicts over a period of time the amount of privately owned tubewells in Gujarat, which have outnumbered the total publicly owned, thus demonstrating private involvement in the extraction of groundwater.

Figure VII: Changing Trends of Public and Private Tubewells in Gujarat from 1960-2003



Source: Adapted from Statistical Abstract of Gujarat State, (Government of Gujarat, 2006)

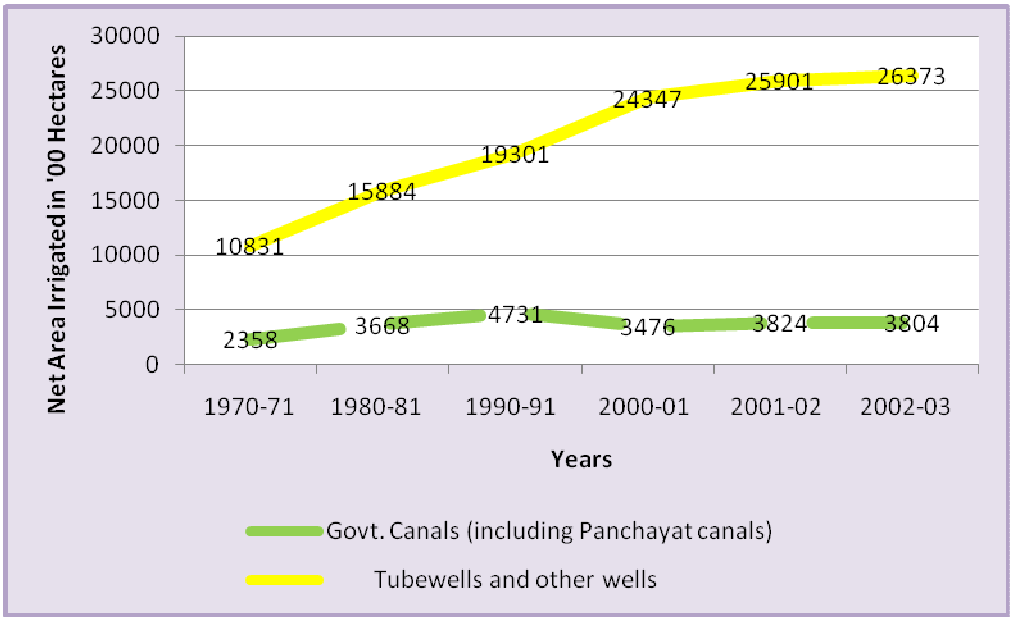
With India's independence, Gujarat invested heavily in its canal irrigation projects, but agriculture still continued to be deeply dependent on irrigation through wells and tubewells (Shah et al., 2008). In recent times, alternatives to well irrigation have come in the form of canal irrigation, which is a comparatively recent phenomenon. Since

India's independence in 1947, two major rivers, the Mahi and the Tapi, have been dammed to provide water for canals. The Narmada River, the largest of all rivers in Gujarat, is also in the process of being dammed. The Sardar Sarovar Project[80] on the Narmada, which started in the 1980s, has been surrounded by controversy, as it is believed that the massive reservoirs created by the project will displace thousands of tribal and peasant cultivators.

It has been widely publicised through the state publicity and propaganda that the Narmada project will solve all the water problems of the state. It is anticipated that water in the huge canals, covering hundreds of kilometres, will be diverted to remote arid zones of the state. Critics of the Narmada project argue that there will be massive demand and supply monopolisation due to the political clout held by industry and the farmers who are located close to the dam. Thus, the vision of the project to supply water to remote arid zones is doubtful at best. As a consequence, there will be no other major river with such a large perennial flow in Gujarat, after Narmada, if it is dammed in this way. Therefore, wells will continue to dominate the irrigation scenario for the vast majority of peasant farmers. Groundwater development in Gujarat has taken off with such speed that it has left behind state intervention. Groundwater is the most important means of irrigation, exemplified by figure VIII, which states the increase in net area irrigated by the tubewells has outnumbered that of canals.

[80] Popularly referred as Narmada Dam Project.

Figure VIII: Net Area Irrigated by Canals and Tubewells in Gujarat from 1970-2003



Source: Adapted from Statistical Abstract of Gujarat State, (Government of Gujarat, 2006)

These developments have significantly affected groundwater resources in the state. In 2009, 31 blocks (*talukas*) in the state were declared as 'over-exploited', 12 as 'dark' (critical) and 69 as 'grey' (semi-critical) (Government of India, 2009). Table III presents a list of the districts and their classifications.

Table III: Decline in Water Level and the Stage of Groundwater use of Various Districts of Gujarat

Districts	Level of Ground Water Development in %	Category
Ahmedabad	92.63	Dark
Amreli	71.03	Grey
Banaskantha	111.49	OE
Gandhinagar	146.04	OE
Junagadh	77.59	Grey
Kheda	72.8	Grey
Kutch	85.96	Grey
Sabarkantha	88.75	Grey
Surendranagar	70.54	Grey
Mehsana	164.65	OE

Source: Central Ground Water Board, West Region Ahmedabad, Government of India 1997a

Due to a failure in managing groundwater, Gujarat is one of the weaker groundwater-governed states of India. Groundwater over-exploitation from coastal Saurashtra, which used to enjoy a successful (ground) water regime, has been pushed into saline water, resulting in salinity ingress and deterioration in the quality of water supply. In northern Gujarat, Kutch and northern Saurashtra the arbitrary withdrawal of

groundwater has depleted water resources due to water mining on a large-scale. At the same time, in the case of southern Gujarat where the rainfall is high, canal irrigation and the subsequent overuse of water has raised waterlogging and salinity. Hence, the immediate fallout of increasing water scarcity and groundwater level decline has decelerated agricultural growth and productivity, which is seriously affecting the livelihoods of millions of people in the Gujarat hinterland (Prakash, 2008). The next task that arises out of this situation is to examine the measures taken by the Gujarat government to check this process.

4.3 Water Governance Crisis in the State

Since colonial times, groundwater has held an important place in Gujarat agriculture in the form of well irrigation. The state has been at the forefront of debates concerning water scarcity and the level of decline in the groundwater table. In order to develop water resources and solve the problem of water scarcity, the state government[81] has implemented various policies and schemes. Water scarcity has distributional and relational aspects, as it does not have a universal impact on all social groups. Hence, water resources management in the state aims to provide water efficiently, equitably and in a sustainable manner. In order to achieve its goal of increasing the net availability of water, the Gujarat government has been implementing various projects to improve water use efficiency, bridge the gap between the potential created and its utilisation, and to restore and modernise the old irrigation system.

The situation is in fact a crisis of governance (Prakash, 2008) because the state encouraged groundwater exploitation by promoting groundwater-based agriculture. In 1975, the government established the Gujarat Water Resources Development Corporation (GWRDC) to develop groundwater through tubewells. Nine hundred tubewells were transferred to the Gujarat Water Resources Development Corporation in 1978 and placed under the control of Panchayat district (Directorate of Economics and Statistics, 2008). The main aim of the public tubewells programme was to increase the area under irrigation by exploiting groundwater and thus accessing farming communities (Prakash, 2008). It was a bureaucratically managed subsidy-based programme which later led to losses, as many of the tubewells became

[81] The ruling political party presently in Gujarat is BJP (Bharatiya Janata Party).

redundant due to lack of repair and maintenance. Following on from this debacle, many of the tubewells were transferred to farm cooperatives.

Moreover, encouragement of the Gujarat government, indirectly of the exploitation of the groundwater through promoting groundwater-based agriculture, and turning a blind eye to the expanding private groundwater markets in the early 1980s and late 1990s by providing subsidized electricity structures contributed to the mess of water governance crisis. In present day Gujarat, groundwater use is governed by the Bombay Irrigation Act of 1879, amended in 1950 in order to extend 'notification' to wells and tubewells as 'second class irrigation works', thereby specifying the use of wells[82] (Dubash, 2007). Again, the Act was amended in Gujarat in 1976. The Bombay Irrigation (Gujarat Amendment) Act was passed by emergency ordinance, which stated that a licence should be acquired for the construction of a tubewell and the depth of the bore should not exceed more than 45 metres (Bhatia, 1992; Singh, 1998). Tubewell owners were also made responsible for checking for water leakages and wastage. Moreover, restrictions were also placed on water consumption, but being an emergency ordinance it was not passed by vote in the Gujarat Legislative Assembly and lapsed, as the legislature failed to ratify it within six months (Ibid).

Many attempts were made in the subsequent years to revive and implement the law, especially by Amarsinh Chaudhury[83] of the Congress Ministry in 1988-9, but due to vested interests his efforts were met with strong opposition and the law could not be passed (Hardiman, 2007). The measure of 1976 has not been made into a law, and even after three decades[84] there has been little real impact on the private rights of unchecked access to groundwater, which were established in the colonial era. In 2001, the Gujarat government created the Gujarat Groundwater Authority to monitor and

[82] This process entails a preparation of a 'record of rights' based on current use patterns, but allows these rights to be consequently commuted by the state based on payment of money, land or alternative compensation as the officiating officer 'may think fit' (Government of Gujarat, 1963).

[83] Amarsinh Chaudhury was the first scheduled tribe member to become Chief Minister of Gujarat and being a tribal he depended less on the support of the dominant Patidar caste and other wealthy caste peasant groups. Thus he was in a stronger position to carry forward the measure to pass the Bombay Irrigation 1976 Act (Gujarat Amendment) (Hardiman, 2007).

[84] Some argue that amendment was passed in 1998 (Moench, 1998; Sharma, 1998; Singh, 1998). Others argue that the amendment was notified in 1988, but was not published in the gazette and therefore may not be in force (World Bank, 1998). Hence this confusion elaborates the sorry affair of groundwater regulation in Gujarat.

control the extraction of groundwater use in the state, and produced a Bill to regulate and control the development of groundwater, which is still under preparation.

The Groundwater Model Bill was a legislation-based approach used to control the usage of groundwater and was introduced by the Government of India in 1970. With 'water' being a state subject, the Bill was to be endorsed by the state, and in 1992 it again was revised and implemented. It applied to a limited number of districts that were overexploited, but even in these areas the Act was never fully implemented due to the powerful farmers' lobby opposing such regulatory measures (Prakash, 2008). Neither the Gujarat Acts nor the Central Model Bill deal directly with the issue of groundwater rights, as the purpose of redefining them is in the context of groundwater management. The laws are aimed at well regulation through licensing. In fact, the success of restrictions over private rights depends entirely to the extent to which the inventory, registration and licensing of wells are carried out, which is quite questionable (Vani, 2009b).

Thus, state laws have never been properly implemented; moreover, the issue is politically sensitive and the ruling government is not prepared to alienate the farming community, which forms the core of their vote bank, particularly the wealthier segments which are the main users of groundwater. Therefore, groundwater-related polices of Gujarat have very little to do with scarcity, depletion or quality of groundwater but more to do with rural politics manifested in terms of the presence of farmer lobbies. Hence, in Gujarat, where there is a real and grave groundwater crisis, the state government has been able to neither implement strict groundwater regulations nor increase electricity tariffs significantly. This has been due to "vote-bank-politics", as over the years groundwater irrigators in Gujarat have formed a powerful pressure group, which mobilises large numbers of votes in the state's general elections on the issue of irrigation.

One of the major water resources development project in India is the Sardar Sarovar Project (SSP), which is an inter-state, multipurpose joint venture between Gujarat, Madhya Pradesh, Maharashtra and Rajasthan, with a major terminal dam on the Narmada River, in Gujarat. In order to make this a success, a separate division within Narmada Water Resources, Water Supply and Kalpsar Department has been created under the heading Narmada Division. Sardar Sarovar Narmada Nigam Limited (SSNNL) was set up to implement the Sardar Sarovar (Narmada) Project in 1988.

About 75 per cent of the command area in Gujarat is drought prone, as defined by the Irrigation Commission, and it is estimated that the project will provide about 179.2 million hectares of land via irrigation facilities covering around 75 *talukas* of 15 districts (Directorate of Economics and Statistics, 2008).

The basin of the Narmada River is 9,7410 km² and a total of 30 major, 135 medium and 3,000 minor dams are to be built in the river valley (Government of Gujarat, 2002). The Sardar Sarovar Canal-based drinking water supply project, covering 8,215 villages and 135 urban centres from Saurashtra, Kutch, North Gujarat and Panchmahals has also been formulated (Directorate of Economics and Statistics, 2008). Hence, 104 towns are to be covered under the Sardar Sarovar Canal-based water supply scheme at a cost of Rs. 54,385.3 million. In addition, the Narmada tribunal has reserved 1.06 million acres (3528 MLD) of water in the Sardar Sarovar for drinking and industrial purposes (Directorate of Economics and Statistics, 2008). There has been debate about raising the height of the Sardar Sarovar Project dam for optimum water utilisation; however, the plan for harnessing the river for irrigation and power generation was initiated in 1946, and the late prime minister, Pundit Jawaharlal Nehru, laid its foundation stone on 5th April 1961. The Indian government constituted the Narmada Water Dispute Tribunal (NWDT) in 1969 under the Inter State River Water Disputes Act 1956. The height of dam over the river Narmada under construction will be 163 metres (Government of Gujarat, 2002).

Controversy has surrounded the SSP (Sardar Sarovar Project) since it began. Various organisations and individuals including Narmada Bachao Andolan (NBA),[85] meaning 'Save the Narmada,' led by Medha Patkar have criticised the construction of the dam and even led a movement against its construction. The extent of irrigation possible under the Narmada command, and the cost involved in bringing water to far-off regions, is questionable, as the data provided by the government are viewed with grave suspicion by activists and scholars. The original river water flow study was calculated in 1979, at which time there was not enough historical rainfall and river flow data available to produce accurate figures (Ibid). Officials have historically underestimated the affected area and grossly overestimated the benefits of dams. Moreover, the efficiency of the canal system assumed by the government also seems

[85] Narmada Bachao Andolan (NBA) was set up in 1986 under the leadership of Medha Patkar. The movement of NBA attempts to publicize the ecological disaster and the plight of the poor in the region.

unrealistic (Roy, 1999) and its efficiency is likely to be around 45 per cent rather than 60 per cent as argued, which will further reduce the water available for irrigation (Ram, 1993).

Moreover, the Sardar Sarovar Dam on the Narmada River, and the entire hydraulic infrastructure below it, are designed based on the annual allocation of 11 km³ of water to Gujarat by the Narmada tribunal in 1978 (Shah, 2009). Studies by Kumar et al. (2005) and Ranade (2005) show that pump irrigation development, upstream of the dam, has increased annual consumption by about 5 km³ during this period. This has happened because of the unauthorised lifting of water by non-command farmers, who use pumps to lift water meant for downstream needs from canals or rivers (Singh et al., 2005). Consequently, pump irrigation development upstream can render dams useless in most seasons, and since the tribunal board is silent on the issue of groundwater sharing among states, the hydraulic infrastructure below the Sardar Sarovar Dam has to be satisfied with far less water than it was originally designed to receive (Shah, 2009). Furthermore, it is propagated that central and northern Gujarat, Saurashtra and Kutch will benefit from the SSP, and apart from bringing irrigation the canal network is expected to alter the groundwater ecology in the canal command areas (Prakash, 2008).

In reality though, Narmada water will reach only 2 per cent of drought prone areas in Kutch, 22 per cent in Saurashtra and 17 per cent in northern Gujarat, while other areas like Sabarkantha, Banaskantha and many villages of Saurashtra, which need water, are not under the command area of the SSP at all (Prakash, 2008). Hence, in Gujarat, the state has 'manufactured' one perception for water, namely the Narmada project as the single solution, whereas in doing so, political and business interests across the state are being served (Mehta, 2007:657).

Since 1995, the Participatory Irrigation Management (PIM) programme has been undertaken by the Government of Gujarat, which aims to transfer the management of irrigation to newly formed users' organisations. In the first phase, 13 pilot projects were identified in different parts of Gujarat, out of which five pilot projects were undertaken by NGOs, who were involved in planning and implementing the programme. In the PIM, participating farmers were expected to operate and manage water user associations; in addition, they had to make a fixed contribution towards the initial expenses of repairing and rehabilitating the system. The WUAs were also

responsible for the allocation of water and collection of demand forms and water charges from their members. In addition, the Gujarat government passed the Gujarat Water Users Participatory Irrigation Management Bill in 2007, authorising farmers to create WUAs to manage the canals.

However, in the new Sardar Sarovar Irrigation project, five years after the water began flowing down the system, not even one of the 1,100 service areas in the command had watercourses or field channels constructed by WUAs (Shah, 2009). On the contrary, pump irrigation emerged in each area where private farmers lifted water from the tributary to irrigate their own fields and engage in selling water (pump irrigation services) to other farmers (Talati and Shah, 2004). Hence, the Narmada irrigation experience suggests that the PIM has not reduced total transaction costs; it merely transfers bits of anarchy from the system to the water users' associations, which are reluctant to absorb the transaction costs of controlling the scheme (Shah, 2009:75). Though Gujarat adopted the motivation strategy (i.e., a bottom-up approach) but did not achieve its wide spread implementation across the state (Swain and Das, 2008).

An ambitious and innovative Sujalam-Sufalam project was introduced in 2004 by the government of Gujarat, which involved building a 337 km-long elevated earthen canal from the Kadana reservoir in the Mahi basin to recharge the parched alluvial aquifers of northern Gujarat by filling up 21 dry riverbeds (Shah, 2009). The Yojana[86] aims to bring about a perennial solution to the ten districts of northern Gujarat, namely Ahmedabad, Patan, Banaskantha Gandhinagar, Mehsana, Sabarkantha, Dahod, Panchmahals, Surendranagar and Kutch (Directorate of Economics and Statistics, 2008). By utilising the flood water of Narmada, lift irrigation schemes, deepening of tanks, increasing the storage capacity of reservoirs, making check dams, farm tanks and drinking water facilities are included in the project (Ibid). Nonetheless, as of now, with the project half completed, it appears that water may flow into the canal only once every seven to ten years, and that will happen only when the Kadana reservoir is filled to the level of 419 feet, at which point water will then tip into the canal because of overspill (Shah, 2009). Groundwater development and decentralised recharge structures take water upstream of the Kadan reservoir, which happens because water

[86] Yojana means scheme.

harvesting and groundwater recharge on a large-scale reduce surface water flows all along the basin, and upstream harvesting and groundwater recharge efforts threaten large reservoirs (Ibid).

Due to the scant, uneven depletion of underground water, recharging work has been given a lot of importance. The Gujarat government introduced a water conservation scheme called Sardar Patel Participatory Water Conservation Scheme (SPWCS) through partnership between people and the government in January 2000. The pattern of sharing is 80:20 for the entire state, where the government contribution is 80 per cent and 20 per cent is borne by the beneficiary. It involves the construction of check dams[87] and recharge wells, as well as the renovation of village tanks and ponds (Government of Gujarat, 2009c). In Saurashtra, dug well irrigation is supported by hundreds of thousands of check dams and percolation tanks, which communities have constructed with government support for over a decade under this scheme (Shah, 2009; Shah, 2009 et al.,). Scientific testimony, however, has proved that these interventions are creating negative ecological effects rather producing positive impacts (Kumar et al., 2009). The reasons for this are i) surface water resources in the region's basins are over-appropriated through a large number of medium (around 100) and minor irrigation schemes in years of normal and deficit rainfall and ii) in very wet years, hard rock aquifers provide no space to store additional runoff underground. As wells in the region overflow during high rainfall years, in normal and drought years they only reduce the flow into d/s reservoirs, while in wet years the water remains on the surface, eventually evaporating during the monsoon season itself due to high evaporation conditions (Kimar et al., 2009:72).

Up to 1988, farmers were charged based on metered use of electricity, but the introduction of a new flat tariff system in 1988 by the Gujarat Electricity Board (GEB) changed the whole scenario of groundwater extraction and led to overexploitation. During the 1980s, farmers got 18-20 hours of three-phase electricity per day, and to control the farm power subsidies, the Gujarati government began to reduce three-phase rural power supply until, at the turn of the millennium, farmers only received about 10-12 hours of power. Furthermore, the power supply was often at low voltages and frequently damaged motors through tripping. In addition, the

[87] Check dams are walls across rivulets or rivers which stop water up to certain height and allow the rest of the water to spill over.

farmers started using phase-splitting capacitors (locally called *tota*) to covert two or single phase power supply lines into three phase powers to run their tubewells, which resulted in tubewells running for 18-20 hours/day.

By using *tota* the farmers were able to beat power rationing, but the voltages for all the rural power users was reduced to a great extent. Moreover, electricity board officials began treating agriculture as a loss leader and farmers as residual customers (Shah, 2009). Paradoxically the poorer farmers of Gujarat, especially landless sharecroppers and marginal farmers, benefited from the capacitors as the tubewell owners with the help of 'stolen power' sold them water at a very low price. Therefore, electricity subsidies began the widespread groundwater depletion. Moreover, the large-scale farmers' political mobilisation and the powerful vote bank politics which aim at preserving at all cost the farm-power subsidy are indicators of the governance crisis in the energy-irrigation nexus.

A noteworthy improvement to groundwater management in Gujarat was initiated by the *Jyotirgram* (Lighted Village) Scheme (JGS), under which a separate electricity supply is provided to domestic and agriculture-related activities in villages. The scheme was initially launched as a pilot project in eight districts of Gujarat, but by November 2004 it was extended to the entire state, assuring 24-hour supply for domestic use and 8 hours for agriculture. This has helped in curtailing the overexploitation of groundwater pumping through illegal means and is described by the government of Gujarat as a win-win solution. Under this scheme, by 2006, 18,000 villages of Gujarat had been covered (Shah and Verma, 2008).

JGS has negatively impacted on farmers, tenants and landless farm labourers, as they bought water from the tubewell owners at an affordable price before JGS; ironically, these poor farmers also benefited from the illegal use of electricity before this time (Shah et al., 2008). Hence, the groundwater markets have shrunk, as pump irrigation prices have increased by 40-60 per cent. Landless labourers cultivating leased land face reduced levels of irrigation as well as low returns on lease farming, while marginal farmers and landless labourers also face reduced opportunities for farm work (Shah et al., 2008; Shah and Verma, 2008), which has affected the livelihood of poor farmers.

Gujarat has many soil and water-related problems and the majority of the population survives on rainfed agriculture. As such, the watershed development approach is of key importance for the state of Gujarat. Although way back in 1978, watershed programmes were initiated through the establishment of the Gujarat State Land Development Corporation (GSLDC) to carry out all activities related to soil and water conservation, it was only in 1994-95 that the central government-funded programme started. Gujarat was amongst 11 states[88] in which the first watershed guidelines of 1995-96 were implemented. The main programmes introduced have been the Integrated Wastelands Development Programme (IWDP), Drought Prone Area Programme (DPAP), Desert Development Programme (DDP) and the Employment Assurance Scheme (EAS) by the Department of Rural Development and National Watershed Development Projects for Rainfed Areas (NWDPRA) by the Department of Agriculture. In the watershed development, the Department of Forest has also been involved with the Joint Forest Management Programme (JFMP).

At present, the GSLDC is also carrying out a number of major and minor watershed development programmes such as the National Watershed Development Projects for Rainfed Areas (NWDPRA), River Valley Projects (RVP), Reclamation of Alkali Soils (RAS), etc. Hence, WDPs started as a policy measure to combat the increasing environmental crisis and non sustainability of agriculture in dry land and semi-arid regions, and became a key strategy for economic development in Gujarat due to frequent instances of droughts, dwindling groundwater resources, increasingly salinity and loss of vegetation.

The approach of watershed development is holistic, while institutional arrangements are unmanageable and compartmentalised. Unfortunately, water resource ministries are not concerned with this matter. As water conservation and development are a prime agenda points within watershed development projects, it is necessary that they should be tackled by water resources ministries and irrigation departments, and there should be more inter-agency cooperation. Moreover, watershed development has not been taken up as a political issue because watersheds do not serve the interests of powerful business lobbies. Special importance is instead given in watershed

[88] The 11 states in which watershed programme was implemented under the1995-96 guidelines were Andhra Pradesh, Bihar, Gujarat, Karnataka, Madhya Pradesh, Maharashtra, Orissa, Rajasthan, Tamil Nadu, Uttar Pradesh and West Bengal.

development projects to water harvesting structures such as check dams, which benefit only small amounts of farmland by recharging wells, and ignore the implications for water resource management in the wider context of the river basin (Shah, 2001). This has led to distorted water use planning and interpersonal, as well as inter-regional, inequality in access to water resources (Ibid). At the community level, with social differences in rural hierarchical society in terms of caste, class, gender and inequity in access to resources, the changes brought about by the watershed programme are not evenly spread, as those with the land benefit more from the recharged structures than the landless, as water rights are inextricably linked with land rights.

Nonetheless, in order to curtail water scarcity, the government has introduced programmes to increase supply and provided efficient management in the form of the PIM. Among other programmes, watershed management has shown some initial success in Gujarat, with an increase in agricultural yield which has been attributed to a substantial increase in the water table (Shah, 2000). Among all the initiatives, however, construction of the Sardar Sarovar Dam has been the most visibly controversial. Therefore, I would conclude that water management in Gujarat is influenced by socio-political, institutional and ecological factors.

4.4 Conclusion and Discussion

Since the 1980s, Gujarat's energy-irrigation nexus has degenerated into a prolonged war of words between the government and the increasingly organised farmers' lobbies. Inequity and overexploitation are the two ugly heads of groundwater mismanagement and its unscrupulous usage (Bhatia, 1992). Gujarat is governed by the rightist Bharatiya Janata Party (BJP), which is referred to as the 'Hindu Nationalist' party by the western press and media. Moreover, Gujarat has not undertaken any formidable land reforms and panchayat exists only on paper. However, agrarian politics in the form of strong farmer lobbies has been the foremost factor in the state's power struggles (Mukherji, 2006). Predominantly, 'Patel farmers'[89] and farmers' voices have provided leadership to the Bharatiya Kisan Sangh (BKS), which is the radical peasant wing of the BJP and plays a decisive role in Gujarat politics. In spite of a severe groundwater crisis, the state of Gujarat is opposed

[89] Patel farmers are the dominant farming caste in Gujarat.

to the CGWB (Central Groundwater Board) suggestions that groundwater extraction should be banned in blocks facing over-exploitation (Mukherji, 2006).

Secondly, the state government has not been overly successful against the farmers' movement against the proposal to raise the electricity tariff for groundwater irrigation. The state government has given up the plan of rising electricity fair due to the wielding influence of farmers lobby under the leadership of Bharatiya Kisan Sangh (BKS).[90] Consequently, even in view of really unstable groundwater conditions, the GOG has maintained a pro-farmer stand. Due to its vested interest of staying in power, many of its politicians and government officials have strong rural roots and have sympathy for farmers within their own caste (Mukherji, 2006, 2007). Therefore, a strong farmers' lobby supported by politicians and bureaucrats has successfully resisted any measures to curb their access to groundwater.

Moreover, Gujarat groundwater markets are insensitive to the natural, social and historical factors (Dubash, 2000). Physical characteristics of groundwater in context to depth and conditions of access have a strong connotation for patterns of agrarian differentiations. Private ownership and unchecked extractions in northern Gujarat have led to competitive well deepening. Access to groundwater has given rise to new forms of social organisation, which are in turn shaped through social and economic aspects within the agrarian set up. The question of inequity in accessing groundwater is very important, as investments in groundwater pumping equipment are often lopsided and disparate, which often results in the ownership of groundwater assets lying in the hands of wealthy farmers and leads to the creation of 'water lords'.

The advantage of unrestricted access to pump groundwater is inexplicably appropriated the large-scale landholding farmers who have the capital to invest, whereas poorer famers come to depend on these wealthy tubewell owners for their livelihoods, which has been well documented in the work of Bhatia (1992), Dubash (2002), Prakash (2005) and Mukerji (2006). The concept of community-based groundwater management is difficult to establish due to the issue of inequity in access to groundwater, as farmers with adequate resources construct deep tubewells with submersible pumps, and in the process are more interested with private gain and ignore the social cost of over-exploitation. This in turn leads to gross over-

[90] For detail on the political turmoil in Gujarat over farmers' agitation against the proposal to raise electricity tariff see Mukherji, 2006.

exploitation, as justified through Garett Hardin's 'tragedy of the commons' whereby access to CPR leads inevitably to degradation (Hardin, 1968, 1977). However, there is no 'tragedy' for the time being for those who have the resources to drill the wells and purchase water, as it puts them in an excellent position to benefit from wider scarcity (Hardiman, 2007:41).

The wealth generated from the groundwater irrigation has led to the social transition of large- and medium-scale landholding farmers. Thus it is necessary to give importance to the implications of groundwater dependence and the struggle to maintain access to it. This is pertinent in understanding the social-cultural-economic and political change in rural society. Prakash's (2005) study explains how the inequity in access to groundwater has also led to poor and marginal farmers becoming sharecroppers, which favours landlords who also happen to be the owners of water. Moreover, the farmers' lobby comprises mostly large landholding farmers, (also called 'bullock capitalists' by Rudolph and Rudolph, 1987) who are organised on a caste basis to safeguard their interests. They do not necessarily voice the concerns of small and marginal farmers or agricultural labourers.

Tubewell partnerships are formed around caste affiliations, and often "caste is the glue that binds the partners together", leaving lower castes disadvantaged. Their inability to form tubewell partnerships on a large-scale removes them from the groundwater market (Dubash, 2002). Hardiman's (2007) study on water scarcity in Gujarat illustrates how Patidars (the well owners) operate on capitalist principles when they sell water to their subordinates, and in the process reinforce caste domination and social inequality. Consequently, the domination by the resource rich in an opportunistic race to the bottom of the aquifer has marginalized the poor and the unorganized in the local groundwater economies (Joshi and Acharya, 2005). In managing water, indirect approaches like limiting institutional credit, electricity pricing mechanisms and electricity connection have made little impact and have proven impossible to implement, so far. Wealthy farmers are generally able to bypass such regulations, obtain credit from their social networks and private credit cooperatives and get access to electricity.

The government policy of subsiding electricity for the farming community has promoted extensive groundwater exploitation. The creation and functioning of the groundwater market, and its advantages for certain sections, has produced an

inequitable society. These markets have also helped in strengthening the position of upper caste/class farmers who have a strong political lobby and work against any move to control groundwater overexploitation. In the case of SSP, state resources continue to be invested in legitimising the project as Gujarat‘s lifeline, but it is the larger farmers, agro-industrial lobbies and the state’s big cities that stand to gain the most from this project (Levin, 2004: Mehta, 2005). Therefore, due to poor management, the great potential of water is being lost, creating a further divide between rich and poor farmers and rural and urban settings.

Hence, Mehta (2003) analyses the context and construction of water scarcity through its linkages with ecological, socio-political, temporal and anthropogenic dimensions and stresses not to visualize it in absolute terms. Consequently, caste, politics, power, gender, institutional governance and inequalities of wealth have a strong effect on water management in Gujarat, determine access to water and do not easily facilitate community-based management due to power relations which are linked to social and economic hierarchy and the issue of resource inequity. Therefore, social differences have affected both macro and micro level water schemes in the state.

Taking that as my reference point, I intend to discuss the issues concerning my work. A case study of one particular village in the subsequent chapters, would try to open up and problematize the entry point and would further tether the already accepted arguments by collating it with newer and fresher perspective of looking at the negotiation of rural Gujarat, amid, welfare measures aimed at reducing wide gaps and filling cleavages permeating the system and political economy of this village called Mathnaa.

Chapter 5 The World of Water in Mathnaa

> "Water is sanctified for everyone when it is underground, but it takes a different meaning when it enters our courtyard, it's our caste which defines water's sacredness and profanity".
>
> (Somabhai,[91] Thakore by caste, Mathnaa)

5.1 Introduction

This chapter empirically introduces the region and the case study village, its social fabric, caste arrangement and the role that caste hierarchies play in water arrangements. Moreover, it outlines the village's social structure and how this centres on water. The preciousness of water is explained through various socio-cultural practices and their locus around water. The domains contextualising water and land arrangements in the village, government water supply schemes and the institutions governing them are dwelt upon historically in this chapter. Tracing the sacred of nature and employment of water is argued through different positions and anomalies. The ownership of water in the caste hierarchy, how it regulates social relations and the negotiation of gender politics amid a patriarchal society are also explained in this chapter. The socio-cultural matrix centered on water arrangements in the context of religion is also typified, and power dynamics in terms of wealth, land ownership and access to water are elucidated. Finally, the chapter explains the power dynamics and its equation with water in the socio-cultural matrix of Mathnaa.

5.2 Study Area: Sabarkantha

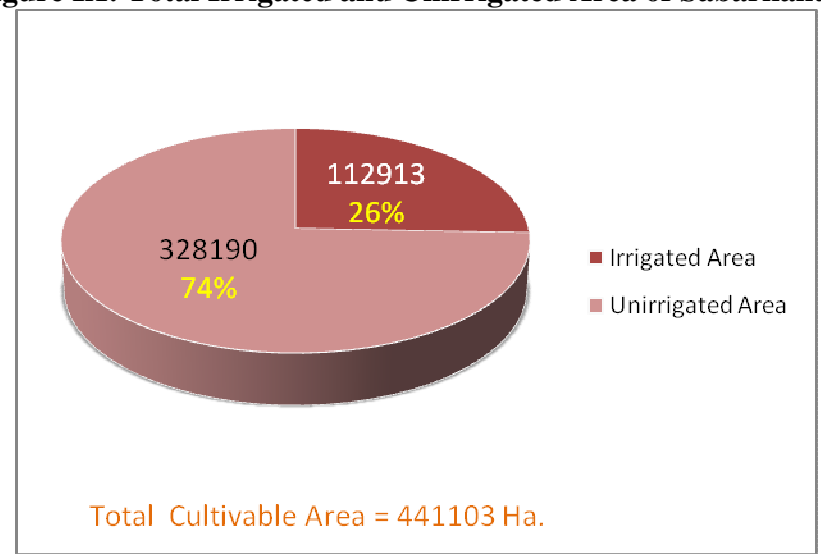
Before I navigate to the exact site where I conducted my fieldwork from May 2008 to February 2009, I would like to throw some light on the district where the village is located. The village of my study is located in Sabarkantha district, which is in the northern part of the State of Gujarat. The total area of Sabarkantha is 7,390 km² of which 1,270 km² is covered by forest (Director of Census Operation, 2001).

The economy of the district is dominated by agriculture, as 62.8 per cent of its workers are engaged in the sector (Director of Census Operation, 2001). Rainfed

[91] Please note that in Gujarati, the male members suffix the word '*bhai*' meaning brother with their first name and woman put '*ben*' meaning sister as a suffix in their first name, and this is officially acknowledge and is used in government records as well.

agriculture and animal husbandry are the chief occupations. The important crops of the district are wheat, cotton, pulses and groundnut. Figure IX clearly illustrates that 74 per cent of the cultivable area of Sabarkantha is unknot irrigated.

Figure IX: Total Irrigated and Unirrigated Area of Sabarkantha



Source: Government of Gujarat, 2010b

Sabarkantha has 13 talukas[92] (Khedbhrambha, Vijaynagar, Bhiloda, Mehraj, Modasa, Idar, Vadali, Talod, Himatnagar, Pranjit, Dhansura, Malpur and Bayad) and 1,372 inhabited villages. As per the 2001 census, the total population of Sabarkantha is 2,082,531, and 10.8 per cent of its total population lives in urban areas. It is one of the districts in Gujarat with a sizeable tribal population. The total percentage of scheduled caste population in Sabarkantha is 8.3 per cent, and of scheduled tribes is 20 per cent. The population density of this district is 282 persons per km² and is the thirteenth densest district of the state. Table IV, below, illustrates the *talukas* as the largest tribal population in Sabarkantha.

[92] Talukas means block or sub-district revenue division.

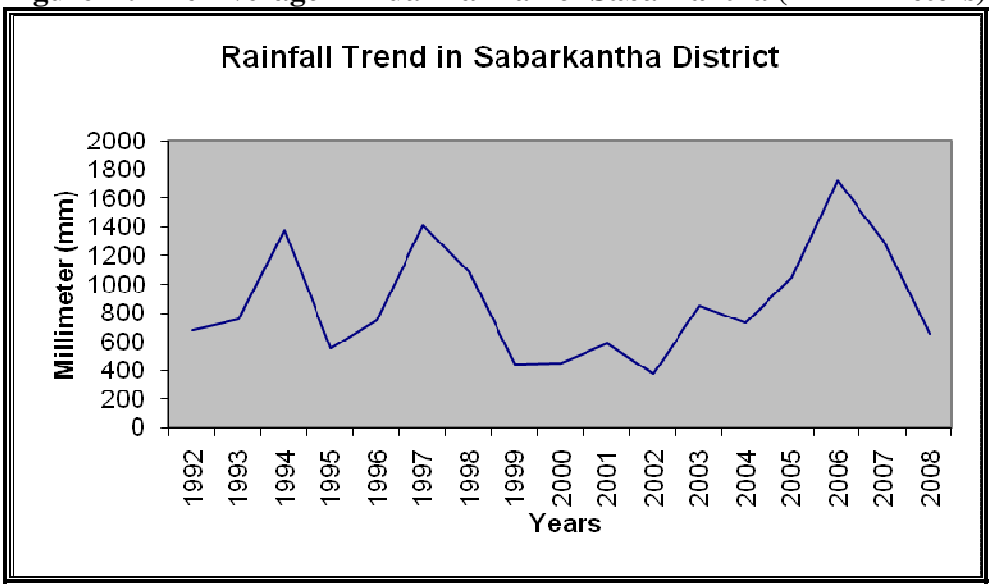
Table IV: Distribution of Tribal Population and Main Tribes in Sabarkantha District

Taluka	Tribal Population (%)	Main Tribes
Khedbrahma	62.73	Dungri Garasia, Bhil Garasia, Bhil
Vijaynagar	73.40	Sokla, Garasia, Dungri Garasia
Bhiloda	53.51	Sokla, Garasia, Dungri Garasia
Meghraj	37.94	Sokla, Garasia, Dungri Garasia

Source: Adapted from Lal, 1998

The average annual rainfall varies from 372.46 mm,[93] in 2002, to 1721.15 in 2006 and 651.23 mm in 2008 (Sabarkantha District Collecterate Office, 2008). Figure X, below, illustrates the trend of average rainfall of Sabarkantha from 1992-2008.

Figure X: The Average Annual Rainfall of Sabarkantha (in millimeters)



Source: Sabarkantha District Collecterate Office, Himatnagar

5.2.1 Water Schemes in Sabarkantha

Topographically, Sabarkantha is highly eclectic. The northeastern and eastern parts are hilly, the central part represents is rugged and undulating and the southwest is a gently sloping alluvium plain. Rocky areas cover two-thirds of the district, and there is no well-defined aquifer system. Groundwater is available from the weathered zone, cracks, fractures and joint planes in limited quantity through wells, hand pumps and single-phase borewells.

[93] Mm means millimeters.

There are about 93 small irrigation schemes (Government of Gujarat, 2009f), under which water is available for crops in the *kharif*[94] and *rabi*[95] agricultural seasons. To ensure the continuity of irrigation, dams and canals are repaired once a year. Moreover, eight major and medium-sized irrigation facilities have been developed in Sabarkantha by the state government (Ibid). More than 17 small irrigation schemes were approved by the central government for renovation, restoration and repair in 2007-08. Schemes like Sardar Patel Participatory Water Conservation, which was introduced in 2000 have been implemented, and 19 check dams on big rivers and 6,253 check dams on small rivers/Kotar constructed (Government of Gujarat, 2009g). Sujalam-Sufalam Yojana was introduced in 2004 for the ten most water-scarce districts achieved the following target. Under this scheme, 17 check dams on big rivers and 156 check dams on small rivers were constructed (Government of Gujarat, 2009g). Furthermore, participatory irrigation management, *Jyotrigram Yojana* and various watershed programmes have also been implemented in Sabarkantha.

Privately owned wells are the main source of irrigation in the district, followed by government canals. This is indicated in Table V, below which exemplifies the area irrigated by different sources during 1993-94 and 1997-98. Out of the 13 *talukas*, one (Idar taluka) falls in an overexploited category and two (Meghraj and Modasa *talukas*) are in the dark/critical category (Government of India, 1997b), pointing towards the overexploitation of groundwater.

Table V: Area Irrigated Under Various Sources in Sabarkantha ('00' hectares)

Source of Irrigation	**Area Sown with Different Irrigation Sources**			
	1993-94		1997-98	
	Net	Gross	Net	Gross
Government Canals	347	431	245	283
Tanks	1	1	7	7
Wells	1,268	1,499	1,538	1,956
Total	1,616	1,931	1,790	2,246

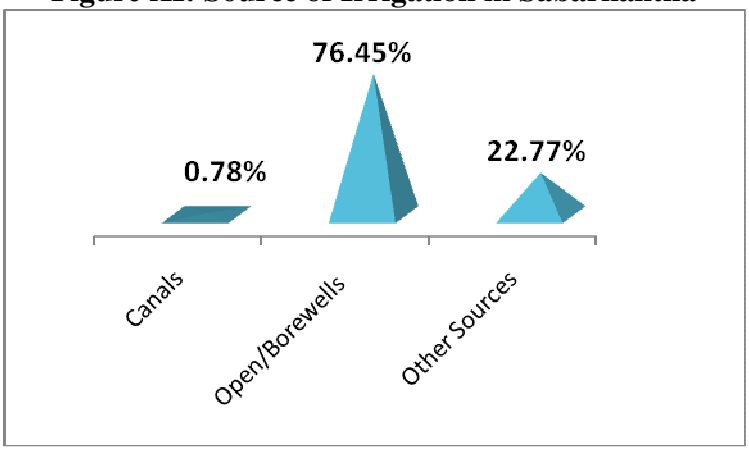
Source: Adapted from Director of Census, Sabarkantha District 2001

[94] *Kharif* or rainfed crops are sown in June and July and are harvested in September-October.

[95] *Rabi* or irrigated crops are sown in October-November and harvested in February-March.

Figure XI, below, illustrates the various sources of irrigation in Sabarkantha and clearly proves that groundwater is the main source of irrigation, accounting for 76.45 per cent of total output.

Figure XI: Source of Irrigation in Sabarkantha



Source: Government of Gujarat, 2010b

5.3 Mathnaa: Socio-Cultural Dynamics of Water Management

The caste system is a product of 'post-Vedic philosophy'[96] and attributes the stages of ritual purity- pollution to human beings on account of their position in the caste hierarchy. Water has since been acknowledged as an instrument for establishing the observance of socio-ritual purity and pollution. Thus, the basis of the caste system is determined by notions of purity and pollution, which are central to Hindi culture (Dumont, 1970). Since the Vedic period, water has been acknowledged as a primordial spiritual symbol. According to the Vedic philosophy, which forms the structural basis of presently practiced Hinduism, water and the human bodies are not simply physical entities (Baartmans, 1990). Thus, the caste-based social hierarchy is determined locally through notions of purity and pollution, which are used in local culture to determine and reinforce inequitable access to, control over and distribution of water and its usage rights. At the top of the caste hierarchy are the pure, high caste Brahmins and at its base are the impure, low status untouchables, who protect the high caste by dealing with pollution, for example removing dead animals. This implies that there are complementary hierarchal relationships in the caste system, where upper caste purity depends on the untouchables' impurity. Between the Brahmins and the untouchables are all the other castes. The whole system is constituted by a complete

[96] The term post Vedic philosophy refers to the ethical thought which was presented in the Vedic literature written during the period 2500-600 B.C., although there is constant debate over the exact duration of its period (Joshi and Fawcett, 2005).

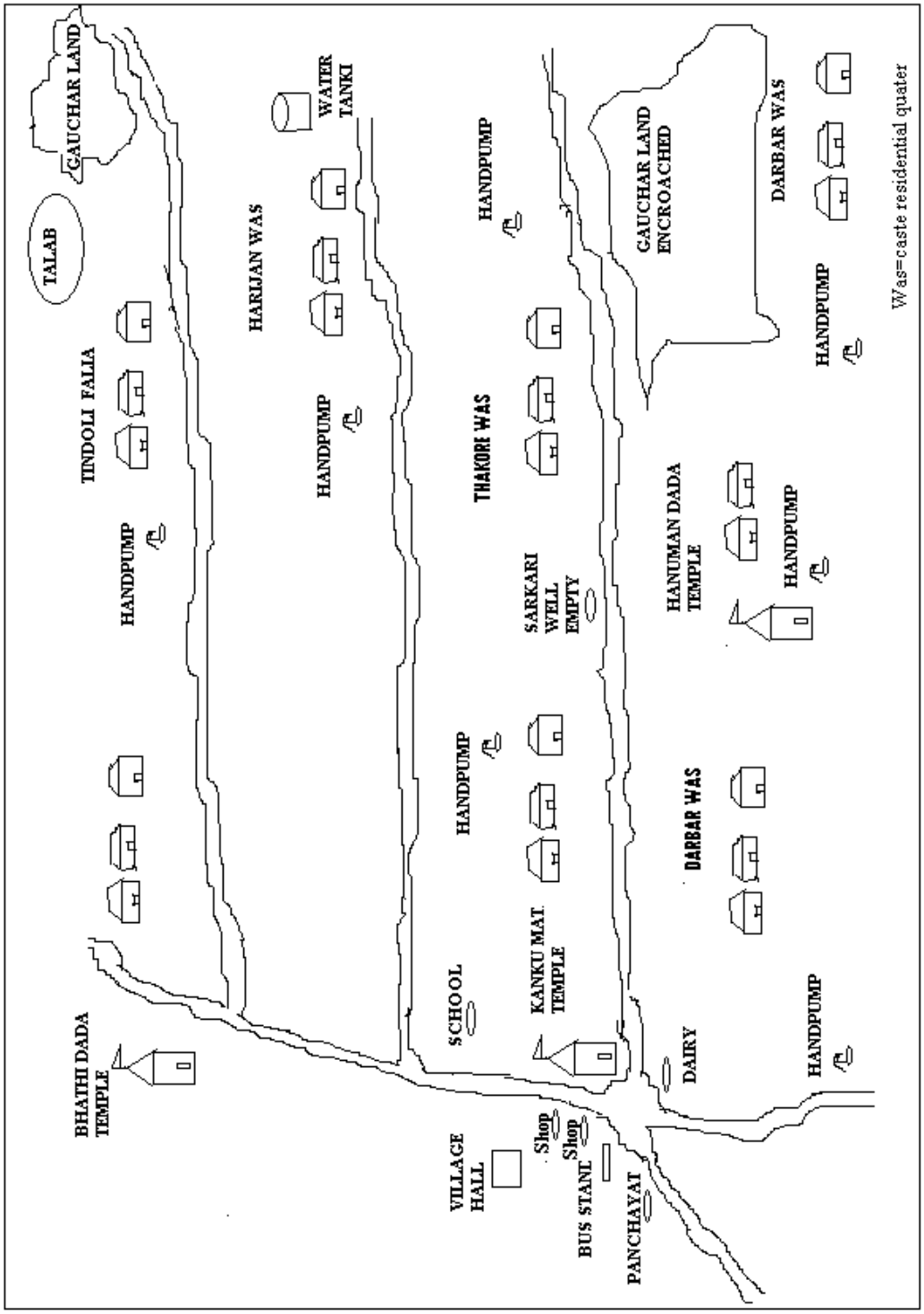
set of complementary relationships, where, in consequence, each caste is mutually ranked by its relative purity.

In Hinduism and village cosmology, water is considered pure and consecrated because of its cause and effect attributed to sacredness. All the residents of Mathnaa,[97] irrespective of their caste and tribal affiliations, endorse this view. Caste-based traditions clearly lay down the rules and regulations of purity and pollution regarding 'whose' water can be drunk, 'whose' should be avoided and who should fetch the water from the common source of water: for example, hand pumps or a sarkari (government) well. However, water takes a different meaning all together, when it comes to using it for irrigation. Thus, water, which is a natural resource, has symbolic, cultural, religious and economic meanings attached to it, and is highly differentiated in its use in the local context (Mehta, 2007). Water, unlike earth, is a standard by which we can measure how deeply the essence of caste has penetrated and perverted social relations (Guru, 2009).

Mathnaa is a small village, in the east of the Sabarkantha district. A bumpy 10-kilometre ride on a narrow road leads to the village from the main highway. Mathnaa is surrounded by the high hills of the Aravalli ranges, and the above-mentioned narrow road off the main highway leads to the '*chopaal*', which is the main square of the village and a common meeting place for the settlement's men. The *chopaal* has one tea stall, a small grocery shop, a panchayat office, a village dairy, a village hall and a bus stand as well as a through road to other settlements. The main temple of the village's local deity (*Kanku Mata*) is located here. (See map III below of Mathnaa).

[97] As an ethical responsibility towards the general welfare of my respondents their real identities have been withheld in order to protect the confidentiality while writing this thesis. Thus to ensure their safety, pseudonyms are used for the people and the study-village. Mathnaa is a pseudonym given to the village understudy in the Sabarkantha district.

Map III: Village Map of Mathnaa



Source: Map drawn by author (Map not to scale)

Mathnaa is connected to the outside world by government bus, jeep or carrier rickshaws, which are referred to as "*tempu*" by the villagers. Often, local transportation is overloaded, so frequently one can see people sitting on the roof of bus or a jeep. Only a handful of people in the village have motorcycles. The villagers need to go to the main town for most of their daily needs, as there is no village market. Mathnaa has one primary school with three male teachers, where children from the lower caste stratum study. There is also a school, exclusively for the tribals, which was built by the Government of India to promote education among scheduled tribes residing on the periphery of the village. After primary education at school, for further education the next destination is the main town, situated at a distance of more than 15 kilometres from the host village. On the health front, Mathnaa is bereft of any medical facility, and the nearest health centre is approximately 15 kilometres away. There is, however, one traditional healer known as a "*tantrik baba*" or shaman in the village, who is more popular among the Adivasis in the village and also acts as the priest attached to the temple of *Bhathi Dada*, which is popular amongst the villagers. He is consulted about family- and marriage-related problems and is believed to have supernatural powers that can cure many illnesses.

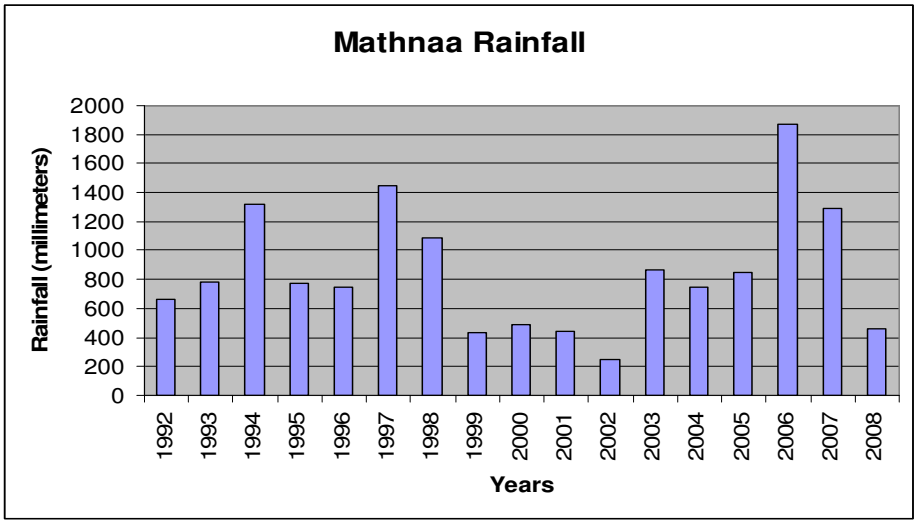
The village has several clusters of settlements along the lines of caste, called "*was*" locally in the Gujarati language. From the main square of the village, near the bus station, one can see the narrow mud lanes leading to the caste-based (*jati*)[98] residential abodes or "*was*". There is a clear-cut demarcation between each caste, whereby upper caste houses are identified with a *tulsi*[99] (holy basil) plant in their main courtyard, complemented with a lamp lit daily in the evening in their concrete houses. The distinct feature of Adivasi houses is their walls, painted with traditional tribal folk art. Their floor is made up of mud and cow dung paste. The usual structure, based on mud and a thatched roof, is easily identifiable in agricultural fields where it is ritually located.

[98] Caste is describe as a small and named group of persons distinguished by endogamy, hereditary membership and a specific style of life which sometimes includes the pursuit by tradition of a particular occupation and having distinct ritual status in a hierarchical system, based on concepts of purity and pollution (Beteille, 1965).

[99] Tulsi plant is a sacred herb and is worshipped by the Hindu community and it is associated with Lord Vishnu or Krishna and used for his worshipping.

The climate of Mathnaa is semi-arid and the topography is mountainous and rough; the soil is sandy in character. Average temperatures rise to 45.5 ºC in summer and fall to 7.7 º C in winter. Rainfall is erratic and varies from 700-1000 millimetres.[100] The year I conducted the field research, the average rainfall was 462 millimetres in Mathnaa. Figure XII, below, illustrates rainfall trend, which is erratic in nature.

Figure XII: Average Rainfall in Mathnaa from 1992-2008



Source: Sabarkantha District Collecterate Office, Himatnagar

The total population of Mathnaa stood at 1,150[101] in during 2008-09, when the study was conducted, and the total number of households was 200. Mathnaa's total area is 503 hectares. Table VI gives an overview of the statistical picture of Mathnaa.

Table VI: Distribution of Land Use of Mathnaa (in Hectare)

Distribution of Land Area of Mathnaa in Hectare	
Total Area of the Mathnaa	503
Total Cultivable Area	449
Total Irrigated Area	220
Total Non-Irrigated Area	229
Wasteland	46

Source: Village Talati (village revenue officer)

The chief source of livelihood in Mathnaa is agriculture, which is mainly rainfed. Two main crops are sown throughout the year – *kharif* and *rabi*; due to erratic rainfall patterns and the scarcity of water, it is not possible to plant major crops during the

[100] Data collected from the Sabarkantha District Collecterate Office, Himatnagar.

[101] Data collected from the study census conducted in the village, in order to recognize households' heads and categories of people based on caste and wealth.

summer months, except fodder or seasonal vegetables mainly for subsistence needs. Cultivators keep bullocks for their plough and buffaloes, cows and goats for milk. Small and marginal farmers go to town, which is about 15 km away, to work as daily labourers or casual labour on construction sites, and return to the village in the evening. No official records indicate any form of seasonal migration in Mathnaa by any caste group. Table VII below illustrates the village's crop calendar.

Table VII: Seasonal Crop Calendar of Mathnaa

Crop Calendar of Mathnaa		
Kharif Crops	**Rabi Crops**	**Seasonal Vegetables**
Maize	Wheat	Brinjal (*ringna*)
Millet (*bajra*)	Mustard	Gourd (*dudhi*)
Pulses (*mug, tur, urad*)	Gram	Ginger (*adu*)
Castor	Potatoes (*batata*)	spinach (*palak*)
Cotton (*kapas*)	Turmeric (*haldar*)	Tomatoes (*tameta*)
		Coriander Leaves (*dhania*)
		garlic (*lesan*)
		Fenugreek leaves (*methi*)
		Cabbage (*kobi*)
		Lemon (*limbo*)
		Lady Finger (*bhinda*)
		Onion (*dungari*)
		Chilli (*mircha*)
		Pods (*guwar fali*)
		Pumpkin (*kaddu*)

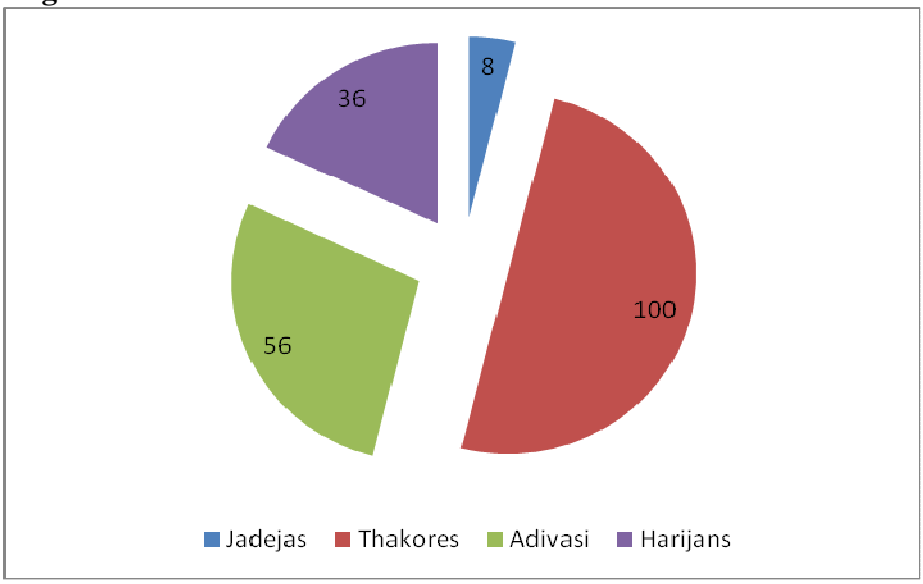
Source: Field Notes

Mathnaa, to a large extent, depicts most of the characteristics of Sabarkantha, the main district, in the form of its economy, cropping pattern, rainfall pattern, topography, source of irrigation and population. In Mathnaa, the agriculture is both irrigated and non-irrigated, and wells are the main source of irrigation. Sabarkantha, as one of the districts of Gujarat, is numerically superior to Adivasis, and in Mathnaa a significant proportion of tribes along with a few other caste groups form its demography. The rainfall is erratic, uncertain and varies with frequent droughts, while the topographically is undulating. Hence, Mathnaa, is a close prototype of the main district.

5.3.1 The Social Fabric

Mathnaa is characterised by strong social differentiations along the lines of caste, tribe, gender and wealth. Mathnaa is a multi-caste village along with tribes, which also constitute a significant proportion of the population. Caste determines living space and is the basis for social interaction in terms of water. Figure XIII, below, gives caste numbers for household representations according to the census study conducted.

Figure XIII: Caste-wise Distribution of Households in Mathnaa



- Eight *Jadeja (Rajputs)* households: They consider themselves superior to all other castes, as they trace their origin back to *Sambha*, son of *Lord Krishna*, and believe to have ruled Sabarkantha and driven away tribes to the forest (Mukherjee, 2003). *Rajput* clans include the *Jadeja, Solanki, Parmar Chauhan*, etc., but it is claimed that in the local *Rajput* caste hierarchy, *Jadeja Rajputs* occupies the highest position. They come under the category of *Kshatriyas* under the '*varna* system'.[102] In Mathnaa, these eight *Jadeja* households own around 113

[102] The social hierarchy of the caste system in Hindu society is said to have originated from the four-fold class system (Das, 1982; Fuller, 2003; Murray, 1994) and the word caste is sometime used to translate *varna*; a term denoting the four 'classes' of the Hindu society with the *Brahmins*, the priestly class; *Kshatriyas*, the warrior class; *Vaishya*, the trader or business class; *Sudras,* the service class which served the other three classes and whereas the untouchables (also known as Harijans, Dalits or the Scheduled Caste, their official designation) are the bottom and are outside the four-class system and object of extreme stigmatization. The *Rig-Veda* hymn '*the Purusha Sukta'* describes how from the *Purusha*, or the primeval man body the four *varnas* originated, i.e from his mouth came the *Brahmins,* his arms the *Kshatriyas*, his thighs the *Vaishya* and from his feet the *Sudras* (Fuller, 2003). The first three *varnas* are called twice-born because their male members undergo an initiatory rebirth; the

hectares of land legally, apart from encroachments on village *Gauchar* land (pasture land), for their own cultivation. *Jadejas'* social standing is also visible through their big houses of concrete, ownership of tractors and motorcycles and the use of big brass utensils (because brass is a symbol of social status) in comparison to many others in the village who use earthen pots for storing water.

- One hundred *Thakore* households: They are *BakshiPanch* and claim their descendants come from the *Rajputs*. They also claim to be *Kshatriyas* and are traditionally associated with agriculture. In Mathnaa, around 137 hectares of land is owned by these 100 households.
- Fifty-six *Dungri Garasia* households: They are the Adivasi[103] (first people), meaning indigenous people. Dungri Garasia, literally meaning, is *jagirdars* or *inamdars* of the hilly areas (Gazetteer of India, 1974). *Dungri* means hills and *Garasia* mean grass. People who have cleared the forests and prepared it for cultivation are the *Dungri Garasia*. They migrated from the Mewar region of Rajasthan three centuries ago. They live on their fields/farms with agriculture and land their main sources of livelihood. In total 122 hectares of land is owned by these 56 households. The *Dungri Garasia* tribe is patrilineal in character.
- Thirty-six *Harijan*[104] households: They are at the bottom of the caste system. Formerly known as untouchables, even though untouchability has formally been abolished in India, they are still discriminated against in the village. There is also intra-hierarchy among the *Harijans*,

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Sudras remains 'once-born'. Thus for understanding the caste (*jati*), the *varna* system is important mainly because it serves as an ideal religious model for the former.

[103] Adivasi literally means 'original/earliest settler'. This term is used to designate the indigenous people of India who are officially known as 'Scheduled Tribes'(ST) and who make around 8 percent of the Indian population. Scheduled Tribes are list of marginalized indigenous (tribal) people, comprising of different ethnic sub-groups. In the dissertation I would be using the word Adivasi instead of their tribe name, as the term Adivasi is widely used in the village to address them.

[104] Harijans means 'Children of God' and this term was given by Mahatma Gandhi to the untouchable's caste, placed in the lowest level in the traditional caste hierarchy. The group rejects this terminology and prefers to call themselves '*Dalits'* meaning 'the oppressed'. Their official designation is Scheduled Caste (SC). But in the dissertation I will be using the word Harijan, instead of the more politically correct designation *Dalit* (oppressed). This is because as they are address in the village by the term Harijans (alongside more derogatory term such as *chamar*).

and in *Mathnaa* they are from the group of *chamars*. Their original occupations were skinning the hides of dead animals. In *Mathnaa* they practice agriculture.

Caste not only determines the living space in Mathnaa but also landholdings and access to water. The following sections discuss the wealth, landholdings and water ownership-cum-access on caste lines.

5.4 Land and Wealth in Mathnaa

In Mathnaa no one is landless; people of every caste in some form or the other own some land, although access is based on inheritance, caste and claims grounded in local history. According to the village elders, the Jadejas and the Thakore community owned large chunks of land. Reforms introduced in 1960 and The Gujarat Agricultural Lands Ceiling Act, enforced in 1961, provided ceilings for existing landholding and for the future acquisition of land. As a result, it afforded some relief to marginalised communities like the Harijans and the Adivasis in the form of land redistribution. Realistically though, the two major groups of Jadejas and Thakores own more than 250 hectares of land in Mathnaa. Moreover, 69 per cent of the large farmers come from the Jadejas and Thakores factions. No one in the village owns a tractor for ploughing the fields apart from the Jadeja family; the rest of the cultivators in the village use traditional oxen and bullocks. Table VIII gives a detailed description of landholding in Mathnaa according to farmer categories and caste identity, respectively.[105]

Table VIII: Caste-wise Mathnaa Landholding under the Different Categories of Farmers (in hectares)

Caste	Larger Farmers[106]	Small Farmers[107]	Marginal Farmers[108]	Total Land
Jadejas	101.2427	7.3521	4.2715	112.8706
Thakore	95.0166	28.1101	14.0918	137.2185
Adivasi (ST)	64.0044	45.5983	12.7503	122.353
Harijan (SC)	32.1133	10.5983	5.4279	48.1395
Total	292.3770	91.9465	36.5415	420.865

Source: Data calculated from the land records available from the Tehsildar office

[105] Please note there exist a discrepancy in landholding records given to me by *Talati* (village revenue officer) and the records available at the local revenue office of *Tehsildar* at the *Taluka* level.

[106] Larger farmers are those whose landholdings is 2 hectares and above.

[107] Small farmers are those whose landholding is between 1 to 2 hectares.

[108] Marginal farmers are those who own land less than 1 hectare.

During pre-independence times, Sabarkantha was politically and administratively divided into two broad categories: a) the Princely States and Estates and b) the British areas of old Prantij talukas and Modasa Mahal. The State of Idar was the largest of all the princely states and estates, and the system of revenue collection was not uniform. Due to geographical difficulties caused by the distance of the villages to be administered by the Idar State, the *Ankada* system was implemented in the 40 settlements. In this system, local elders were allotted certain villages on lease, which were in hilly and far flung areas of the Bhiloda and Meghraj *talukas* (*Gazetteer of Indi*a, 1974). The Ankadedars were in charge of leasing out lands for agriculture in the villages and for collecting fixed sums called '*Ankada*' and passing these on to the Idar Darbar.[109]

Villages participating in the *Ankada* system were in hilly and largely inaccessible areas and usually populated by the tribals. Leading Adivasis (tribal) were made Ankadedars of the villages, and it was their responsibility to populate the hilly regions, serve the border land of the state and collect revenues for the state. Mathnaa is a good example of how the land in the villages was controlled by the Ankadia during pre-independence, but after independence this system was discontinued.

Encroachment is a common phenomenon in Mathnaa, whether it is the main *Gauchar* land, i.e. land for the grazing cattle or a small piece of land between private fields, or the village pond. The village pond (*Talab*) is often dry in summer. Villagers farming adjacent to the pond convert pond land into a private farm during dry periods. Manikbhai, an Adivasi, has occupied the pond for his own cultivation and the logic he states for encroaching on the pond is illustrated below:

> "The village pond is good for nothing, it's dried for most part of the year and everyone has encroached common land in the village. If I have also done, what's the big deal about it?! At least I am making use of this pond for good; it's only in monsoon season that there is some water in the pond, it's not very deep, and I do

[109] Idar Darbar is the term used to refer the court of the 'Princely State of Idar'

> cultivation in the upper side of the pond which is adjacent to my field, so it's all right" (Personal Interview, 3-9-2008).

In Mathnaa, small patches of wasteland sit in-between private fields. In order to derive benefit from these common lands, farmers with land adjacent to common land use it for growing fodder or grass for cattle. This was explained by Kantibhai, who shares a small piece of common land (plot) situated between his field and his cousin's field.

> "Instead of fighting over who uses this small piece of common land and reporting the matter to the panchayat, we use the plot for our own personal use. Turn by turn in each season, though the plot is not big, fodder can be grown, so we use the land for fodder cultivation and share the produce. It's good this way. We both benefit from this process of sharing the common land between our respective fields. Many people in the village have done this kind of negotiation, as both parties benefit from the small piece of common land, so it's a good deal" (Personal Interview, 1-9-2008).

Certain people in Mathnaa have been able to use their social, political and economic status to influence and make tacit agreements with the *talati* (village revenue officer), thus enabling them to encroach on common land. The main common land (*Gauchar* land) allocated for cattle grazing in Mathnaa has been encroached on by the Jadeja families, and there is no common land left for other villagers to graze their cattle. Maniyabhai justifies the reason for not complaining to the government authority:

> "There is no use reporting the matter to the higher authority, as a few years back someone reported the matter and the Jadejas came out with knifes and swords in public. Police will come for their routine call and will not remain here permanently. We have to live here, what is the use of having enmity with the powerful families? They have police connections and relations in taluka panchayat. Furthermore, during the scarcity of water, they might provide water for free drinking purposes if one is in their good books, so why have enmity with them?" (Personal Interview, 10-9-2008).

Hence, in Mathnaa, people carry out negotiations and harmonise with their co-villagers to access and manage water.

5.5 Ownership of Water

Mathnaa has only one village pond, which is often dried up in the summer. The village used to have one *sarkari* (government) open dug well with a depth of 60-75 feet, but it has been dry for almost a decade now. The main source of irrigation in Mathnaa was open dug wells, which ran on diesel and electric motor. There were around 50 open dug wells with a depth of 60-75 feet before 1999, but all of them are now dried up.[110] The agent of change in Mathnaa was the Jadejas. It was in late 1980s that the Jadeja farmers sourced a diesel engine and installed it next to the well, and were able to irrigate, whereas others were dependent only on rain. With the introduction of motor technology, others also made an effort to have electric/diesel engine motors in the open dug well. In the words of Jethusingh Jadeja, whose father was the first person in Mathnaa to use a motor for an open dug well:

> "My father introduced the engines to everyone in Mathnaa in the late 1980s. Many in Mathnaa had open dug wells but were not using any motor on it, due to a lack of information about such motors and also because diesel was expensive. The majority of people in Mathnaa practiced only rainfed agriculture. Later with rural electrification, which was at a subsidised rate, people got motors, electricity was cheap and people could afford it, although the electricity supply was not regular" (Personal Interview, 7-1-2009).

Many farmers embraced inexpensive pump technology in the late 1980s. Water was found easily and not at great depths below ground. In Mathnaa, again, it was one of the members of the Jadeja family who introduced borewell[111] technology to the village in 2000. In the words of Daljeetsingh Jadeja and Gambhirsingh Jadeja:

> "It was me who introduced this borewell technology in Mathnaa. It is an expensive technology but it bears fruit as it goes deep, up to

[110] Information collected from the household survey.

[111] Borewell is a well consisting of pipe placed in hole bored into the ground to tap groundwater supplies from one or more aquifers.

200-250 feet, to fetch water for longer periods, even in the summer. I had gone to Himatnagar to buy spare parts for my dug well electric motor, and then the agent of the local borewell company told me about this amazing borewell technology and how it was far better than the normal motor used in the dug well. I immediately decided to have this on my field" (Personal Interview, 8-1-2009, Daljeetsingh Jadeja).

"My family brought this technology to Mathnaa, similarly, as my uncle Jethusingh had introduced the electric/motor, for the open dug well in the late '80s. Once we got the borewells installed, others also slowly started getting the borewells on their fields. When they saw the borewell water pumping capacity, many others were inspired to have one of their own" (Personal Interview, 8-1-2009, Gambhirsingh Jadeja).

Borewells started to increase in Mathnaa after 2000.[112] As a consequence, dug wells in the village started drying up. By 2009, there were about 24 borewells as deep as 200-250 feet in Mathnaa.[113] Caste-wise distribution of the borewells is given below in Table IX.

Table IX: Caste-wise Ownership of Borewells

Caste	Number of Borewells
Jadeja	4
Thakore	11
Harijan (SC)	2
Adivasi (ST)	7
Total	24

Source: From Field Survey

In Mathnaa, borewells are collectively owned by a group of relatives. These people cannot be classified as 'tubewell companies,' which exist in the Mehsana and Banaskantha districts of northern Gujarat and consist of rich farmers.[114]

[112] In the year 2000 there were 4 borewells and which increased to 24 by the year 2005. But from the period of 2006 to 2008 there have been no new installation of borewells. Hence there has been 6 fold increases in the installation of borewells in Mathnaa.

[113] Data collected from the field survey.

[114] From personal communication with Prof. Amita Shah (Economist GIDR, Gujarat) 26th November, 2008.

When I conducted my field research, all the dug wells of Mathnaa had dried and were no longer in use. The reasons given by the villagers who earlier owned dug wells are as follows:

> "Dug wells are not deep. When our neighbour got a borewell installed on their fields, the water from our open dug well dried up completely, as the borewell went very deep – as much as 200-250 feet. Subsequently, the rainfall has also failed in the last few years and from the proud owner of a dug well I became a water buyer" (Personal Interview, Beerabhai, a Thakore, 3-1-2009).

> "I did not want to have a borewell, but due to my economic conditions there was no other option because my well went dry due to the borewell in the nearby field. I was forced to think about having a borewell" (Personal Interview, Kirtibhai, a Harijan, 6-1-2009).

> "The rate at which water was sold has changed. Now the majority of the people's wells have dried up. Few people in Mathnaa have borewells and water buying is turning out to be expensive due to the new electricity scheme. Moreover, the rains have not been very good for the past few years, so the viable option is to own a borewell collectively" (Personal Interview, Shanthaben, a Adivasi, 29-12-2008).

> "With the water level going down, due to borewells on nearby farms, my well is becoming dry with each passing year. Deepening of the well costs more and is not very fruitful. Therefore, making borewell is considered wise. Although it involves huge expenditure, it is deeper and does not go dry in the summer" (Personal Interview, Praveenbhai, Thakore, 7-1-2009).

Well ownership goes hand in hand with land ownership, so no one can stop the construction of private wells or borewells. Regulations set minimum distances

between borewells, but unfortunately these are not followed.[115] A survey carried out with 25 borewell-owning farmers[116] (and participants in the groundwater market as water sellers) gave a striking result, in that 56 per cent had got borewells because of poor rainfall, and these were mostly from upper castes. On the contrary, lower castes (Harijans) and Adivasi felt that borewell installation was not solely down to less rainfall alone; a combination of less rainfall and drying up of their open dug wells due to the coming of the borewells in adjacent fields forced them to have a borewell.

In terms of drinking water, Mathnaa has a total of twenty-two government hand pumps,[117] which are under village panchayat[118] supervision, located in each caste quarter in the village. Out of these, only ten are in good working order and in the summer very little water availability makes life tougher for the villagers.[119] In Mathnaa, water tankers are brought into the village during weddings and death ceremonies.

There is clear inequality around landholdings (see table VIII) and those having access to irrigation facilities and wells (see table IX). Irrigation is a resource of 'unusual social power', as stated by Hunt and Hunt (1976), and contributes to better harvests and poverty reduction, but it can also increase social inequality (Epstein, 1973). This can be observed in the context of irrigation facilities and the ownership patterns of borewells, which ostensibly strengthen if not promote social inequality. Those having access to irrigation through ownership of a borewell are assured of water and therefore in a better position to enjoy an assured harvest. People who have access to water – those who own the borewells – are indeed the wealthiest and most powerful actors in Mathnaa. This group comprises people from several castes, mainly Jadejas, Thakores and a cross-section of other groups.

[115] Although Gujarat was the first Indian state to pass groundwater legislation in the year 1976 to deal with the regulation and licensing of tubewell construction and to control the use of groundwater but its implementation prove to be very difficult as the regulation was usually by-passed.

[116] The 25 farmers on whom sample survey was carried out consist of the following caste background: 5 Harijans, 5 Adivasis, 8 Thakores and 7 Jadejas.

[117] Data collected through field survey.

[118] Panchayat is the village elected council.

[119] Data collected through field survey.

5.6 Gender Dimensions

Other than caste, gender is a key aspect of difference and hierarchy. The commonality running across all the women in every caste and tribe in Mathnaa is their subordinate position to men in all affairs, whether religious or economic. This is apparent from the following statement of a Thakore woman:

> "Having no son means no salvation from the cycle of birth and death, because a son is needed to light the funeral pyre. Her in-laws and her husband consider a woman bearing a girl child good for nothing. A son is the lamp of the family as he can carry forward the name and honour of the family" (Field Notes, August, 2008).

This is the general view of all women in the village. They cannot perform any religious sacrifices or ceremonies, and they do not own any land either. All women in Mathnaa share a common gender-based restriction of veiling (*ghunghat*) in front of strangers such as outside men and elders, but married women have coped up with the veiling tradition by deciding the length of the veil depending on their relationship and interaction with the male space, even, in the agricultural fields. Jadeja women do not work in the fields, whereas women from the Thakore, Harijan and Adivasi communities do carry out this sort of manual labour. Although, they work in the field, they have no decision-making power or bargaining capacity when it comes to the pricing of water for selling in Mathnaa's informal groundwater market. This is apparent from the statement of an Adivasi woman:

> "Water is a male-centric arena, as the price of water for irrigation in each season is decided by men. Water is an important commodity and only men have the decision-making power, as they have more knowledge about how things work in the market. Men are more knowledgeable about money matters relating to water. We stay at home. We do not know how things work in the outside world. Our intelligence is doubted and is not considered wise enough to make a decision about a commodity like water, which is so scarce in the village and has a tremendous economic value attached to it. Moreover, having a borewell is a status symbol" (Field Notes, August, 2008).

Harijan (lower caste) and Adivasi women interact in public, unlike upper caste women. It is the lower caste women and Adivasi women who go door-to-door to sell seasonal fruits, like custard apples, or berries and seasonal vegetables to the nearby town. Even the institution of marriage in Mathnaa is not free from the influence of water scarcity, and casts its shadow on women in their groom selection. 'Village exogamy'[120] and 'caste and tribe endogamy'[121] for marriage are practiced in Mathnaa. Dowry systems exist in all the caste groups in the village, except among the Adivasis. It is the custom of the village that after marriage the bride and her groom, irrespective of their caste affiliations, have to pay obeisance to the village deity, Kanku Mata, and seek blessings before the marriage is solemnised. According to Malibhai, the priest of village deity's temple:

> "The new bride should seek the blessing of the Kanku Mata, in order to pray that Mata removes any water shortage in the bridegroom's home and saves the woman from the agony of bringing the water long distances during drought years. Mata is a female deity and she blesses the women by removing the water scarcity. This is our belief" (Personal Interview, 17-10-2008).

The main responsibility for managing household water rests with the women. There is preference and a prevalent norm among mothers to give their daughters to those men who own borewells or wells, in order to spare their offspring the agony of walking miles to fetch water. Women of all the groups in Mathnaa shared this view. Sakaben, a Thakore by caste, states:

> "If a girl is really lucky and is born with good destiny she gets to marry a man who owns a borewell. But everyone is not so lucky. A man who owns a borewell demands more dowry" (Personal Interview, 7-9-2008).

Although this view was shared by women from all the groups in Mathnaa, it is mostly the lower caste (Harijans) and Adivasis who face the brunt of water scarcity because of the low social and economic standing of their families. For them, possessing a

[120] Village exogamy means preferred or prescribed practice of marriage outside the village boundaries.

[121] The preferred or prescribed practice of marrying within the defined kin-group, be it caste, linage or ethnic group.

borewell is a huge status symbol and luxury. In India, arranged marriages take place mostly between families of the same caste and social status, and in rural areas this is no different.

Gender differences are used to emphasise social and caste differences in the village and are linked with water arrangements in the village. In any water-related management practice, for example, becoming a member of watershed committees at village level, Harijan and Adivasi women tend to participate for the sake of it, although women from upper castes are highly unlikely to participate in public events dominated by males. According to Meenaben, a Thakore:

> "It's a matter of shame and dishonour for women from good families to participate and sit with strange men in these committees. It is disgraceful for her family and for her husband. If he allows his wife to sit with other strange men in the meetings of watershed committees or any public events like these, then it seriously affects the caste honour and family's prestige. Harijan and Adivasi women participate in these 'all-men' gatherings, as they are of lower caste and status and they do not have any legacy of family izzat [honour] which they need to maintain or protect" (Personal Interview, 5-10-2008).

Married Jadeja and Thakore women do not go out to fetch water from the common hand pumps; it's the small children who do it for them, when needed. Women from the other groups are seen actively participating in getting water from the common hand pumps or grazing their animals in the common land. Small girls and boys have to work in the fields after school, especially girls from the Harijan, Thakore and Adivasi groups. In Sabarkantha, the literacy rate for females is quite low compared with that of males. In 2001, 52.3 per cent of females were literate as opposed to 80.4 per cent of males (Director of Census Operation, 2001). Thus, in social relations and social positions, the caste system prevails, which is further articulated by gender in terms of hierarchies and boundaries (Dube, 1996).

In Mathnaa, 12 self-help groups (SHGs) were formed in 2000, but now only three are left functioning, namely Jai Laxmi, Jai Shreeji and Jai Dashama, after the watershed project got finished in 2007. Membership of SHGs is caste-based to ensure smooth

running through kinship ties. All the original SHGs were named after gods and goddesses in order to seek the blessing of God on the group and their money. Mostly, saving and lending activities were carried out within the SHGs, and its members made up their own rules, which included a Rs 2 per month levy as interest on borrowing Rs.100, and an increased rate of Rs.5 per month if the loan was not repaid on time. Despite their apparent benefits, many of the groups dissolved due to internal conflicts such as low attendance, poor repayment of loans, etc. The reasons illustrated by the women who dropped out of the SHGs are as follows:

> "Meeting coordination took a lot of our time and we have to manage cooking, washing, working in the fields along with fetching water, which is all very time-consuming" (Kaniben, Personal Interview, 12-2-2009).
>
> "It was difficult to have a fixed, coordinated time for the meetings for every member. Many of us have to do agricultural work as well as other household chores" (Kokilaben Personal Interview, 28-11-2008).
>
> "Sometimes, favouritism was apparent in giving loans to a close relative, leading to conflict of interests between two people who required loans simultaneously" (Kantaben, Personal Interview, 3-11-2008).

Women's social identities are multiple and overlapping, as they can be treated as a single social group in certain contexts. Cutting across differences like caste status shapes their position and options in critical ways. In addition, they do not formally own any land or enjoy water rights. For example, the watershed project, which was implemented in Mathnaa in 1999, had nine user groups, which were constituted around the nine water harvesting structures (check dams) and consisted only of male members. Even in the village panchayat or watershed committees of Mathnaa, women were just present to fulfill the criteria of various government guidelines. The real decision-making power and authority rests with the male members.

Over and over again, gender is used as a symbol to make the social distance between social groups more visible and apparent (Mehta, 2005; Unnithan, 1994). Furthermore, class, caste, religion, wealth and other symbolic and structural systems have it's a

strong binding force on gender (Harding, 1996; Mehta, 2005; Mohanty, 1991). Thus, hierarchy is prevalent among women. For example, a Harijan woman is considered inferior to all the women – even to an Adivasi woman. Thus, in Mathnaa, gender is sharply shaped and governed by caste relations, which in turn have a strong influence on water arrangements and management. Its impact can be seen in all the aspects of life, including local politics, which is discussed in the next section.

5.7 The Political Struggle

Mathnaa politics is centered on caste and tribal affiliations. It shares a common village panchayat with two other villages. Various caste panchayats in traditional form still exist in Mathnaa and are known as 'jati samaj' for each caste (which consists of senior male members of that particular caste) and 'Adivasi samaj', i.e. the local village-level tribal council (consisting of senior male members of the tribe). Members are not elected but are chosen unanimously from older people who tend to command traditional authority.[122] In Weberian sense, this also holds true for the tribe, as it is inter-village and intra-village rivalry which plays a key role in panchayat elections. In 2008, when I conducted my field research, a panchayat election was held in Mathnaa, in September 2008, and the outgoing sarpanch (village headman and leader of the elected panchayat), Kachadabhai, an Adivasi, won the election for the second consecutive term. Although an Adivasi (tribal), he enjoys support from other community members like the Jadejas and the Thakores. He is nouveau-riche among the Adivasis, as two of his sons have jobs in the Indian Army and he owns a substantial amount of land. Kachadabhai is also known to give tremendous respect to the legacy of the Jadejas and Thakores communities. The Sarpanch seat in 2008 was a reserved seat (due to the Indian government's affirmative action policy) for scheduled tribes.[123] The whole village was united in voting for him, despite internal differences, so that development work, especially related to water could take place. Hence, in this case, voting transcended caste and class divides to promote a collective 'public good'.

[122] Traditional authority is based on a claim by the leaders and a belief by the followers in the virtue in the sanctity of age-old rules, customs and power (Ritzer, 2004).

[123] Due to oppressed caste system, SCs and STs they were historically oppressed, denied respect and equal opportunity in Indian society and were thus under-represented in the nation building activities. Hence in order to bring them at par with the rest of the society and to mend the injustice done to them for centuries, constitution of India has given reservation to them in the field of education, government jobs and in contesting elections.

Furthermore, in pursuing the case for a water storage structure, which was constructed in the year 2006 in the Harijan "*was*", which was not functional due to lack of some paper work relating to the installation of an electric motor. Finally, became a rallying point for bringing unity. It was a general belief in the village that if a sarpanch got elected from the other village, Mathnaa's development would be neglected, so the villagers put aside their personal rivalry and mobilised the whole village to vote for Kachadabhai. Bemabhai (who was an ex-watershed secretary of Mathnaa) was also encouraged to stand, but he refused.

Bemabhai declined the offer, stating:

> "Let Kachadabhai stand and we will make him win the election. I am the most educated man among the Adivasis in Mathnaa, and I know I will be the real sarpanch, even if I do not run for elections. Kachadabhai is just IV class pass, he cannot work without my help, he is elder to me and I respect him. It does not matter, if he becomes the Sarpanch or me. We are from the same clan. I prefer to work from behind the doors rather being at the forefront" (Personal Interview, 19-9-2008).

Mathnaa's social fabric is shaped by caste, tribe, gender and wealth. The community is heterogeneous and village life is sharply governed by local politics. The local traditional caste hierarchies are still very much prevalent and determine the individual's position in the village social structure.

5.8 Socio-cultural Matrix of Water

Water is used as a metaphor to assert the social differences and distance between various groups in the village. Water symbolises the difference between communities, and the social distance to be maintained by dictating whether the other's water can be drunk or not. There are clear-cut rules; for example, the higher caste abstains from drinking water supplied by the lower caste. Thus the Jadejas, Thakores do not drink Harijan and Adivasi water. Ironically, an Adivasi, who is also marginalised in the village and under the scheduled tribe category, refrains from drinking Harijan water, even though Jadejas and Thakores consider Adivasis at the same level of impurity as the Harijans. This was apparent from the statement of an Adivasi woman, Sakantaben:

> "We are at a higher level in the hierarchy than Harijans; if we drink their water we will get paap (sin). Harijans have come from the feet of the Purusha, the primeval man" (Personal Interview, 2-10-2008).

Furthermore, water, unlike earth, is available to every caste and determines the scale of untouchability (Guru, 2009). Even during times of water scarcity, which is most acute in summer months, people of the higher groups are still not willing to fetch water from the government-sponsored hand pumps located in Harijan "*was*" or Adivasi "*was*". This amply demonstrates the concepts of pollution and purity in village life. It is widely believed in the village that Harijans are impure because they eat carrion and that they also come from the feet of the Purusha, the primeval man, mentioned in the *Rig Veda* hymn 'The Purusha Sukta'. Although no one in Mathnaa performs the traditional task of carrying away animal carcasses, many of the Harijans feel that they are merely waiting for the day to come when the upper caste, which discriminates against Harijans in spite of government prohibition of such discriminatory practices, will be forced to undertake menial work. Maltiben, an old Harijan woman, states:

> "I am too old to live to see the change when these upper castes will do menial jobs, but one day will come when there will be Harijan rule in the village, in a true sense. During the scarcity of water in the summer, as the water level goes down in many of the hand pumps located in Harijan "was", we are not allowed to take water from the hand pumps which are located in the "was" of the upper caste. They believe their water will become impure. For us, everyone is equal, and we take everyone's water. But we are discriminated against by the upper caste as well as by the Adivasi " (Personal Interview, 22-11-2008).

Hence, the upper caste take their cue from the manu code[124] and use water for creating a perpetual division, thus rendering some bodies ritually 'pure' and others as everlastingly 'impure' (Guru, 2009). Purity is amplified by connecting the link between water and actors assigned with pure status, and by reducing involvement with things and actors of impure status. Nevertheless, the condition of purity is

[124] Manusmriti (The Laws of Manu) is the foundation of Hindu religious law and social conduct written by Manu, and is popularly known as Manu code.

maintained either by distancing oneself from objects symptomatic of impurity or purifying oneself in the form of things recognised to have a capacity to absorb and remove impurity. Water is considered to have intrinsic purity and is the most common medium of purification (Babb, 1975).

Water, being a scarce and precious commodity, has led to the cultural practice of drinking by pouring it straight into the throat with specially designed vessels called “lotas” to prevent water from spilling. Water for domestic needs, such as washing clothes and utensils and for animals to drink, is stored in a concrete structure called a “kothi” (See photograph: I), which prevents waste and evaporation. The villagers make every possible effort to preserve and make use of water, as it does not come for free for many families.

Photograph I: Kothi

Moreover, because of its value, the majority of Mathnaa residents, irrespective of their caste, do not feel the need to have concrete flush latrines, instead preferring open

defecation, as less water is used. Some also see the advantage of using human excreta as manure. Bathing is also a luxury in general, and especially during summer. With no separate bathing place for women, they usually bathe with their clothes on. In Mathnaa, the Jadejas, sarpanch and the ex-watershed committee secretary have latrines, making a total of four latrines in the whole village.

The only school in Mathnaa also has no separate toilet facilities for boys and girls. To make matters worse, there is no drinking water facility for the students, so they have to get drinking water from home. The toilet structure of the primary school stands without any door or roof and is in a dilapidated condition. The boys urinate in fields adjacent to the school, whereas the girls control their urine until they return home after school. The reason given by girl students for controlling their urine is explained below.

> "Our parents tell us not to urinate in the school's fields, as there are boys also, so we should control ourselves and drink less water to avoid toilet. A mundane activity, only to be done at home, can't be done otherwise during the school hours" (Field Notes, Female Students, October, 2008).

Photograph II: Primary School of Mathnaa without Proper Toilet for Students

Arrow indicate the toilet for boys and girls in the school having no roof, door and water

Due to water scarcity, the villagers prefer to use ash for washing their utensils. The reason for not using soap or washing detergent is that it requires more water to rinse the utensils properly. Conversely, ash uses less water and is easy to clean off, thus saving a lot of water. Apart from water being a precious commodity, and due to its scarcity, it has been given immense religious importance. This deification stretches to any structure related to water including the digging of an open well or a borewell. The "*tantrik baba*", an Adivasi, conducts elaborate rituals to accompanying any water-related construction process. Ancestors are worshipped as well as the village deity, Kanku Mata. Moreover, the religious ceremony includes the feeding of seven "*kumari kanyas*" (virgin girls). The reason for feeding food to the virgin girls is as follows:

> "A virgin symbolises pavitra [pure] and untouched, thus the water which will come from the borewell should be pure and flowing forever. Just like the virgin sanctity, the borewell will maintain its sanctity by flowing for years with water being uninterrupted" (Personal Interview, Jethabhai, 18-12-2008).

When the nine check dams[125] were constructed as part of the watershed project implemented in Mathnaa in 1998, each of the nine check dam user group members insisted on the implementing NGO official performing a *puja*[126] to combat water scarcity. When there is less rainfall in Mathnaa, the village deity Kanku Mata is prayed to and offered earthen pots as a symbol that they should not become dry.

[125] Check dams are low cemented or earthen barriers made to capture monsoon run-off in empty streambeds, creating a series of small reservoirs which percolates to nearby wells and recharge the groundwater aquifers (Wood, 2007).

[126] Puja is a form of Hindu worship in which chosen deities are honored.

Photograph III: Temple of *Kanku Mata*, Village Local Deity

There is a belief in the village that whenever there is no rain in Mathnaa, the idol of Lord Hannuman should be bathed in milk in order to invoke the rain god. It is believed that whenever this ritual has been carried out, it has rained:

> According to the villagers, the moment they bathed the idol of Lord Hannuman and had left the temple for their way back home it had rained, so this legend has continued in the oral tradition of Mathnaa for years (Field Notes, October 2008).

In both the ceremonies, a caste-based difference is visible. The Jadejas and the Thakores, to assert their authority and status in Mathnaa, supply the milk, and the main ceremony performed for the village deity is presided over by the Thakore Priest. Hence, supplying milk is considered a way of generating an important form of cultural capital (cf. Bourdieu, 1977). The gains arising out of providing milk for the ceremony every year are not only material but also symbolic in the form of punya (rewards) in the afterlife and attaining *moksha* (salavation) from the 'rites of passage' (the cycle of life and death) and blessings from God.

Water is a matter of survival which has been given a sacred touch by the people of Mathnaa, by keeping the drinking water pots next to idols of gods and goddesses. This act of ritual can be accorded an intrinsic and extrinsic relationship when seen through

the perspective of Durkheim's sacred and profane for *darshan* (act of viewing the deity) and material gains. Water which is an everyday, commonplace, utilitarian and mundane aspect of life in its profane sense acquires a sacred meaning when kept next to gods' and goddesses' idols and pictures in the household, thus bringing out the attitudes of reverence, respect, mystery, awe and honour in the pure Durkehiem sense (cf. Durkehiem, 1965). The reason explained by Shantiben, an Adivasi, is as follows:

> "Water is a scarce commodity in Mathnaa. We keep the drinking water next to God so that 'His' blessings are always in our house and we do not face the crisis of drinking water and 'He' blesses our home by removing the scarcity of water. Water is a precious commodity and keeping next to the god shows we place tremendous importance on it. God blesses our home and we have water throughout the year, and we should be able to have the honour of offering drinking water if someone asks for it" (Personal Interview, 9-9-2008).

Accordingly, water that is needed for survival has been given a religious touch by the villagers and is directly linked to social status when it comes to possession and ownership.

5.8.1 Government Water Supply

In Mathnaa, water is available through open dug wells, hand pumps, borewells and the village pond. The government has also made various efforts in providing drinking water and combating water scarcity by providing open dug wells, borewells, hand pumps, piped water supply and the watershed project. However, water supply systems provided by government departments are poorly maintained or are often a source of conflict in the village, due to various vested interests. This conflict is laden with the resonating claims of upper castes and their purported control. The village had one *sarkari* (government) open dug well, but the higher caste asserted their authority over its management and access and the distribution of water. As Raniben, a Harijan, states:

> "We were at the mercy of the upper caste groups to give us water from the well; it was believed if we fetched on our own we would pollute the well and the water for everyone" (Personal Interview, 11-10-2008).

Furthermore, she recounted an incident which happened few years back, when a young Adivasi boy was caught stealing water from this common well. He was beaten up, his head was shaved and he was ridiculed for stealing water by making him sit on a donkey. In addition to this, the concrete structure floor of the well was washed and 'puja' (prayer) was organised to do away with the impurity caused by the boy's touch.

In 2005, Mathnaa was blessed with the Schedule Caste Sub Plan (SCSP). Under this scheme, water supply facilities were to be provided in the form of hand pumps and piped water supply at stand posts in the schedule caste localities in the rural areas. For this purpose, a huge concrete water storage structure was constructed in the Harijan "*was*". There was dissent in the village on the location of the water structure, as some social groups felt that, as Thakores were in the majority, this water storage structure should have been built in the Thakore "*was*", and not in the Harijan "*was*". The group felt that favouritism happened in order to please the Harijans, as one of the family members of the Harijans was employed in the taluka panchayat office. The electric pumping motor was installed in the structure but it was stolen after a few days. As a consequence, due to an ongoing fight, the structure stands without any water supply to the present day. Kaniyaben, a Harijan, states:

> "These upper caste people do not want us to see having water taps in our homes and having a regular supply of water by tap. As having water taps will reduce our water scarcity and would increase our self esteem; which upper castes do not want, as they want us to be at their mercy always". (Personal Interview, 2-12-2008)

When the Harijans reported the matter of the stolen motor to the *taluka* panchayat office, government officials blamed them for mismanagement. The Block Development Officer, who himself was an Adivasi, advised the Harijans to maintain peace and not to get agitated in this matter. He said:

> "Funds have finished, you all know. Already, there has been so much dispute on this site for this *tanki* and you should have taken care of its safety. It's your mistake, how can you people be so careless? That electric motor in your '*was*' got stolen right under your nose. Now, no use of blaming the upper caste for this theft, this blame game will not do any good to you, so learn to make peace with the upper caste. And remember, without good relations with the upper caste, you will find it difficult to get water. So go back and do not trouble me with these kinds of issues again" (Field Notes, January 2009 based on reports of Harijans who were present at this meeting with the officer).

Harijans saw this water storage structure with a tap as a source of empowerment and self esteem. This water structure installed under the government scheme took caste colors right from the beginning of its installation, and even today the structure stands without water supply and electric equipments.

Although, there are state sponsored hand pumps in each "*was*" of Mathnaa and were installed in the year 1995. They are maintained by the village panchayat. Water problem is most severe during the months of March to June. In summers, most of the hand pumps go dry as they are not very deep and water level is very low during the summer season. Women have to walk to the nearby villages to fetch water for free. Different caste members do not fetch water from the handpumps installed in the other caste "*was*", due to the stigma, attached to purity and pollution of water in the caste context. This has led to informal water market for drinking water in Mathnaa. Drinking water is sold during the severe water crisis period of the year, especially in summers. Caste inequality has also not spared the handpumps either and the access to water in handpumps is clearly marked by the caste dynamics: involving the pollution and purity concept of caste hierarchies.

There are also three *sarkari* (government) borewells, one located in the Adivasi "*was*" near the sarpanch house, one in a Harijan "*was*" and the other in the Jadejas "*was*", each installed for public use. Instead, a few people monopolised and used them for personal needs by taking water through their pipes to irrigate their fields, even selling some to others for irrigation. This resulted in conflict and the matter was brought to

the attention of government officials at the taluka level; it was ignored and swept under the carpet. When asked, Sanjabhai illustrated the situation as follows:

> "No one dares to complain as these people have connections with the officials, so no use of feuding having an enmity with the powerful people. And if we are in the good books of these people, we might get water for free, so it's a trade off" (Personal Interview, 3-2-2009).

Moreover, in Mathnaa, a watershed development project was started in 1999 under the Integrated Wasteland Development Programme (IWDP) by a local NGO. It was done with the aim of reducing water scarcity by constructing nine check dams in order to improve groundwater levels. From the very beginning, the upper caste hijacked the project and their dominance was present in every form, from the selection of the watershed committee members to the formation and functioning of the user groups.[127] They were all pervasive. The working of the watershed project was influenced by caste politics, gender disparity on the lines of caste inequality and inequity in access to resources due to the inability to invest in technology for the extraction of groundwater. The user groups formed were male-centric in nature, but management was in the hands of women, who, in spite of doing all the work, had no decision-making power. Hence, the government-sponsored and NGO-run water-related programmes in Mathnaa are influenced by caste, class, ethnicity, gender, local politics and inequity. This occurs because of the uneven spread of technology. This issue will be discussed in detail in the following chapter.

5.9 Discussion and Conclusion

It can be summarised that Mathnaa's world is deeply rooted in the religious artefacts of water-related practices. Water occupies a central place in the life of the people of Mathnaa, as various water sources in the village have social, ecological and institutional principles governing their use. Furthermore, social relations and differences are centered on water arrangements. In addition to this, water issues in the village are in juxtaposition with caste, gender, wealth, politics and power. Social

[127] This issue is explained in detail in chapter 6: Social Organisation in Watershed Development Project of Mathnaa.

fabric, caste arrangements and caste hierarchies symbolise heterogeneity within the village.

The village community cannot be seen a 'whole unified community', as it has many layers around it in the form of caste, class, gender, ethnicity and wealth. Local traditional caste hierarchies are still very much prevalent and determine the individual's position in the village's social structure, water management, access and distribution. They are also being altered and challenged through gender, politics and wealth. The material fact of wealth can be seen when people become members of the watershed committee, or in other various water groups, by participating in the groundwater market. Caste as an identity, a form of social organisation and the basis for staking claims in resource build up and authority remains significant in rural India.

Gender hierarchies conditioned by caste lead to disparity in terms of water access and management in Mathnaa. Even at community level, the gendered relationship between men and women across castes and in tribes (Adivasi) tends to be subtle and biased. For example, Harijan and Adivasi women face more gender bias compared to upper caste women (Jadeja and Thakore) in terms of water management. Carrying out maintenance work on the check dams for their user groups, and for the upper caste as well, along with fetching water from the hand pumps, are examples of biases. However, lower caste women (Harijans) and Adivasi enjoy the freedom of participation at public occasions like watershed committee meetings, the village panchayat, election meetings, self-help groups etc., whereas women from the upper caste are not expected to take part in public occasions involving any form of interaction with men from other castes. Evidence shown in the discussion demonstrates that decisions pertaining to water-related management in the guise of the watershed committee, the price of water, maintenance of the check dams bear witnesses to the submission of women across all castes.

Access to and control over water influences participation and decision-making processes as well as the institutional structure that regulates access to the same. Lastly, water management in Mathnaa is dominated by caste in terms of access, distribution, ownership and participation in water-related arrangements. Whether it is the government- or NGO-operated water-related programmes like hand pumps, borewells, dug wells, watersheds or the piped water supply scheme, all follow the same claims of ownership. Inequality in landholding leads to inequity in access to

groundwater, as poor farmers are unable to invest in technology and as a consequence remain excluded from beneficial groundwater extraction. Hence, the resource is used largely by a few well-to-do households, which are often the upper caste. In the case of Mathnaa it is demonstrated that inequality in landholding and caste are directly related to each other. The higher the caste status, the higher will be the landholding. Finally, the government institutions add indirectly to the inequity by ignoring the social undercurrents of power relations linked to social and economic hierarchies. Therefore, caste plays a dominant role in influencing every other aspect such as gender, landholding, ownership of borewells, access to technology, the groundwater market, the watershed project, user groups, etc. In a better way, this also provides an oxymoronic entry point to contestations, cooperation and negotiations in water management, taking its cue from ascriptive and normative mores at work. The issue of caste provides a further set of contradictions waiting to be questioned within the domain of social organisation around check dams, borewells and diverse property rights. The coming chapter will deal with such issues.

Chapter 6 Social Organisation in Watershed Development Project of Mathnaa

6.1 Introduction

Often, the participation of local communities is seen as a means of achieving equitable goals, but the question arises as to what constitutes 'a community' and what factors facilitate their participation in watershed development. This chapter empirically depicts how the quality and form of community participation within the watershed community depends to a large extent on the characteristics of the local community itself. The chapter demonstrates that the village community is influenced by caste, class, gender, ethnicity and wealth and comprises actors with varied interests, who are involved in shaping the outcome of any development interventions, such as the watershed project in the case of Mathnaa. Moreover, the chapters explain how gender relations are characterised and socially constructed through gendered norms, meanings and practices in the context of participation in the water development project. The chapter further explains how formal participatory arenas created for participation fall short of achieving the desired result of equitable participation.

This chapter elaborates on how groundwater development has been an important recent phenomenon of irrigation through the introduction of the borewells, which have been as a rule achieved through individual or cooperative efforts of farmers in Mathnaa. Moreover the strategies farmers adopt in order to extract groundwater, using kinship and caste ties, offer an interesting subject for study. We further illustrate how the exchange of groundwater is embedded and governed by local institutions which are deeply embedded in the caste system, along with a series of other social factors. Finally, we shall explain the social, hydrological and policy factors which influence the development and management of the groundwater through borewells, electricity schemes (pre- and post- *Jyotirgram Yojana*) and check dams. Moreover, the chapter shows how the community intelligently combines various pre-existing property rights to gain access of water.

6.2 Setting the Scene for the Watershed Development Project in Mathnaa

When the watershed project was initiated in Mathnaa, drought-like conditions prevailed, with annual rainfall of less than 440mm in the whole Sabarkantha district. Mathnaa is a rainfed area and has no irrigation facility supplied by the government, although groundwater irrigation does take place in the larger realm of informal water markets. Mathnaa has uneven terrain and is surrounded by hills. The seasonal Watrak River flows in the *taluka* where Mathnaa is located, but the village is outside the river's irrigation command area.

The watershed development project was started under the Integrated Wastelands Development Programme (IWDP)[128] in 1999 by a local NGO, under the Common Guidelines of 1994.[129] A ridge-to-valley approach was adopted, as it is in the upstream, and soil conservation was considered necessary to retain water and soil moisture.[130] Before the intervention, 95 per cent of the rainwater used to run off.[131] The watershed project was seen as a viable option for reducing water scarcity, which was apparent from the statements of the one of the government officials at *taluka* level:

> "Mathnaa is totally dependent on rainfed agriculture, although groundwater irrigation does take place and there is the prevalence of an informal groundwater market. Not everyone can afford a borewell and canal irrigation is not possible in Mathnaa. Thus, watershed development was considered a viable option for Mathnaa in order to recharge its groundwater through constructing check dams and checking the rainwater runoff" (A.R. Kalasavabhai,[132] Deputy Tehsildar Officer, Meghraj, Personal Interview, 20-8-2008).

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[128] Predominant activity of Integrated Wastelands Development Programme (IWDP) is soil and moisture conservation on wastelands under government or community or private control.

[129] Common Guidelines are discussed in detail in chapter 2: Water Management across Space and Time in India.

[130] In personal communication with the Mr. B.K. Darzi, assistance irrigation engineer in *taluka* (block) panchayat on 20-09-08. (See the Watershed Map of Mathnaa in the annexure- III).

[131] In personal communication with the implementing NGO, team leader for Mathnaa Mr. Gor on 1-07-08.

[132] Please note that in Gujarati, the male members suffix the word '*bhai*' meaning brother with their first name and woman put '*ben*' meaning sister as a suffix in their first name, and this is officially acknowledge and is used in government records as well.

Groundwater is the only source of drinking water for the Mathnaa people, as no piped water supply has been issued by the government.[133] Secondly, it is also use for irrigation purposes, so the watershed project was considered the key solution to Mathnaa's water problem:

> "The authorities decided the best option for Mathnaa was to have a watershed project, keeping in mind its topographical features, soil condition, rainfall scenario and population structure. Rainwater conservation is necessary, as groundwater is used for all major purposes such as drinking and for irrigation, through open and borewells, although rainfed agriculture is practiced" (Ramehbhai Patel, Block Development Officer, Personal Interview, 18-8-2008).

> "Canal irrigation is not possible in Mathnaa and in its surrounding villages, due to its uneven and hilly terrain, and the seasonal Watrak River flows and Mathnaa is outside its command area, so the watershed scheme is a viable option for Mathnaa-kinds of villages, as their main source of irrigation is groundwater, although a large and substantial area is under cultivation through rainfed agriculture. Watershed techniques have served as quite good alternatives in many villages with terrains like Mathnaa, thus it was a wise decision by the government and the implementing NGO to have a watershed project in this village" (Deepakbhai Kaushik, Deputy Block Development Officer, Personal Interview, 18-8-2008).

The first time the NGO officially visited Mathnaa in 1998 to inform the villagers about the implementation of the watershed project, a rumour was spread regarding government steps to confiscate farmers' land for the project. The people who were against the project were the Jadejas and Thakores, who believed that if government development intervention took place in the village, outsiders would frequently visit Mathnaa, and as a result their encroachment on *Gauchar* land and their use of coercion and pressure would be highlighted in the eyes of local government authorities. This was apparent from the following statements of the villagers:

[133] Importance of groundwater in the life of Mathnaa people has been highlighted in the chapter 5: The World of Water in Mathnaa.

> "The first time the NGO officials visited Mathnaa in December 1998, we came out with knifes, swords and sticks, and threatened them with dire consequences, as we were told that they had come to monitor our meters used in groundwater extraction and would take our land for this project" (Field Notes, December 2008 based on reports of Harijans and Adivasis who participated in this act).

The initial reactions and resistance of villagers against the watershed project led the implementing NGO official to hold a meeting with local caste leaders, along with the village panchayat, explaining the whole concept and the project's aims, objectives and benefits.[134] Gradually, people started to cooperate with the NGO official, which led to the establishment of community-based organisations like a user group, watershed committee and so on, related to the functioning of the watershed project.

6.3 Politics of Participation in Mathnaa's Watershed Project

The formation of community-based organisations such as self-help groups, user groups and a watershed committee acted as a confidence building exercise with regard to certain norms, procedures and arrangements. The most important questions arising here are does real participation take place, who participates actively in this consensus building and how is consensus achieved?

As part of the watershed guidelines, a watershed association[135] was formed in Mathnaa, as the watershed area (503 hectare) covered was in co-terminus with the village panchayat. The functions of the watershed association, according to a specific bye-law, are as follows:

a. The Watershed Association (WA) should be registered as a society under the Registration of Societies Act.
b. The Watershed Association should meet, at least, twice a year to evolve/improve the watershed development plan, monitor and review its progress, approve the statement of accounts, formation of user groups/self- help groups, and resolve differences or disputes between different user groups and self-help groups.

[134] From personal communication with the implementing NGO officials Mr. Chaganbhai and Suratabaen and officials at the *taluka* panchayat Mr. Deepakbhai and Mr. M.I.Shaikh (2-07-08 and 10-07-08 respectively).

[135] Where a watershed is conterminous with a village Panchayat or its area is confined within the boundaries of a village Panchayat, the Gram Sabha (all members of the village over 18 years of age) of the Panchayat concerned will be designated as the Watershed Association as per the Common Guidelines of 1994.

c. The WA should look into the arrangements for the collection of public/voluntary donations and contributions from the community and individual members; lay down procedures for the operation and maintenance of assets created, and approve the activities that can be taken up with money available in the Watershed Development Fund.

d. The WA should nominate members of the Watershed Committee from amongst the user groups/self–help groups by a system of rotation, and take disciplinary action of removal of membership from the Watershed Committee or user groups and whatever other disciplinary action it deems fit.

e. The WA will elect its own President, who shall be different from the office bearers and members of the Watershed Committee. The Watershed Secretary shall assist the President of the WA in the discharge of responsibilities entrusted to the WA.

Mathnaa Watershed Association had a total of 97 members, consisting of 81 male members and 16 female members,[136] but when inquiring about the actual numbers in the watershed association, no one in the village was able to inform the researcher of the exact number. On repeated questioning on this topic, the people unanimously indicated that all information was held by the ex-watershed committee secretary, as he managed all the affairs of the watershed.

Contrary to the guidelines, the functioning of the WA in reality was quite different, as the members only met once when the association was being formed and rarely met after that. As a result, villagers complained that they were never informed about any meetings related to WA- or watershed-related activity. The villagers were legally members in the WA, but in practice they had no opinions, views or representation in the true sense, in order to fulfill the formal criteria set out when the WA was formed. In practice, the traditional existing structure of power in terms of caste and wealth hierarchy was used to run the WA, which was controlled by a few powerful rural elite to maintain their control in the village. Initially, when the project was started and the WA was formed, there was some enthusiasm amongst the people, but with passage of time they lost interest, as they found no transparency in the working of the WA or watershed activities. The WA and various guidelines existed only on paper.[137] The

[136] This information about the number of members in the Mathnaa Watershed Association was given by the ex-watershed secretary.

[137] Information compiled from various informal interviews with the villagers in Mathnaa.

WA in Mathnaa consisted of 11 members, shown by a breakdown of the members' caste status in Table X, below.

Table X: Caste and Gender Breakup of the Watershed Committee Members of Mathnaa

Total Number of Members	No. of Male Members	No of Female Members	Caste -Wise Representation
11	9	2	Harijan (SC): 3 Jadeja: 1 Thakore: 3 Adivasi (ST): 4

For the participation and representation of villagers in the watershed project, and to make the watershed committee a success, various rules were made by the members, such as:

i) All castes should be represented in the watershed committee, as Mathnaa has a diverse caste composition and in order to ensure that benefits reach all castes.

ii) The committee should be gender-sensitive by including female members.

iii) Watershed committee members will meet regularly every month to discuss the progress of the work and chalk out future lines of action.

iv) If a member misses a meeting three times, without prior notification, they will be asked to leave the committee.

v) In selecting beneficiaries, the committee members have to ensure the principles of the watershed and equity so that no caste is neglected or left out of the project-related benefits.

vi) The watershed committee will solve and look into any dispute arising between the villagers over watershed-related work.

vii) There will be a 10% contribution by users in the case of (check dams) structures built on common property and a 15-20% contribution in the case of private property.

viii) The beneficiary from the watershed-related work have to give labour for the work done near their field, if they cannot contribute through cash.

ix) For those households where even labour contribution is difficult, they have to provide water to build the structures.

x) User groups for the check dams' structures have to monitor the structures during construction and should, from time to time,

inform the watershed committee about work progress and any problems related to it.

6.3.1 The Politics of Participation and Functioning in the Watershed Committee

In the watershed guidelines the rule for the formation of the watershed committee was that the majority of members had to come from the marginalised section of the village. In land-based technology the landed are primary beneficiaries, as benefits will mostly follow the contours of existing inequalities and property rights. The Jadejas and Thakores, who were opposed to the project initially, on realising that the check dams were to be constructed as part of the watershed project actively lobbied for the nomination of these types of candidate,[138] as illustrated by the various statements of the villagers.

> "As the user groups were to be formed around the check dams and in the formation and selection of the site for check dams, watershed committee members played a key role. The upper castes had the maximum landholding and were to be benefit most, along with those lower castes and Adivasis who had land, too. Thus, those people were favoured, who traditionally have good relations with the upper caste, and therefore it was all about the vested interest of each being fulfilled and being opportunist to cash in on the watershed project for their respective benefits" (Amritbhai, Harijan, Personal Interview, 11-10-2008).

> "No doubt there was representation of marginalised people in the committee, but the real power rested with someone else, in the hands of Jethusingh Jadeja and Daljeetsingh Thakore and his close associates in their respective caste panchayat. Their favourites were nominated in the watershed committee and they tried to hijack all the work related to water-retaining structures, and their people got check dams constructed near their fields" (Motibhai, Thakore, Personal Interview, 20-9-2008).

[138] Nomination of the candidates belonging to the marginalized section of Mathnaa, who would not deify the authority of Jadejas and Thakores in the long run, were nominated and favoured to become members in the committee.

In Mathnaa, the resource-rich, i.e. those who own water in terms of borewells and maximum landholding, are the upper caste – around 69 per cent of the large farmer group is comprised of the Jadejas and Thakores caste groups. The agents of change in Mathnaa were also the upper castes, who were the first to introduce motor technology to the dug wells, and out of 24 borewells own 15 of them.

Bemabhai was chosen unanimously to become the watershed committee secretary, as he was considered the most educated amongst the Adivasis. He had a diploma in agriculture, could take care of the financial accounts, was smart and presentable and could speak confidently in meetings with the government and NGO officials. These views were expressed by the ex-watershed committee's members, as well as by 'user groups' members. However, when I asked villagers who were not in the committee or in any user group, they gave me a different story about the selection of Bemabhai:

> "In order to show to the NGO official that the villagers are united and the marginalised voices will be expressed, represented in the project activities, the rich and the powerful people in Mathnaa favoured an Adivasi to become the watershed secretary" (Mayaben, Personal interview, 6-1-2009).
>
> "Bemabhai has good terms with the Jadejas and Thakores, and he also has the maximum land amongst the Adivasis, so the powerful people in Mathnaa wanted a man to hold the post of watershed committee secretary who could work in close confidence with the people who still hold traditional authority in the village" (Mevabhai, Personal Interview, 13-9-2008).
>
> "He is outspoken and is known to get the work done quickly, so there was no other choice better than him, so whether we like or not he was thought to be suitable to take care of the work and furthermore he enjoyed the backing of his tribe *samaj*[139] as well" (Dengarbhai, Personal Interview, 19-10-2008).
>
> "Common land in Mathnaa exists only in papers with the *talati* [village revenue officer], but in reality at the ground level, large areas of the common land [*Gauchar* land] have been encroached by

[139] Samaj means council.

> the Jadeja families, and thus the question of common land being treated does not arise. Thus, Bemabhai's selection served a lot of purposes for many people" (Durgabhai, Personal Interview, 27-1-2009).

Thus, his election was a combination of various aspects like being the most educated amongst the marginalised section of Mathnaa, as well as in his tribe, his dynamic personality, his ability to handle accounts and speak confidently with outside agencies and having the backing of his own *samaj* as well as the support of the upper castes.

Monthly meetings by the watershed committee members were held in the first six months of the watershed project in order to discuss watershed-related work, as the NGO personally initiated these meetings. Later, with the passage of time, the meetings were held annually, and at times decision were taken by the few members who happened to control the working of the watershed committee. As such, their messages would be conveyed to the other members. Typically, meetings became regular on monthly a basis when the money was released and the work progressed. In these meetings, apart from the watershed committee members, the caste leaders of each caste were present, although the lower echelons were there purely to make up the numbers. The meetings were dominated by upper caste members and caste leaders, who played an active role in its functioning. The reason for their interference was that they knew about their caste interests and wanted to ensure that these were not ignored (Field Notes, November, 2008). Laxmiben and Praveenbhai, Harijans who were watershed committee members, were replaced by Savitriben and Kishanbhai, other Harijans, as both of them had questioned the authority and functioning of the watershed committee, which they believed lacked transparency.

> "They talk about collective participation and equity, but it was only a few people, especially the secretary and the upper caste leaders, who were the real players in the whole project. Decisions were already pre-decided and we were just informed and our views and opinions had no value. When we questioned the financial details, cement bags used for the construction in the check dams, and advocated that all the members should meet the *sarkari motobahi* (government officials) and the villagers should be informed about all the decisions pertaining to the watershed, we were asked not to

speak. Being in our caste limits, we were told that we should be indebted that we were in the committee, in spite of being untouchables. Later on we were asked to leave by citing the watershed committee rules that we did not attend the meeting without giving prior notification" (Personal Interview with Laxmiben and Praveenbhai, 16-11-2008).

Mathnaa has a slope, varying from 2-6 per cent, and the velocity of water and run-off is quite high. Consequently, reducing land degradation, retaining soil moisture, storing and recharging water and increasing the water table level in the wells were the prime objectives of the watershed project.

Activities such as constructing farm bund were done, and two types of farm bunds were constructed: a contour bund with stone and one with earthwork to retain rainwater and moisture in the soil and reduce the slope of land, thus increasing the chances of rainwater retention in the soil. Additionally, there were many small streams (gullies) in Mathnaa on higher slopes, which led to soil degradation. Gully plugs with loose stones were constructed to reduce the intensity of the flow of the stream, leading to reduced land degradation. Nalla plugs were also constructed on the streams to reduce the intensity of their water flow, thus reducing land degradation and increasing water percolation in the soil. Check dams were made constructed on rivulets in Mathnaa to check the flow of water, reduce land degradation and increase the percolation rate in upstream areas for wells recharging the borewells and ultimately increasing water for irrigation. Gabions are structures consisting of a rectangular or cylindrical wire mesh cage filled with rock and are constructed on small rivulets to check soil erosion and increase soil fertility through silt deposition. Table XI illustrates the various activities carried out in Mathnaa under the watershed project.

Table XI: Area Treated Under Watershed Activity in Mathnaa

Activity	Number	Area treated in Hectares	Area treated in Percentage
Contour Bunding, running in meters	16303 meters	138	29
Gully Plugs Nos.	4	0.84	----
Nala Plugs Nos.	15	98.90	21
Check Dams Nos.	9	157	33
Gabion Nos.	2	17.86	4

Source: Data available from the ex-watershed committee secretary

According to the villagers, the locations of the abovementioned structures were chosen by the watershed committee members, who were also members of the user groups due to the pattern of landholding, as the agricultural land of each caste is adjacent to their residential caste quarters. These structures were meant to be built on government land, but most of this had been appropriated by the upper castes, especially the Jadejas and Thakores. As a result, most of the structures were built near upper caste private land. Moreover, the Jadejas and Thakores had their representatives in the watershed committee, who worked for their particular interests. Some of villagers complained that when government officials visited the construction site for inspections, they were not allowed to meet them and were not informed when they attending. Villagers also highlighted the misuse of construction material such as cement bags for private use by some of the committee members. Shivabhai, Laxmanbhai and Praveenbhai had constructed their homes' floors from concrete immediately after the project had finished, with the cement which was bought for the project work (Filed Notes, January, 2009). However, a civil engineer with the taluka panchayat and the NGO stated that check dams could not be built everywhere, as certain geographical and technical aspects, and the availability of land for deciding the location of the check dams, had to be followed, but the villagers failed to understand this point.

As far as female representation was concerned in the watershed committee, there were just two women candidates – one from the Adivasis and the other from the Harijans (untouchables) caste in order to fulfill the criteria laid down by the common guideline of 1994. In reality though, the roles of these women were just to agree with whatever they were told to do, with no chance to stress their own opinion.[140] This is exemplified by the statements given by ex-watershed committee women members:

> "I did not know how the committee worked, to be honest, as it involves lot of politics. It was my husband who told me what to say and do in the committee; it's an all-men affair, so I did not ask unnecessary any questions. It's only when the mottabhai [meaning 'big brother' in Gujarati] from the sarkar [government] or NGO

[140] The women members in the watershed committees had the passive participation, and were just like the token members, in the presence of large number of male members that too upper caste in the committee.

> officer used to come that I was told in advance what to say to them if they asked any questions regarding the watershed committee and the project" (Savitriben, Harijan, member of the ex-watershed committee, Personal Interview, 15-11-2008).
>
> "Occasionally, I attended the watershed committee meeting when my thumb impression [signature] was required, as I have to do a lot of household work like feeding the cattle, fetching the water, cooking and also to work in the agricultural field. It was my husband who used to represent me in the meetings when I could not go; in a way it was fine, as he was taking care of everything and knew what was good for us and for our village" (Malaben, Dungri Garasia, member of the ex-watershed committee, Personal Interview, 17-11-2008).

Nevertheless, in spite of having just a puppet representation with no real authority or voice in the working of the watershed committee, both women felt proud that they were watershed committee members:

> "We are better than the upper caste women as we participated, even if it was for the sake of it. We felt empowered, as our thumb impression was required to facilitate the functioning of the committee. We know it's a small beginning but imagine women of our status getting this honour and position to sit with men – it makes us feel good, at least for the time being. We were made to feel important, as our thumb impressions were required" (Personal Interview, 15-11-2008 and 17-11-2008).

On the contrary, upper caste women feel that they have honour to preserve and maintain, so why would they want to sit with strange male members on a male-centric committee and interfere with male working?

> "These lower caste and Adivasi women feel that they have empowered themselves by being in the committee as members, but in reality when their male members have no decision-making authority in front of our male members in the committee, than what makes them feel that they are empowered and better than us. Our

> ancestors have ruled Mathnaa; and women are the honour of the family and they should not be sitting with male members. They still work in our fields as agricultural labourers and in maintaining our check dams, so what have they gained by being members in the committee?" (Field Notes, January, 2009)

The active participants in the meetings were male upper caste members and leaders, who were present in the meetings, in spite of not being the members. Hierarchies exist even amongst genders, between upper caste women and lower caste/Adivasi women. Hence, gender disparity exists in line with caste hierarchies in the representation of women from different sections of Mathnaa society. Historically they have been excluded from decision-making powers.

6.4 Working and Participation in User Groups

The size and shape of the check dams[141] constructed to control water run-off were small (see the diagram in annexure III). One of the most important aspects of the watershed project in Mathnaa was the formation of 'user groups'[142] around the nine check dams (water retaining structure) for the smooth functioning of the check dam construction and its maintenance. The check dams in the case of Mathnaa were built on common property resources such as wasteland, unused pastureland and the traverse land of rivulets and drains. Consequently, no private land was submerged. The check dams worked on the lines of a common property regime.[143]

Residential patterns in Mathnaa are demarcated by caste and tribe, so the agricultural land of each caste is adjacent to each residential caste quarters. Therefore, the users group's members consisted of people from the same caste, related by kinship ties, and were from the same (*kutumb*) extended families. There were only a few exceptional cases where the members of the user group came from different castes. The composition of the nine 'user groups' along the nine check dams are as follows:

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[141] Check dams is a small earthen or stone structure that captures runoff water in a drainage line. Like a percolation tank but smaller in scale.

[142] 'User groups' consist of those members, whose lands were adjacent to the site where the check dams were constructed.

[143] In a common property regime, an identifiable group controls the rights for the resource use and there exist the rules concerning who may use the resource and who is excluded from the resource and how the resource should be used (Berkes and Farvar, 1989).

a) The first user group is named *Jadejas eik*[144] (I), as all its four members are from the Jadejas clan.

b) The second user group is named *Jadejas bae*[145] (II), as two of its members are Jadeja and one is Thakore.

c) The third user group is named *Thakores eik* (I), as all four members are from the Thakores clan.

d) The fourth user group is named *Thakores bae* (II), as three members are Thakores and one is Jadeja.

e) The fifth user group is named *Chamar eik* (I), as all three members are Harijans.

f) The sixth user group is named *Chamar bae* (II), as all four members are Harijans.

g) The seventh user group is named *Chamar trind*[146] (III), as three members are Harijans and one is Adivasi.

h) The eighth user group is named *Tindoli eik* (I), as all three members are Adivasi.

i) The ninth user group is named *Tindoli bae* (II), as all four members are Adivasi.

Each check dam user group had its own leader, which was appointed unanimously by its members; moreover, each user group consisted of four to five members. Out of the nine user groups, four had members of different caste backgrounds together, whereas in the remaining five user groups, members came from the same caste and were related to each other through kinship ties. Members in the user groups around the check dams had activity-specific participation. The user groups were organised on the basis of landholdings near the check dams. Focus group discussions (FGD1and FGD2)[147] illustrate that members of the same caste in the user groups came from the same extended family and the borewell was also collectively owned by the family members, who also happened to be members in the user group due to landholding patterns. Moreover, being related through kinship ties, the degrees of conflict were less for the maintenance of check dams. This was elaborated by Jashubhai, a Harijan:

> "Our borewells are collectively owned, and we acknowledge that this structure will benefit our borewell, so there was no question of any doubt or conflict and we happily provided water from our own

[144] Eik is numerical one in Gujarati language.

[145] Bae is numerical two in Gujarati language.

[146] Trind is numerical three in Gujarati language.

[147] For details on the Focus Group Discussions (FGDs) see the annexure-IV.

borewell when the construction was taking place of the check dams, as it was for our own collective good and in the near future we would ripen the fruit of the check dam collectively" (Personal Interview, 4-8-2008).

Furthermore, borewells in Mathnaa operates on the lines of common property regime as the ownership in the borewells are shared and they are operated jointly, which will be elaborated later in this chapter in detail.

6.4.1 Participation in the Maintenance of the Check Dams through User Groups

During my field visit to Mathnaa, over a period of one year I did not see a single structure which was in a dilapidated state; in fact, all of them were in good condition and fully operational. Below is a photograph (IV) of one of the check dams.

Photograph IV: Check Dam

FGD1 and FGD2 revealed that check dams are quite new. Technical designs are provided by government engineers and there is no compromise in the quality of the materials used for their construction to ensure they can stand heavy rainfall. Moreover, maintenance work for the check dams is distributed amongst the user group families on a yearly rotation basis, and the structure is maintained by cutting the shrubs and de-silting the path through which the water flows.

FGD1 and FGD2 revealed that if any damage was to occur to the check dams in the near future, the members would only carry out repairs if monetary expenditure was not involved. All of them asserted that they would complain to the panchayat if a hefty sum of money was required as the dams are *sarkari* (government) structures, so it is the government's responsibility to take care of them. When asked what they would contribute in this situation, they were very clear that they would provide labour and, if needed, water from their borewells only. Check dams come under common property rights, but with a slight change in terms of ownership, which is restricted as no financial burden is required for its maintenance by users.

6.4.2 Power Dynamics of Check Dam Maintenance and Participation: A Gender Perspective

Women in Mathnaa have neither land rights nor water rights, even though they are largely responsible for water-related tasks. Further, their participation in decisions vis-à-vis water is minimal. However, the role of women is very significant in maintaining the water-retaining structure (check dams). In the case of Mathnaa, one can see gender disparity, as Harijan and Adivasi women participate in the maintenance of the check dams. Institutions which seem to be serving a collective good might in fact be shaping and reproducing unequal power and authority relations and marginalising the concerns of women and poorer people. This issue has been highlighted by various feminist works (see Kabeer and Subrahmanian, 1996; Goetz, 1996).

FGD5 explained why the upper castes refrain from doing menial work such as cleaning the check dams. The upper caste (Jadejas and Thakores) women do not participate in cleaning and in the maintenance of the check dam structures. It is a status symbol that (cultural capital) menial work for the upper caste landowners or landlords is done by the Harijans or Adivasis. The reasons for providing these kinds of services by the lower caste are many, as illustrated by Gauriben, a Adivasi:

> "Our ancestors have been serving the Jadejas and Thakores for years and we are just carrying forward this legacy traditionally, as a mark of respect for them. Secondly, in summers most of the hand pumps go dry; it is these people who give us free drinking water, and we are saved from walking miles to other village to fetch water from the government hand pump made for our tribe people. Thus, we are saved from the agony and pain of walking and standing in the rows to fetch water and our time is also saved. Furthermore, they also make generous donations when any marriage takes place in our family, and also during festivals we are compensated with clothes and gifts" (Personal Interview, 16-11-2008)

Kundiben, a Harijan states:

> "The Jadejas and some Thakores are rich families and we have been working on their fields for years. We have also developed a good rapport with them, so as mark of respect we do their cleaning work on the check dams. In return, whenever there is a severe crisis of water, we can look up to them for help, at least the drinking water we will get free, and it is always nice to be in the good books of the powerful people; it also enhances one's status and say in one's own caste, as well. They are powerful people in the village and still hold considerable authority in village matters" (Personal Interview, 18-10-2008).

Households that have membership in the user groups, and which participate in the cleaning process of the check dams, collectively decide on the work of each woman in the households and distribute this work load each year prior to the monsoon. This meeting is called by the most elderly woman of the household, who is usually the mother-in-law, and her decision is taken seriously by all the other young women in her stead.

Photograph V: Women Discussing and Allocating work for Check Dam Maintenance

The reason for this meeting is explained by some women in the FGD3 and FGD4, as follows:

> "It is usually the elderly woman of the kutumb, which happens to be usually the mother-in-law, who allocates the work load between her daughters-in-law and other young girls or women in the household. In Mathnaa, there are mostly joint families having separate kitchens, but still the mother-in-law commands a great authority amongst the other young women in the household. There is less chance of conflict between the young women, if the mother-in-law decides on and allocates the workload of the cleaning of the check dams" (Field Notes, from some of the meetings on the maintenance of the check dams attended by the researcher).

In the cleaning of the check dams and of the path of the check dams from where the water flows, lower caste women clean the check dams belonging to the upper caste first. Hence, even in the process of cleaning and maintaining the structures, the caste dynamic within the gender hierarchy plays a significant role, as upper caste women do not participate in the maintenance process of the check dams belonging to their own user group.

6.5 Groundwater Development and Management

Groundwater is an important source of water in Mathnaa, and its development is largely a private affair. The private property regime in groundwater has created a place for private exploitation of groundwater. With the absence of well-defined property rights to the groundwater and rapidly growing groundwater markets along with the widespread use of modern water extraction technologies, groundwater is being used as private property in Mathnaa.

6.5.1 The Private Regime of Groundwater through the Lens of Check Dams

Water-related activity is interlinked with land, so it is always bound to benefit those who own land, which applies in the case of check dams in Mathnaa. Plots closer and downstream to these structures get much more water compared to those that are placed further away and upstream from the structures, due to the physical attributes of water and its gravitational flow.

From the point of view of property rights[148] and collective action, treating the watershed as a collective resource unit is important, as water which is seen as open access in the form of rainfall becomes private the moment it is drawn from a borewell. Property rights are integral to how economic resources are governed. Four broad categories of management regimes are found in the common pool resource management literature: state, private, common property and open access, or non-property. Table XII, below, explains these four categories in detail.

[148] Property rights regime constitute a terrain of struggle, which is not given surprising given that 'property' is not an object, but it is rather a social relation that defined the property holder with respect to something of value (the benefit stream) against all others (Bromley, 1991).

Table XII: Property Right Regime and its Characteristic

Property Right Regime	Characteristics
State Property	The state has right to determine use and access rules; and individuals have to follow the rules of access and use stated by the state.
Private Property	Based on exclusive and permanent individual ownership.
Common Property	System of group ownership with bounded membership and internal allocative mechanisms for individual usufruct rights, while behavior of all group members is subjected to a set of accepted rules; both usufruct rights and management rules are embedded in the institutions.
Open Access or Non-Property	Individuals have both privilege and no right or duty with regard to use and maintenance of the resource, hence resulting in no rules or restrictions regarding access and resource use.

Source: Cousins, 1992

Groundwater is regarded to be in the open access regime, i.e. anybody can extract as much as water as he wants from the ground below because there is no social authority that defines and enforces the rights of individuals or a group to use open access resources, and thus each resource user ignores the consequences of his behaviour on others (Bromley, 1992). However, the open access nature of groundwater is restricted due to the fact that land owners are able to gain access only if they have the means to invest in the necessary infrastructure required for the extraction of water. Consequently, groundwater open access can be termed as a 'restricted or skewed' open access regime.

Hence, the groundwater system, which is an open access resource, operates through the private property regime through borewells, which are privately owned by group members, as in the case of Mathnaa. The check dams built in Mathnaa operate in a common property regime, as user groups have been formed for the maintenance of the check dams' structures. Nonetheless, these check dams operating on common property encourage the private property regime of extracting groundwater, as they increase the percolation of rainwater and its harvesting. Therefore, borewells have an advantage over structures built on common land, so the landed benefit more than the landless. Even the landed who are able to monopolise and use the opportunity can reap the benefit of having a borewell. As such, diverse individuals groups have interests in how the movement of water in different parts of the watershed is

managed, thus at time connecting people with conflict for the mutual benefits. This is apparent from the composition of the user groups and maintenance of the check dams, as some of the user groups have members from different caste backgrounds but have common interests of borewells within the command area of the check dams.

Despite the drought-like conditions in Mathnaa during the year of my fieldwork, I spotted standing sugarcane crop, which is a water-hungry crop, in the field of Jetusingh Jadeja, who happened to be the member of two user groups due to the positioning of his land near to two check dams. When asked about the paucity of water and how he managed to irrigate sugarcane, he said:

> "I own borewells which have water and I am simply lucky that two check dams are near my fields. The water below my land is mine and no one can prevent me from growing whatever I like" (Personal Interview, 4-10-2008).

Investment in water-related infrastructure comes from public funds, but it is ultimately used for private profit making by a few whose lands are strategically located near the water storage structure. Thus, the development of water resources through watershed development interventions has serious equity implications, as the nature of benefit is based on one's spatial location within the watershed and on pre-existing inequalities of class, caste, gender and wealth.

During informal interviews and focus group discussions with the farmers who had borewells near check dam command areas, it was established that most were members of the user group. They agreed that groundwater levels had improved, as check dams increase the retention of rainwater in the soil, leading to rise in the water table. Borewell owners in the command area of check dams are able to participate more widely and actively in the groundwater market as water sellers, and even in summer they are able to sell water for drinking, if not for irrigation. The numbers of Harijans and Adivasi borewell owners, who are near the check dams and participate in the groundwater market, have increased, and they feel a sense of pride in participating in the groundwater market more actively and widely.

In Mathnaa there are total of 24 borewells, the ownership of which is based on collective partnership between brothers and close kin. All of the members of the nine

user groups (33 members) also have a stake in the borewells.[149] Through informal interviews with these 33 members it was disclosed that the cropping patterns amongst these households have changed significantly. The table below explains the kind and the number of crops they grow. Various advantages for these households are shown in Table XIII.

Table XIII: Benefits to Households Having Membership in User Groups and Borewells

No of crops	3 crops per year
Vegetation in Summer	seasonal vegetables, fodder for selling
Change in Cropping Pattern	Grow wheat, cotton, pulses, castor and mustard, (maize for self consumption)
Engagements in Water Market	actively engaged as water sellers in groundwater market

Source: Author's fieldwork data from Mathnaa (Gujarat, India)

Even in the summer months they grow vegetables and fodder for their own use and for selling in the nearby town of Meghraj. Moreover, wasteland is fully cultivated with crops like wheat, cotton, pulses, castor and mustard, as well and sugarcane for market selling and maize for self-consumption. Conversely, households that have no borewells grow mostly maize for subsistence needs and have to buy water for irrigation and drinking.

6.6 Social Organisation of the Borewells

Borewell installation increased from 2000 to 2005 in Mathnaa, and in most cases families jointly own borewells, although some came from separate households. Thus, ownership of the borewells in Mathnaa started as a collective partnership in the form of finance partnerships, in order to cover expanding construction costs of borewells. Table XIV, below, shows year-on-year increases in the numbers of borewells in Mathnaa.

[149] Source: Interviews and Field Notes.

Table XIV: Trends of Borewells in Mathnaa from 2000-08

Year and Caste Wise Increase in Number of Borewells in Mathnaa		
Year	**No. of Borewell**	**Caste Ownership**
2000	4	Jadejas
2001	6	Thakore and Adivasi
2002	3	Harijan and Thakore
2003	5	Harijan, Adivasi and Thakore
2004	4	Thakore
2005	2	Adivasi
2006	0	Not Applicable
2007	0	Not Applicable
2008	0	Not Applicable
Total=24 (Borewells in Mathnaa by 2008)		

Source: Author's field data from Mathnaa

The arrival of the borewells led to a decline in the use of open wells. The depths of the open dug wells were approximately 60-75 feet deep, which was nothing compared to borewells, which went as deep as 200 feet below the ground. As a result, open dug wells that were near borewells dried out. The individual solution was investment in borewells, which brought added costs and new forms of strategies for water sharing. With inadequate resources, forming partnerships with others, whether based on kinship or caste ties, provided protection against risk. Caste networks played a key role in forming partnerships regarding borewells and access to groundwater. Lower caste groups formed their own partnerships based on kinship. For example, in 2002 Kacharabhai, a Harijan was the first person from the Harijan clan to form a borewell partnership with his five brothers, financed by the money his sons had earned working with Indian Army as soldiers. Together, they spent Rs. 60,000 on pipelines and buying a pump with a 5 horsepower engine:

> "We decided to have our own borewell, when we saw how this technology makes access to groundwater easier, as it goes deep compared to our open dug wells, which are only 60-70 feet deep. Moreover, in the due course of time we were told that through the watershed project check dams would be installed near our fields, and we would be part of the user group. So we decided that it was time that we should have our own borewell. Moreover, check dams

would indirectly benefit our borewell in the long run" (FGD7, 16-12-2008).

It was at the same time that Nanjibhai Thakore also decided to have a borewell with his brothers:

> "The reason which facilitated our common ownership of a borewell was that our lands were adjacent to each other, so there would be no interference with pipelines crossing other fields, and we are related to each other through blood ties. The best way to cope with a falling water table was to own borewell, as buying water from others would be expensive in the near future" (Nanjibhai, Personal interview, 28-12-2008).

The institutional glue that held partners together was the social bond of *kutumb*, or extended family membership, as most of the borewells were collectively owned.[150]

All expenses relating construction costs, electricity charges and any wear and tear are shared equally amongst the members of the borewell. Water allocation between members (brothers) is done in the following way. Days of the week are allocated in advance for each brother to irrigate his fields, and for drinking water a fixed time is decided on for all the members to take water for livestock and other domestic work (See photograph VI). Crop choice is also decided for each season amongst the partners, as they have to share the electricity charges together. In these private arrangements, women have little or no decision-making power and there are hardly any irrigator women, irrespective of caste in Mathnaa.

Borewell ownership in Mathnaa cannot be classified in the same way as 'tubewell companies' found in the Mehsana and Banaskantha districts of Northern Gujarat. In the case of Mathnaa, membership numbers are small and the ownership of the borewell is family-based locally called *kutumb*.

[150] Total number of borewells owned by different caste groups collectively has been described in detail in the chapter 5: The World of Water in Mathnaa.

Photograph VI: Women Collecting Drinking Water from the Common Borewell

Drilling machinery used in the construction of the borewell is hired from the nearby town of the bordering state of Rajasthan. Privately run drilling machine owners usually offer cheap prices if more than one borewell has to be installed and drilled. The price also varies according to the season; for instance, it is more expensive prior to the monsoon season due to the heavy demand for drilling in villages. In order to cut the cost of drilling, groups of farmers usually strike a deal with the drilling machine owners and get the work done simultaneously. Moreover, ownership of over groundwater rests particularly heavily on social and caste ties and networks.

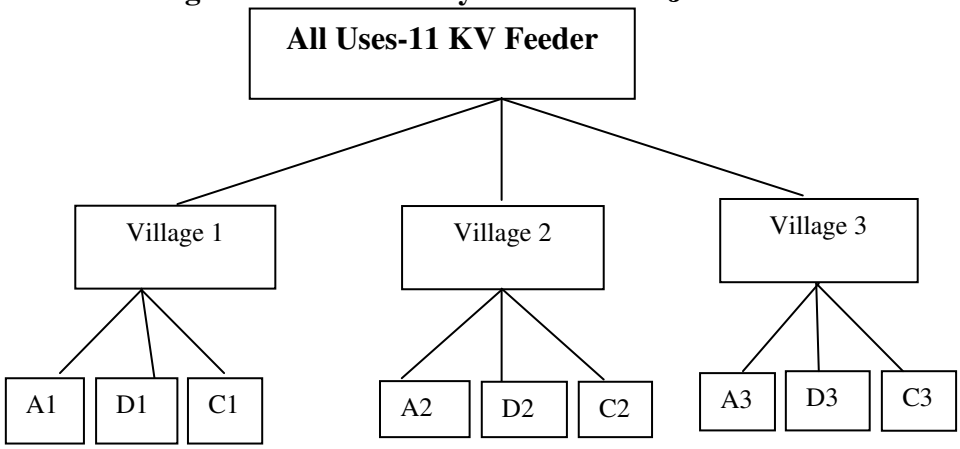
6.7 Groundwater Exchange and Electricity Nexus

Groundwater development in Mathnaa is largely a private affair and the private property regime, which in turn encourages private exploitation. Prior to 2000, the majority of the farmers had their own open dug wells with electric motors, and the price of electricity was at a flat rate tariff according to the horsepower of individual pumps. For example, an electric motor with a 10 horsepower capacity cost Rs 100 per

month, whereas a 20 horsepower motor cost Rs 200. Thus, pricewise, it made no difference to the farmer if the motor ran for an hour a day or for 24 hours.

In Mathnaa, electricity was available at a flat rate up to 2005, prior to the *Jyotirgram* Scheme.[151] In pre-Jyotirgram Scheme (JGS) times, at the lowest level 11 KV (kilo-volt) feeders served a group of 2-5 villages, whereby all connections in these villages (domestic, agricultural and commercial) were served through this feeder (Shah et al., 2008; Shah and Verma, 2008) (see Fig. XIV).

Figure XIV: Electricity Network Pre-JGS



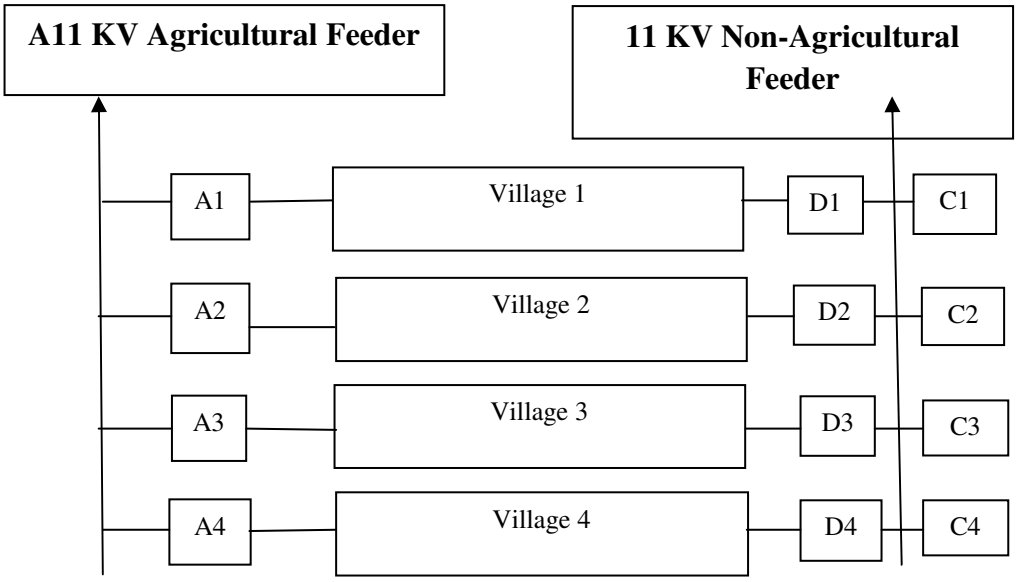
A=WEM (Water Extraction Mechanism) Owners
D=Domestic Power Consumers
C= Commercial Power Consumers
Source: Adapted from Shah et al., 2008

Post-JGS, the feeders were bifurcated into agricultural and non-agricultural feeders (see Fig. XV below), which meant that certain feeders only served farm tubewell connections, whereas the rest served domestic and commercial customers. Meters were installed on agricultural feeders intended to identify the source of any significantly greater than expected demand (Shah et al., 2008; Shah and Verma, 2008). In rural Gujarat, two major changes occurred in villages: i) they began to receive a 24-hour power supply for domestic use, in schools, hospitals and village industries; ii) farmers began to receive eight hours' worth of daily three-phase power, but at full voltage and on a pre-announced scheduled, after which power supply was

[151] *Jyotrigram* mean 'light of the village', this scheme basic idea was to improve the quality of rural life through better power supply, was introduced in Gujarat in 2004. This scheme was initially launched in eight districts of Gujarat but by 2006 more than 95 % of Gujarat's 18,000 villages were covered under JGS (Shah et al., 2008).

disconnected to those feeders, making to impossible for tubewell owners to use any capacitors (Ibid). Hence, every village now receives agricultural power during the day and night and on pre-announced alternate weeks.

Figure XV: Electricity Network Post-JGS



A=WEM (Water Extraction mechanism) Owners
D=Domestic Power Consumers
C= Commercial Power Consumers
Source: Adapted from Shah et al., 2008

6.7.1 Groundwater Market

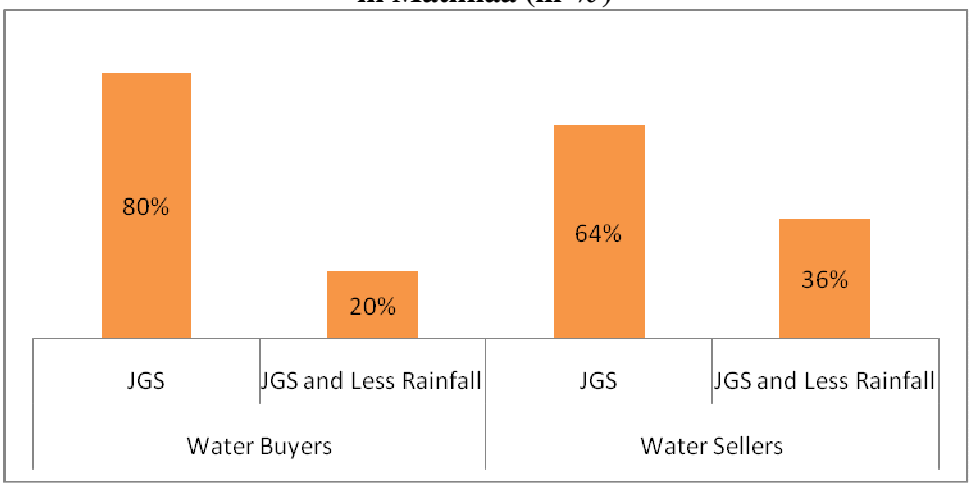
Mathnaa did not have water market before 2000, as irrigation was done through open dug wells run on electric motors and rainfed agriculture was practice extensively. However, a combination of certain factors introduced and boosted the water market. First, borewell technology came to the village in 2000 and extracted more water, as it went very deep compared to open dug wells. Second, electricity was made available on a flat tariff. Third, check dams were constructed near the borewells as part of the watershed project. Together, these factors acted as incentives in the development of groundwater and the groundwater market in Mathnaa.

There exists no uniform price in the village for selling and buying water; instead, this is determined by the caste affinity of each buyer and seller. The price of water ranged from anything between Rs.15-20-25 per hour, depending the kind of relationship the water buyers and sellers had with each other. This was the scenario in the village before the JGS.

The Jyotirgram Scheme imposed by the Gujarat government in 2005 led to an increase in water prices, as electricity was no longer available at a flat rate. Selling of water was most profitable in Mathnaa between 2000 and 2004, but now a uniform water price is prevalent in Mathnaa, due to the rise in electricity charges, which are applied to all borewell owners, irrespective of their caste affiliations.

A sample survey of 25 water buyers[152] and 25 water sellers[153] was conducted in Mathnaa. In total, 80 per cent of the water buyers and 64 per cent of the water sellers stated that water prices had increased in the informal groundwater market due to the Jyotirgram Scheme, although all of them agreed that electricity supply had improved greatly. Figure XVI shows that water buyers and sellers, to a large extent, blamed JGS for the increase in water prices and the consequent shrinking of the water markets.

Figure XVI: Reason for the Change in Water Price in the Groundwater Market in Mathnaa (in %)



Source: Sample Survey of Water Buyers and Sellers Engaged in Groundwater Market in Mathnaa

During 2008-09, when I carried out the research, the price at which water was being sold was Rs.65-75 per hour, which was exceptionally high, as this rate had never been charged in Mathnaa before. The reason for this hike was due to less rainfall and the scarcity of water, along with expensive electricity. Moreover, water was only being sold if the water sellers had surplus. In usual years, after the Jyotirgram Scheme, the price at which water was sold was Rs. 50 per hour.

[152] Sample of water buyers consisted of 8 Harijans, 9 Adivasis and 8 Thakores.

[153] Sample of water sellers consisted of 5 Harijans, 5 Adivasis, 8 Thakores and 7 Jadejas and 92 percent of them have stake in collective borewell ownership.

> "This year has not been good; not much rain, so we are not selling water at all. Only those borewells owners who have surplus are selling, but that's only to their caste members who happen to be related to them through kinship ties. As a whole in the village this year, very less water is being sold" (FGD8).
>
> "Otherwise, when rainfall is ok, water is sold and the price is also less such as Rs. 50-55, but again it depends who is buying water, as most of the buyers are related through kinship and caste ties due to landholding patterns, which are adjacent to each caste living quarter" (FGD9).

Hence, during periods of water scarcity, members first fulfill their crop water requirements and then decide collectively whether or not to sell to others. If they sell, it's mostly to relatives who have land near to them.

6.7.2 Terms of Exchange

Water is sold on two bases: firstly for cash on an hourly provision of water, and secondly for a one-third share of the crop. Quite often farmers mentioned '*trijo bhag panino*', meaning a third part of the crop is to be given away for water.[154] Water delivery follows a set pattern of rotation among members who have a stake in the ownership of the borewell, including the water buyer, therefore facilitating the timely delivery of water.

Competition existed between water sellers leading to vast differences in water price in the groundwater market prior to JGS, as electricity was available at a cheaper rate to all. But post-JGS, there is no such thing as competition in selling water. A uniform price exists in Mathnaa for water selling for irrigation. At the beginning of each season, leaders of different castes jointly decide the price; there is no formal meeting and sellers do not meet individually to discuss explicitly the price. These meetings are kept quiet and secret.

Whilst the location of one field decides potential buyers and sellers for irrigation, as one is bound to buy from them, one has the choice of buying from anyone who is above his/her caste as far as drinking water is concerned. No uniform price for water

[154] *Trijo bhag panino* kind of deal is negotiated when more water is required for crop cultivation.

selling exists for drinking water, as price is determined by the individual group of water sellers of each caste. This is due to religious faith and sentiments attached to rewards in the after-life and attaining *moksha* (salvation) from the cycle of life and death after providing drinking water. Though many of the water sellers are of the opinion that they would like to provide free drinking water to their own people, money is needed to pump the borewell, which is why they are forced to charge for drinking water as well.

6.7.2.1 Rules of the Game for Water Exchange

Caste and religious-based traditions lay down clear rules and regulations about purity and pollution regarding 'whose' water can be drunk, and 'whose' should be avoided in groundwater market exchange. This view is endorsed by all the residents of Mathnaa, irrespective of caste and tribal affiliation, and is practiced when buying drinking water.

There are clear cut rules regarding buying water under the rubric of pollution and purity of caste system. For example, the higher caste abstains from buying drinking water from the lower caste or Adivasi, thus Thakore do not buy drinking water from Harijan or Adivasi water sellers. The irony is that Adivasis, who are also marginalised, are considered at the same level of impurity as Harijans by the upper caste. Adivasi feel that they are superior to Harijans, because they are indigenous people.

> "We are the original settlers of this region and were outside of the Hindu hierarchy, but now, after entering the Hindu religion, we consider ourselves at a higher level in the Hindu hierarchy than Harijans. If we buy drinking water from them, we will get *paap* [sin], as Harijans have come from the feet of the Purusha, the primeval man" (Lataben, a Adivasi, Personal Interview, 17-8-2008).

As a result of these beliefs, Harijan water is considered polluted and deemed unfit to be placed in pots next to the idols of gods and goddesses, as practiced in other households (see Photograph VII, below).

Photograph VII: Drinking Water Kept next to the Idols of Hindu Gods and Goddesses in Mathnaa

For irrigation purposes, farmers, irrespective of caste affiliation, buy water from the borewell owner adjacent to their field, as according to them water for irrigation does not have the concept of being pure or impure. Thus, water is sold and purchased freely.

> "There is no problem in taking water from the borewells which are owned by the Harijans or Adivasis, as water for irrigation is purified when it mixes with the soil, so the question of getting polluted or impure by taking water from the lower caste does not arise" (Kanthaben, Thakore by caste, Personal Interview, 10-11-2008),

For the drinking water, there are very strict rules. Hence, the concept of Durkheim sacred and profane is prevalent in water context.

> "Our samaj cannot buy drinking water from the Harijans, as it will put us in paap and we will get impure, so there's no question of us buying [drinking] water from untouchable borewell owners. But we will certainly buy it for irrigation" (Meeraben, Adivasi, Personal Interview, 22-12-2008).

> "Water has a very strong place in the village life, as Mathnaa has water scarcity, so earthen pots containing drinking water are kept near the idol of the local deity in each household. Thus, we cannot buy drinking water from everyone; we have to follow the religious and caste rules" (Shivabhai, Thakore, Personal Interview, 30-10-2008).

Water needed for human survival gains the importance of religious value, as well as the worldly value of social status attached to it, through access to and possession of water. Thus, the purpose for which water will be used and not the source (borewell) is given due importance, and is the deciding factor for the villagers when buying water in relation to caste purity and pollution. [155]

Lower castes (Harijans) and Adivasi feel a sense of prestige when people from other castes buy water from them. In addition, they also happen to be members of the check dam user groups, so are better off than others from their own community. This has created intra-hierarchy amongst these groups, as those who participate in the groundwater market as sellers are power brokers within their community.

As described earlier in this chapter, the most borewells are owned by the upper caste (Jadejas and the Thakores), assuring them of a plentiful water supply and regular cropping patterns, as they are able to grow crops throughout the year. Pump irrigators' social status is also represented by their big houses, spending at village festivals and donations made for religious matters in the village. The owners of borewells in each caste group also have the maximum say in their caste panchayat and represent their caste interests in the village matters and in groundwater market exchange. Hence, the groundwater market in Mathnaa is depended on social structure, social norms and practices of the Mathnaa which is deeply embedded in caste trajectory in regards to irrigation and drinking water which developed at the village level.

[155] The sample survey on 25 water buyers of different caste groups, it was unambiguously stated that they will buy drinking water only from their own caste or caste upper than their own but for irrigation from any caste group.

6.8 Conclusion and Discussion

Caste dominates all spheres of Mathnaa's interactions and negotiations in the CBNRM intervention setting.

Social networks play an important role in human interactions, and are made up of direct and indirect relationships and exchanges. In addition, various types of social network are used to achieve a particular goal or action (Long, 2001). For example, networks are needed for carrying out specific collective action for the maintenance of check dams, which is done by user groups whose members have common borewell ownership traits and are related to each other through kinship and blood ties, as well as caste affiliations. Consequently, user groups members become 'collective actors'– those who at any given moment have the same common goals, situations and interests and agree tacitly or unambiguously to follow a definite course of social action. Thus, 'collective actors' are attributed as having power of agency, along with the capacity to make decisions and implement them; moreover, they can be formally or informally constituted and strategically organised (Long, 2001). Therefore, members of common borewell user groups in Mathnaa can be classed as 'collective actors'.

Gender relations are socially constructed through gender norms, meaning and practices within a particular community. Men and women are not homogenous, as they are divided by caste, class and ethnicity based dynamics operating at the maintenance of the check dams and in participation in the user groups and water committee. Although women are represented in the formal domain, such as in the watershed committee structure, this does not necessarily guarantee that they actually take an active role in proceedings. Women, irrespective of their caste, also take no part in the groundwater market, which is considered an all-male arena. Hierarchies have been created amongst genders on the lines of caste and class difference, whether it is in the management of the check dams or being a member of the watershed committee. As such, gender disparity exists in line with caste hierarchies in the representation of women from different sections of the rural society of Mathnaa.

Equity in terms of achieving the benefits of check dams built on common property land is one of the key issues in Mathnaa. In the property regimes of water, groundwater does not belong to common property and is accessed and used more as private property by those who own borewells or tubewells. The water pumped is the property of the pump owner, and in the groundwater market the water seller neither

owns nor produces the water he sells; in effect, they sell the service of their irrigation equipment and enjoy ownership rights over the community's groundwater resources (Shah, 1993). In the case of Mathnaa check dams further complement this process because although they are built on common property land to serve the community, instead their benefits are privately held by the borewell owners who happen to be in the user groups set up for the maintenance of the check dams.

What is more, common property rights exist in the maintenance of the check dams' structures, which are community-based because they are built on common property land. In Mathnaa, actors with borewells belonging to different castes are able to tap in to the maximum benefit of the check dams, which are built on common property land, hence leading to inequity in access to groundwater. Most of the borewells are owned by the upper castes, who have membership of the user groups and land near the command areas of the check dams, giving them the advantage of having better access to groundwater than the lower caste and Adivasis. Due to the absence of well-defined property rights to groundwater, rapidly growing groundwater markets and the widespread use of modern water extraction technologies, groundwater is being used as private property.

As a result, it has united people in the form of collective ownership user groups. Kin and caste ties facilitate joint action in check dam maintenance and in the ownership of the borewells. Thus, people are homogenous in regard to forming user groups around the check dams and in the ownership of borewells, as they have common interests in accessing water for longer periods. Consequently, various small groups form around the borewells, user groups, check dams and caste-based groups of water sellers.

In the village, economic class is indicated by landholding, which ties in with the control of water via caste and borewell ownership. Ownership of the borewells in Mathnaa started as a collective partnership in the form of finance partnerships, in order to cover expanding construction costs. Caste networks played a key role in this process, but because of the small numbers involved they cannot be classed as 'tubewell companies'.

The groundwater market was a new development in Mathnaa owing to new technology and the subsequent drying up of open dug wells. Moreover, the government indirectly provided incentives for its spread through the availability of

electricity at a flat tariff rate and the construction of check dams near the borewells as part of watershed project activity. Therefore, by default, each of these factors has promoted the groundwater market in Mathnaa.

It is suggested that the groundwater market depends on social structure, social norms and practices deeply embedded in caste traditions, the next chapter summarises the findings of this thesis.

Chapter 7 Summary, Conclusion and Future Research

7.1 Introduction

Failure of state-led development projects and growing concerns for participation, in the 1980s and 1990s gave rise to community-based natural resource management (CBNRM). The 1992 Rio Summit of the United Nations Conference on Environment and Development (UNCED) issued statements advocating a combination of government decentralisation, devolution of responsibilities to local communities for natural resources, held as commons, and community participation as solutions for global environmental problems (Leach et al., 1999). Since the Rio Summit, the international focus on community management of natural resources has resulted in many participatory conservation interventions sponsored by international donor agencies such as the United Nations Development Programme (UNDP), World Bank, Department for International Development (DFID), International Development Research Centre (IDRC) and Deutsche Gesellschaft Fur Internationale Zusammenarbeit (GIZ) GmBH. The main agenda of such interventions is to involve communities in the management of natural resources for sustainable development through community participation and the subsequent empowerment of communities.

CBNRM, which is a natural resource management intervention, is a paradigm shift model that focuses on the state-centered to community-based participatory approach. It has been loaded with complexity in its implementation. One of the most important critiques of CBNRM projects has been that different advocates visualise the word 'community' differently. As a result, it has become more of an abstract idea loaded with non-pragmatism and ambiguity. The past few decades have witnessed a growing number of projects for natural resource management with the word 'community' attached to them as a prefix. Different experiences and varied results in the field of CBNRM have led to various reactions from diverse quarters.

In CBNRM interventions, decentralisation has come to occupy a prominent place, whereby the state gives the responsibility for natural resource management to the local community through institutions such as watershed committees and water associations. The advocates of decentralisation justify this concept on the grounds that it could lead to more participation, efficiency and equity; however, most of the efforts end up not increasing the negotiating power of the local community (Agrawal and Ribot, 1999). Actors who take charge of these institutions tend to engage in constant

negotiations and interactions while simultaneously participating directly and indirectly in formal institutions, like watershed committees, and in informal institutional structures such as local social networks. The formal participatory arenas and institutions created by the process of decentralisation do provide opportunities for marginalised community members to participate, but the power imbalance in a given community is less likely to guarantee 'equitable participation' as an intervention outcome. International donor initiatives for CBNRM interventions have less scope in their blueprint to accommodate the dynamic power relations that characterise a community during its project life, as participation in these CBNRM intervention is considered complete and real when it happens in the 'formal invited arena'.[156] Nonetheless, the actors participating in these formal invited arenas do not have a social life just made simply of formal relations, interactions and negotiations alone. Hence, there is a need to understand what the 'informal' holds in the functioning of 'formal participatory arenas'.

A growing body of literature acknowledges the problematic policy and its implications, vis-à-vis ignoring the issue concerning the difference and portrayal of village communities as homogenous and harmonious (see, inter alia, Leach et al., 1997a; Li, 1996; Guijt and Shah, 1998; Mehta, 2005; Shah, 2003). Portraying the village community in a unified manner leads to its members being seen monolithically instead of as different social actors/agents with varied interests and inspirations. Hence, due to the widespread notion of the theories of smallness (Schumacher, 1973), there is an inherent assumption that small is always beautiful; it is believed that if a project is small, it will be successful and egalitarian in nature and lead to true representation and participation of all sections of the society – in a true sense working on the principles of democracy and equity. Furthermore, there is a need to see the village community as a heterogeneous body, consisting of different social actors who form various small groups in terms of caste, class and gender. They also have different, often conflicting, perceptions of and claims to natural resources. Thus, social differences,[157] which are an important aspect in the community, are not stagnant but are fluid entities and interlinked with each other, structurally and

[156] Arena is helpful concept to study development project which is usually an outside intervention process and consist of intricate set of interlocking arenas of struggle.

[157] By social differences it is meant asymmetries arising due to variables such as caste, gender, wealth, historical legacies, power, and politics (Mehta, 2005).

symbolically (Mehta, 2005). Such is the case of Mathnaa village. Caste, apparently, is a foremost source of inequality in issues concerning water use and access, as water-caste relations in the village shape related practices and their management.

Most of the earlier literature on watershed development projects, in particular in Gujarat, has focused on the impact of projects and emphasised income generation for the participating communities, changes in groundwater level and minimising dreadful land conditions in the micro-watershed (Groetschel et al., 2000; Shah, 2000, 2001, 2004; Shah and Menon, 1999; Sreedevi et al., 2006). This study is an ethnographic study of micro-level analysis along the lines of the actor-oriented approach in a socially stratified context. The thesis has taken up the analysis of socio-cultural aspects affecting actors' participation and the strategies used in various water-related community groups' formal and informal participatory arenas of managing water. Caste, class and gender dynamics influence various water-related community groups such as ex-watershed committees, user groups, water sellers and buyers in the groundwater market, while collective borewell ownership is analysed using the 'actor-oriented' approach.

This thesis investigated the micro realities of Mathnaa community members by exploring their everyday interactions and negotiations within various water-related groups formed in the village around community-based water management. The thesis explored how socio-cultural factors influence the various water-related community groups in negotiating, gaining access to and controlling the benefits of community-based water management. The specific research objectives were i) to look into the socio-cultural meanings attached to water in the community-based water management and ii) to scrutinise the linkages between formal and informal institutions that shapes actors' participation in community-based water management. iii) It further identified the major actors and their interests, roles and power in the formal and informal participatory arenas in the community-based water management.

Social research in a development project context, as in my case, requires the use of more than one method. Thus it is imperative so that the dynamism of numerous intricate processes of social interaction can be extensively covered. Ethnographic and qualitative orientation guided the data collection process for this study. The use of multiple methods reflects an attempt to gain an in-depth understanding of the phenomena in question. Objective reality can never be captured, so we know of

something only through its representation (Denzin and Lincoln, 2000:5). Hence, the most vital tools used for the collection of qualitative data were in-depth interviews, participant observation, field notes, dialogue and focused group discussion.[158] These were integral to understanding the problems of scarcity, the process of participation and the role of formal and informal institutions in community-based ground water management. Therefore, different methods were employed simultaneously to maximise the reliability of the data collected and to triangulate the data gathered through participation observation.

7.2 Findings

Caste is the cause of conspicuous inequality, which this study established, but it is not the only reason for hierarchies. The findings from Mathnaa reveal that there are diverse interpretations of high and low ranks in rural India. The study demonstrates that any kind of community water-related intervention is building on and feeding into existing social and power relations. The advocates of community-based management projects tend to have this naïve assumption that just because a project is small, it will be egalitarian and successful, while the underlying assumption that actors' participation will be facilitated through the adoption of participatory approaches and by creating a participatory arena is misleading. This is because the goal of social equity is difficult to achieve, as actors are neither homogenous in composition and concerns nor necessarily harmonious in their relations.

The field study seems to suggest that community-based water management approaches such as rainwater harvesting have several potential social risks and dangers. In the case of Mathnaa, few people in the name of the development of the whole village hijacked the project, which was small because it was just one specific village. This study argued that actor participation in the formal participatory arena and interaction in the Mathnaa water management context is shaped by the actor agency and networks, their relative power positions, interests and interactions. The findings confirm the assertions of actor-oriented scholars in that social action is actor-oriented and is at the same time embedded in the larger social setting that manipulates the choice of actors in a situated manner (Long, 1992; Long and van der Ploeg, 1989).

[158] Total number of interviews and focus group discussion (FGDs) carried out for data collection has been discussed in chapter 1: Introduction. For details on FGDs see annexure-IV.

Often, development agencies overlook the fact that most beneficiaries of small interventions will be the village landed or historically advantaged groups, which is demonstrated in the case of Mathnaa. In order to start gaining legitimacy, the project's implementing agency operated through Mathnaa's traditional power brokers, thus the project, despite its condescending agenda of participation and equity, led to the invariable perpetuating of existing forms of social inequalities. In Mathnaa, an NGO implemented the watershed project to harvest rainwater by building check dams. The existing social structure of the village in terms of caste, wealth, class and gender facilitated the functioning of user groups formed around the check dams for maintenance purposes. Consequently, it became apparent that caste, which leads to differentiation in society, played a key role in the maintenance of the check dams, ostensibly because the members of the user groups were mostly from the same caste and related to each other though kinship and blood ties.

Some of the major theoretical findings of this study are discussed around the issues of communities, the cosmology of water, water and power and the co-existence of diverse property rights to substantiate the answers found through the lens of research objectives.

a) Conceptualising Communities

The fundamental assumption in CBNRM and the decentralisation discourse on the notion of homogenous local community has been challenging (Agrawal and Gibson, 1999, 2001; Chambers, 1994; Guijt and Shah, 1998a; Leach et al., 1999; Mosse, 1994) and opened up a Pandora's box of analytical issues such as the heterogeneity of communities and its relationship between gender, caste, class, ethnicity and the community in natural resource management interventions. It has been demonstrated through this thesis that Mathnaa is typically complex, just like many other rural communities, and far from idealistic. From an actor-oriented approach, which emphasises actors, actions, agency and power relations, communities cannot be treated as static and rule-bound, as they are composed of people who actively monitor, interpret and shape the world around them (Long and Long, 1992; Long and van der Ploeg, 1989). The actor-oriented perspective does not reject the notion of community altogether though; rather, it contextualises, by describing it as more or less temporary unity of situation, interest or purpose. For example, in the case of the election of the village headman, the community did cut across caste and class divides

towards a collective good. Hence, differences were accommodated superficially in order to secure consensus in the panchayat elections. Similarly, the caste and Adivasi leaders, having traditional authority in the Weberian sense, played the role of creating a democratic space in order to build consensus for the Mathnaa watershed project.

Community-based actors are highly differentiated with varying socio-economic and political backgrounds as well as diverse perceptions, capabilities and institutional attributes. The image of shared beliefs and interests propagated by the classic notion of a homogenous community has been taken over by the diverse, and often conflicting, values and resource priorities pervading social life. Actors' varying interests and interactions have also resulted in the relative transformation of their socio-economic positioning in the community over time. The Harijans and Adivasis have a considerable level of upgrading and mobility in their relative position within the Mathnaa community. Their ownership of borewells and participation in the groundwater markets as sellers, as well as members in the user groups of the watershed committee, has contributed to their mobility pattern going up.

Gender differences do exist in Mathnaa in terms of caste hierarchy, and gender relations are characterised as socially constructed through gendered norms, meanings and practices.[159] Gendered power relations operating in the watershed committee and user group have serious implications for women's participation in watershed interventions. There was gendered exclusion in the formal, i.e. the watershed committee and user groups, and inclusion in the informal spheres, i.e. cleaning and maintaining of the check dam structures happened concurrently, as women were influenced by patriarchal norms, caste-based differentiations and practices operating at the informal level. It was observed that female members in the watershed committee were merely token representatives. Though not formal members in the user groups, they were mainly responsible for the maintenances of the check dams. In caste-based differences, which also exist in the female domain, women of the lower caste and Adivasi group participated in the process of check dam maintenance, thus leaving out the upper caste Jadejas and Thakores women from this work. Hence, gender-based hierarchy on the lines of caste stratification existed in Mathnaa, which is

[159] The aspects of gender differences, relations, norms and meanings in Mathnaa are discussed in detail in chapter 5: The World of Water in Mathnaa and in chapter 6: Social Organisation in Watershed Development Project of Mathnaa.

apparent from the task allocation for women of different groups. The complex interplay of gendered perceptions, power relations and gendered division of labour influenced their participation in formal participatory arenas. Evidence from Mathnaa also shows that actors' self-image and perceptions do have a strong influence on their strategies, agendas for participation and relationships with one another. For example, the gendered self-image of Harijan and Adivasi women as members in the watershed committee gave them a sense of pride, in spite of just being a mannequin member with a patronising sense of participation in the committee. Similarly, Harijan and Adivasi men considered it a matter of pride to be recognised as watershed committee members. Therefore, this thesis established that in highly stratified communities, restricting gender analysis and attention to formal institutions alone is not sufficient for understanding complex gender dynamics operating at the grassroots level.

Moreover, the separation of roles between formal and informal institutional structures in the intervention context is not entirely clear. They have always been interwoven, as the actors who engaged in both these realms do not separate them in the true sense. For example, the traditional caste panchayat leaders, the Harijans, Adivasis and the upper caste leaders engaged with each other, and with external actors like the implementing NGO. In practice, there are inter-linkages and overlaps that make the boundaries very fluid between the formal and informal institutions. In Mathnaa, a diverse set of social, economic, cultural and power dynamics operating in a given society influence relations between formal and informal resource management institutions. Evidence from the village proved that there is coexistence and cooperation between formal and informal institution structures in the intervention setting, whereby community-based actors constantly interacted and negotiated with each other through their power relations.

b) Cosmology of Water

Mathnaa's world is rooted deeply, religiously and cosmologically in terms of water-related practices. Water occupies a central place in the lives of the people, exemplified by the fact that various sources of water in the village have social, ecological and institutional principles governing their use. Water and caste inter-linkages are the dictating factors regarding the distance to be maintained between factions in the village. As a result, water is used as a metaphor to assert these social differences. For instance, any water-related practices in the village such as the

keeping of drinking water pots next to the idols of gods and goddesses and performing *puja* (prayers) before any water-related structures are constructed, or appeasing the local village deity and other gods and goddesses by offering prayers to the rain god, ascribe immense religious significance to water in Mathnaa. Collective practice relating to appeasing the rain god further reinforces caste and social differences among the villagers.

The findings of this study explain the role of water as a tool, used to reproduce untouchability practices in the village by having clearly defined rules pertaining to caste groups for buying drinking water, regulated by the sanctum of pollution and purity. However, water takes on a different meaning all together when it comes to buying it for irrigation. Caste rules are bent when buying irrigation water, irrespective of caste status in the local caste hierarchy, as buyers state that water for irrigation is used for a secular purpose, i.e. for irrigation, and hence carries no traces of pollution if brought from a lower caste borewell owner engaged in the groundwater market. The groundwater market in Mathnaa is dependent on social structure, social norms and practices deeply embedded in caste in regards to irrigation and drinking water developed at the village level. Therefore, the caste system helps in understanding the notions of purity and pollution and how these are used in the local culture for determining and reinforcing inequitable access to the control and distribution of water and water use rights. All this forms an important element in understanding the various meanings and management practices attached to water by the local community.

Water is so interwoven into the life of Mathnaa people that selection of a wedding groom is decided within the larger realm of water scarcity. Marriage rituals are said to be completed with the involvement of water rituals, associated to combat water scarcity, as described in Chapter 5. Moreover, various beliefs and practices are associated with water management and scarcity through which actors such as rural elite practice symbolic capital. This is demonstrated and put on show in the case of milk used for bathing the idols of God in a collective gathering at the village festival. In other depictions, water is seen as sacred and profane in relation to how it is used; for instance, drinking water is considered sacred, as it is kept near to religious idols. Thus, water, which is a natural resource, has symbolic, cultural, religious and economic meaning attached to it, and is highly differentiated in its use in the local context (Mehta, 2007).

c) Water and Power

In Mathnaa, any aspect of water-related management is dominated by caste in terms of access, distribution, ownership and participation in water-related arrangements. Whether they are government or NGO operated, water-related programmes such as hand pumps, borewells, dug wells, watersheds or piped water supply schemes, everywhere caste regimentation is followed. Chapter 5 makes it evident that, in Mathnaa, inequality in landholding and caste are directly related, which means that the higher the caste status, the higher will be the landholding, which is directly linked with the ownership of water. As a matter of fact, people who own and have access to water – read who own the borewells – are indeed the wealthiest and most powerful actors in the village. With water as a male-centric arena, all the matters related to it are controlled by men. Whether it is the watershed committee or user groups in the formal participatory arena or the informal groundwater market and social practices associated with water rituals or management, men dictate and call the shots.

Women who happen not to belong to user groups do the maintenance of check dams. Hence, gender disparity exists, even between upper caste and lower caste women, because it is the responsibility of the lower caste (Harijans) and Adivasi women to work on the check dams of the upper caste. Even the scarcity of water is felt the most by the women of lower caste and the Adivasi; the upper caste is devoid of any such burden or scarcity. Thus, the hierarchy between women is manifest if not rampant. In addition to this, water issues in the village are in juxtaposition with caste, gender, wealth, politics and power.

The social organisations formed around the project are believed by development agencies to replicate traditional organisation and reproduce the assumed effectiveness of a traditional past. In reality though, as demonstrated by Mathnaa's case, the village community is portrayed by its powerful actors, who indeed tend to benefit the most out of check dams due to their land and borewells. This gives a picture in terms of temporary unity of a situation, interest and purpose to secure benefits from development implementing agencies. This was exemplified in Mathnaa in the formation of user groups, self-help groups and the watershed committee and association, in the process supporting Adivasis and Harijans to become watershed committee members, and even an Adivasi in the village panchayat election. Thus, this wider community representation is seen as one created and manipulated by powerful

people for a particular purpose, and not necessarily as a shared purpose or a temporary outcome of dynamic interaction between differentiated social actors.

Community-based actors like the Harijans and Adivasis participating in the formal watershed committee and in user groups were influenced by the power relations they engaged in at the informal level. This could be seen in their negotiating power to access free drinking water during drought conditions, and in their livelihoods as agricultural labourers. Moreover, their participation as watershed committee members and user group members was also coloured by their loyalty to the upper caste. Marginalised actors like the Harijans, Adivasis and women from these groups were nominated as members of the watershed committee as per official guidelines. Upper caste leaders under the surveillance of the traditional panchayat leaders of each caste group presided over their nomination. The decision-making activities of the Mathnaa watershed committee were vested with the upper caste represented by village elders. Through participant observation, it was established that whole exercise of nomination by the upper caste village elders was laden with tokenism, which was largely voluntary on the part of these relegated community-based actors like female, lower caste and Adivasi members. Mathnaa's case proves that this voluntary tokenism had its roots in the opportunity cost incurred by the marginalised actors, whose agency to draw on these formal participatory arenas depended directly on the opportunity costs they incurred in the form of water access and benefits from the project.

Female members were shown as important figures in formal participatory arenas for legitimising the watershed committee, but its core activities, such as consultation and decision-making, remained more or less out of reach and beyond the purview for these marginalised actors. On the brighter side, the marginalised sections that were participating in the formal participatory arenas were able to extract and derive tangible benefits. This was made possible by being members of the user groups while their relatives were check dam members. The Harijans and Adivasis made situational choices, guided primarily by endogenous institutional structures like informal norms and practices. And this would deliver more concrete results in the face of dynamic power relations than the exogenous, top-down institutions like the watershed committee because these marginalised actors were very clear that their source of getting free drinking water during dry periods was from upper caste people. Moreover, they were employed as agricultural labour in the farms of these rural elite

and as such were entitled to receive donations and gifts at weddings and festivals. The following statement of one female watershed committee member further illustrates this point:

> "We all knew very well that this watershed committee and other such arrangements would never make us equal and powerful. Hence, we did not feel the need to fight for real decision-making power in the committee. In any case, we will always need help from the upper caste because of their complete hold and access-based control over maximum land and water resources. Moreover, being in their good books leads to benefits in terms of access to free water and donations and gifts during festivals and weddings. Besides this, one's status in one's community enhances if one enjoys a good rapport with the rural elite".

Hence, despite the creation of formal institutions and arenas for participation, Mathnaa community members, actively depended on the traditional informal institution's practices and norms such as caste for engagement. And in the face of socially embedded, informal institutional structures, a formal watershed committee ended up being another means for co-opting into already existing power asymmetries. It is evident from the case study of Mathnaa that the power relations operating at the grassroots level thoroughly influence the participation of various actors within formal participatory arenas.

It may be hasty to label the formal participatory arenas and institutions opened up in Mathnaa as 'inefficient' because they did not deliver what the interventionists had intended. Evidence shows that actors benefiting from the Mathnaa watershed project interventions have done so despite abstaining from direct participation due to strategic reasons. The substantial developments experienced by the Mathnaa community such as the building of check dams might not have taken place in the absence of participatory arenas. Through the formal institutional structure of the watershed committee and user groups, Mathnaa's case demonstrates the level of social interaction for opportunities to achieve economic gain. The emerging intervention, operated within a gamut of 'bounded rationality', reconfigures and makes individuals and groups realise the costs and benefits of participation, as opposed to being guided

by a 'calculated rational choice'.[160] This study also highlighted that actors' opinions, responses and preferred extent and form of participation, as well as abstinence from participation, are embedded in informal institutional practices, patriarchal norms and power relations, which are reproduced continuously in Mathnaa. Therefore, relations between formal and informal institutions in resource management are influenced by a diverse mix of social, economic and power dynamics in a given community. Thus, in practice, there are inter-linkages and overlaps that make the boundaries between formal and informal institutions fluid.

The distribution of power within and between the various levels of community is central to the debate about decentralisation and participation in natural resource management. Power is seen as a capillary, which is acting in the daily enforcements of social practices, independent of the legal power of the formal institutions (Robbins, 1998). Hence, this approach shifts in analysis from the dichotomy of formal and informal resource management institutions to an essential investigation into the kinds and effectiveness of social power. This is deployed through the formal and informal authority systems of hegemony, domination and control (Ibid), as decentralisation processes often tend to impact negatively on power relations within the local community. The 'gramscian hegemony' of rural elite influences the management process for their own vested interests.

Moreover, Mathnaa's evidence showed that situational rationality in a way prompts actors to volunteer to perform as 'front stage' actors, a role expected of them by grand actors like the NGO. For example, marginalised actors such as lower caste men, women and Adivasi members in the watershed committee were asked to meet government officials inspecting the work of the project, and were supposed to inform them about progress and the fair working of the watershed project activities. Hence, all actors involved seemed to be enacting their respective roles on the 'front stage'[161]

[160] The concept of calculated rationality assumes that individuals are capable of making rational choices without any restrictions and; the principle of bounded rationality refers to the idea that actors are incapable of confirming to a model of absolute rationality because they cannot apprehend all the possible choices (Steins, 1999).

[161] Front stage and back stage concept given by Kothari (2001) for post structuralist critique of participation. Kesby summarizes the Kothari critique by highlighting 'front stage' as a place in which performances are enacted in order to make an impression in public life. These project arenas cannot allow performers to be sincere because they are devoid of 'back stage' places where unrehearsed, private performances are not intended for public consumption take place in rehearsal for the production of front stage performances. Participatory performances are contrived by stage-managing facilitators who script to meet the project objectives (Kesby, 2005:2043).

of participatory institutions. This was enacted to achieve their share of social power at the informal 'backstage' or rear curtain of everyday life. In Mathnaa's cultural landscape, this act of performance is staged by the lower caste to gain better negotiating power in the groundwater market. Thus, community-based projects cannot be dissociated from local power politics. Consequently, water issues in Mathnaa are in cognisance with caste, gender, wealth, politics and power.

d) Co-existence of a Diverse Property Regime

In the case of water resources, ownership and user rights vary across water sources and usage. Water use is guided by multiple property regimes such as common property, state-owned and private resources, open access, etc. The efforts of a community in conserving rainwater, which is open access through check dams, is a common property regime and has helped in recharging the borewells. This has resulted in building the private property regime of groundwater, which is not equitably shared by all the members of the community. Hence, recharging of the borewells, which are private property, by the publicly funded watershed development programme leads to a public investment becoming a private property. In India, there are five possible property regimes, and water has presence in all of them, which is illustrated in Table XV.

Table XV: Property Right Regime in India and Source of Water

Property Rights Regime in India	Source of Water
Individual private property	Groundwater
State or public property	Surface Water Resources
Common Property	Tanks with Panchayati Raj Institutions
Common Pool Resources	Access to identified group but no one has a right eg. Village tanks
Non property or open access	Open Access water bodies

Source: adapted from NAAS, 2005

Although groundwater is 'open access', its extraction is effected within the realm of private property rights, which alludes to the economic disparity among the famers investing capital in the extraction of groundwater. Therefore, the control and ownership of water are linked with the ownership of land and irrigation structures. Even among landowners, access is restricted only to those who have locational advantages, as small farmers and other marginalised weaker sections of society often

miss out on these developments. Therefore, one can speak of groundwater open access as a 'restricted or skewed' open access regime.

Inequities exist in the benefit of the structure built for the community and also in access to groundwater. The water system operates in the private property regime through the check dams, which are constructed on common property. Borewells, which are collectively owned due to kinship blood ties, encourage members to take a keen interest in the user group allocated to maintaining the check dam. This in turn ensures double membership – one in the user group and another in the borewells, which plays an instrumental part in groundwater recharge management.

Water is a problematic issue in terms of achieving equity. In most cases, it is treated as private property because water rights are tied to land rights in terms of both location and size. It also determines, on the basis of one's land holding, eligibility for how much water can be received. Generally, those who have land near the valley and close to the water harvesting structures get most of the water. Thus, equitable water distribution is rarely part of the mainstream watershed agenda, because the ground reality ensures the loss and gain mechanism for different parties. Having a watershed development augments groundwater, which is currently private property and is tapped by the people who own the borewells. There is no doubt that recharging of the groundwater level has taken place due to check dams (farmers near the check dams agree on this, but this also depends upon good rain and affects the borewell's ability to help grow three crops a season; even in summer months, the water situation isn't bad, courtesy of the borewell). The benefits are not evenly distributed due to topography, which affects the social distribution of gains from soil and moisture conservation. Thus, in Mathnaa, groundwater is a 'restricted open access' resource and becomes private property once the pump owner has extracted it from the ground. Who sells it in the groundwater market to the fellow villagers and, moreover, groundwater development are facilitated by the check dams, which are a common property resource. Therefore, in Mathnaa, we see the co-existence of three property regimes working simultaneously, and the community using them to gain access to water, by using different technologies such as borewells and check dams.

Groundwater development through borewells has united people in the form of collective ownership and user groups. Kin and caste ties facilitate the joint action in check dams maintenance and in the ownership of the borewells. Thus, people are

homogenous on the aspect of forming user groups around the check dams and the ownership of borewells. They have common interests in both to manage groundwater, which in turn benefits their fields and means it is extremely important to nurture short-term commonalities. Consequently, various small water-related groups within a village community are formed around the borewells and check dams in the form of user groups, which happened due to intervention in the form of the watershed project and the introduction of borewells, simultaneously, in the village. The groundwater market started in Mathnaa with the introduction of collectively owned borewells, and the government indirectly provided incentives for its spread and extraction in the form of a flat rate electricity tariff. All this was possible before JGS (Jyotirgram Scheme), under which there was no uniform price for water selling in Mathnaa's groundwater market. This created competition, but after JGS, the water market followed a uniform price for irrigation water every season. Due to a change in the electricity tariff, the scope for competition in the groundwater market was reduced, hence uniting all the water sellers, irrespective of caste.

The social structure of Mathnaa in the form of caste and kinship affiliation promotes groundwater extraction and the market through common borewells. Thus, the groundwater market unites people in the form of having collective borewells due to social structure, and then as water sellers after JGS.

Therefore, it can be concluded that people are homogenous on certain aspects such as caste and kinship (*kutumb*). Having the same interests in managing groundwater, due to common stakeholding in the borewells, and in the user groups formed around the check dams, brings them onto the common platform to manage groundwater. Hence, they form a community around borewells – not in the way common property theorists advocate, but due to default by having land adjacent to each other, shares in common borewells, membership in user groups due to landholding patterns, a flat electricity tariff scheme.

7.3 Policy Implications

Often in a government/NGO-implemented project, importance is given to 'village community' and 'participation'. The participatory and village community rhetoric tends to often ignore the social composition of village community and conflicts of interest within and between the communities. This has serious implications on the success of a project and on its actors, who are the real participants in the project; it is not necessarily the case that a successful experiment in one location will be successful in another, because every rural social setting in Indian society is different. With the rise of a new dominant caste in twenty-first-century India, newer definitions and paradigms have sprouted through traditional patriarchal flavours rooted in feudalism. Although India is a rising power, even today its society is very much gripped by and encapsulated in the caste system. This was one of the points in consideration for the Indian government when it conducted its caste census in 2011.

Having discussed the concept of community from various perspectives, it is evident that the images of community often seen in CBNRM policies are a reflection of poor empirical reality, and are, as a consequence, a misleading guide to practical intervention strategies. A village community is made up of diverse small social groups, each with different agendas and inspirations. This is not to dispute that they do have value in the current context of wider debates for achieving sustainable NRM goals, but there have been several studies in which 'romanticised' representations of community and its implementation have shown successful results. Thus, implementing CBNRM is inevitably controversial, and various examples have shown that progress is clumsy and an extremely bumpy ride. Flaws within the process stem from the underlying assumptions that community is homogeneous and will work together for the overall development of the whole, and thus equity will be achieved. Hence, in order to make the project reach every section of the village society, participatory management must evolve along different lines in different rural cultural settings, keeping in mind the specific and particular composition of the village community. Moreover, community-based ownership and understanding of social differences relating to resource access are major determinants for the successful functioning of any formal participatory institution (natural resource management in general and CBNRM in particular fall under this umbrella).

7.4 Future Research

1) This is a micro level study, which takes into account the socio-cultural context of the village community rather than a broader picture of the state of Gujarat. Hence, it would be an important hypothesis attempt to test not only socio-cultural but also ecological Gujarat state characters in the main theoretical framework. For example, the effect of various state legislations concerning water management on different ecological zones in Gujarat would be a fruitful line of enquiry.

2) It would also be worth exploring initiating a comparative study based on two or more villages, and looking into the different mechanisms by which caste, gender and religious affiliation play a role in explaining groundwater management.

3) It would be interesting, as a further point of analysis, to study the socio-cultural practices centered around water scarcity and the kind of effects it has on the local community in terms of health and sanitation issues. The health, sanitation and other human development indices aspect emerging due to the scarcity of water are beyond the scope of this dissertation.

The idea of water management, with its far-reaching and expounding consequential reasoning, is accompanied by its own pitfalls and the nature of inequality. The questions hovering over the bordered segmentation of infrastructure, state planning, welfare economics and the discontent of hyper rationality present a telling case for democratisation to be achieved in reality. All of that contemplation and planning on the part of civil society should not see the light of development facing aberration from several quarters. Thus, the role of water should be seen in totality and reality, witnessing the dynamism of Durkheim in culture-specific societal settings.

Annexure I: Politics of Carrying out the Fieldwork

I gathered data and insights through observation and participatory engagement. The qualitative methods were largely influenced by phenomenological approaches, and this played a role in my collection of data. The empirical investigation was framed largely as a case study along with the ethnographic observation of social realities. I conducted a baseline household survey of Mathnaa village in order to collect demographic data pertaining to all the households, which helped me to gain general insights into the social differentiations of community members. Most importantly, this gave me an opportunity to introduce myself to the villagers and nurture a rapport with them in general.

During the initial days the observations made in the field dairy proved very handy, as they helped me to compare, sporadically, people's views and perceptions including the formal and informal positions they took on a variety of issues concerning village politics, water, the watershed project, JGS, borewells, groundwater markets and caste and social relations. I realised that there was a qualitative difference in the perceptions I had of the Mathnaa community as time passed, and this contributed immensely towards a better understanding and analysis of the villagers' perceptions and events.

I first stayed in the taluka, but then gradually shifted to the village where I chose to stay with the Adivasi family, who were at the midway position between the upper caste and the Harijans (Jadejas and Thakores). Mathnaa is an *ankada* village, where the leading Adivasis (tribal heads) are made *ankadedars* of the villages and are responsible for populating the hilly regions, serving the border land of the state and collecting revenues for the state in the form of fixed amounts called *ankada* (*Gazetteer of India*, 1974).

Due to its *ankada* roots, Mathnaa Adivasis enjoy good relations with all the other castes in the village, as they believe that their ancestors were the founders of the villages in this region. The connotations for this research and my relationship with the community would have been extremely different if I had stayed with the Harijans, Thakores or Jadejas families. In due course, suspicions were bound to arise as I spent my time with women from the Adivasi and Harijan communities; however, I also faced suspicion from the elites of the village, due to this intermingling.

Although the villagers originally knew I was dining with the Harijans and Adivasis on occasion, the upper caste initially allowed me inside their kitchen, but when they came to know I was dining with untouchables, they did not afford me the same courtesy. Nevertheless, I still maintained cordial relations and they fed me tea. Considering my urban and Muslim background, certain prejudices were ignored on my part such as the lack of a rigid caste system based on the principle of 'pure and impure' within my faith. Thus, on this basis exceptions were made for me. In spite of having relations with Harijans I was welcomed. My upper caste, metropolitan Muslim identity made my entry point easier and helped me gain acceptance because of my tolerant, pluralistic approach towards their caste rituals.

The fieldwork process presented occasional hurdles due to my language skills limitations and religious and gender identity, but overall the Mathnaa community was very accepting and approachable from the moment of my arrival. In the initial days an NGO representative was always present when I conducted my interviews or met the ex-watershed committee and user group members on the pretext of helping me. In his presence the villagers were very careful in what information they provided and in the manner in which they interacted. Moreover, he only introduced me to certain people who happened to give a rosy picture of the watershed project. Furthermore, during my initial dealings with the women, they interacted with me only in the presence of their male members and were not allowed to speak to me directly when I asked any questions; either their husband, older brother or some elder male members gave answers to my queries.

It was later, when I started staying constantly within the Mathnaa community, that it became possible for me to gain access to all the strata of the community and have moments of privacy with individuals and groups of respondents, especially women. As time elapsed, it was in closed group discussions and informal meetings that the participants revealed the informalities of Mathnaa community involvement in the watershed project, as well as other important water-related issues.

The Essence of Participant Observation

As a participant observer, I chose to live within the Mathnaa community, in order to observe and comprehend the everyday processes, interactions and life events of actors in the village. Participant observation as a method encourages researchers to immerse

themselves in the day-to-day activities of the people they are attempting to understand (May, 2001:148). As a result, this method helped me as a researcher to understand and study complex socio-cultural and political phenomena as they arose, and provided me with an excellent opportunity to gain deeper and better insights through firsthand experience. The method helps the researcher to collect information about every aspect of a culture, even if the researcher is investigating only one particular area. A holistic hypothesis, i.e. the idea that the various aspects of culture are interrelated and that knowledge of the nature of this interrelationship is crucial to the understanding of how even a single institution or set of institution works (Srinivas, 2002:545), makes participant observation an important tool in research.

An interpretative approach includes the researcher's beliefs and behaviour as part of the evidence presented and considered in a research activity (Harding, 1987). Following this argument, my own role and biases as a researcher with multiple identities (which I shall explain in detail later on in subsequent paragraphs) involved in this process are duly acknowledged. When one enters rural India, it paves an opening to the world of caste and its influences on research in many ways (Srinivas, 2002). Hence, in the larger socio-cultural field, being Ashraf[162] in the Muslim caste hierarchy, which traces its roots from a high caste Brahmin family converted to Islam centuries ago, played a significant part in my research in the form of facilitating and at times hindering my research. My conversion to Islam created conditions for me to break away from some of the rigid traditional Brahmin mores of social relation, especially caste-based distinctions, and helped me to interact with and reach out to the different caste groups in Mathnaa.

During the fieldwork in Gujarat, my various identities were enacted in relation to different research subjects; at times bringing opportunities and at times challenges for my research. My interaction with the local NGO was of a researcher with an urban background and studying in Germany for a PhD. The NGO members always felt I was trying to monitor their project work in terms of their impact benefits for overcoming water scarcity, and whether their efforts would lead to community

[162] The Indian muslim society is divided into three broad categories i) Ashrafs are those who trace their origins to foreign lands such as Arabia, Persia, Turkistan or Afghanistan and all those upper caste Hindus who converted to Islam; ii) Ajlaf are middle caste converts whose occupation are ritually clean iii) Arzal are those who consist of the lowest caste and mostly untouchable castes who converted to Islam (Sachar, 2006).

participation in the truest sense and on realistic grounds. Conversely, my interaction with the Harijans (untouchables) and Adivasis made them feel proud because of my Brahmin roots and that I had been able to reject the rigidity in my life. I could sense a 'feeling of self pride' in them when I was drinking and dining with them. For them I was '*ben*' (sister). The Harijans and the Adivasi always felt that I would bring about some change for them in terms of overcoming water scarcity through my work, which they viewed as the purpose behind me being in their village. Moreover, through my work I could highlight the plight of discrimination carried out against them in Mathnaa. However, on numerous occasions I had to clarify my stand as a researcher and my purpose of visiting their village. I was introduced by the NGO's people as a researcher from Delhi who was studying in Germany. As Delhi is the national capital and the seat of the central government, this made them feel that through my work their grievances over water would reach and be heard in Delhi, or at least in Gandhinagar, the state capital of Gujarat.

For the government officials at the taluka and district headquarters, I was a non-Guajarati Muslim woman researcher, wanting to study Gujarat water issues. I often encountered questions about psychosis and apprehensions concerning Gujarat. As the state witnessed communal riots on a massive scale in 2002, such inquiry was natural, if not obvious, on their part. Questions bordering around my safety and insecurity were subtly raised. The selection of the district (Sabarkantha) on my part brought with it twists and discomfiture, often from official ranks.

The upper caste members in the village, on the one hand, identified with me, because being an upper caste Muslim with Brahmin roots gave them a sense of ease and caste purity, although they were disappointed to know that my family had converted to Islam. The upper caste at times felt that I was some kind of government spy, who had come to record the rampant practice of land grabbing carried out by powerful upper castes and the way the watershed project was implemented and monopolised by certain people. Hence, these social identities played a role the moment I was introduced and entered into the village, and when I met with organisation and government officials. During various interactions I always maintained and clarified my manifest identity as a researcher studying their village, but still had to encounter several contradictions and inhibitions based on their perceptions about my identity.

Hurdles in Carrying out the Research

Being a non-Guajarati, language posed a challenge in my research. In order to overcome this hurdle, I took Gujarat language lessons before going into the field; it was a challenging and daunting job. The Gujarati language has various dialects; however, my workable knowledge of the language made my fieldwork and gaining acceptance easier in the Mathnaa community. Aeries of other events also posed a challenged in the research, such as the serial bomb blasts which rocked the city of Ahmedabad on 26th July 2008 and then in Modasa on 29th September 2008. I was still carrying out my fieldwork during this period, and the bomb blasts led to communal tensions in Gujarat, in general, and in the city of Ahmedabad, in particular. Gujarat society is highly communally sensitive and polarised completely after the 2002 riots. In addition, incidents like these often lead to 'emotions running high in the open'. Being a non-Gujarati Muslim woman researcher, it was a tough situation and fear gripped me about the viability and adaptability concerning fieldwork, as the aftermath of those blasts could have incensed and stoked internal civil disturbance. Nevertheless, and contrary to my thoughts, the people of Mathnaa did not allow this communal tension to affect our research relationship; in fact, despite knowing my religious identity, they showered me with their support, love and affection.

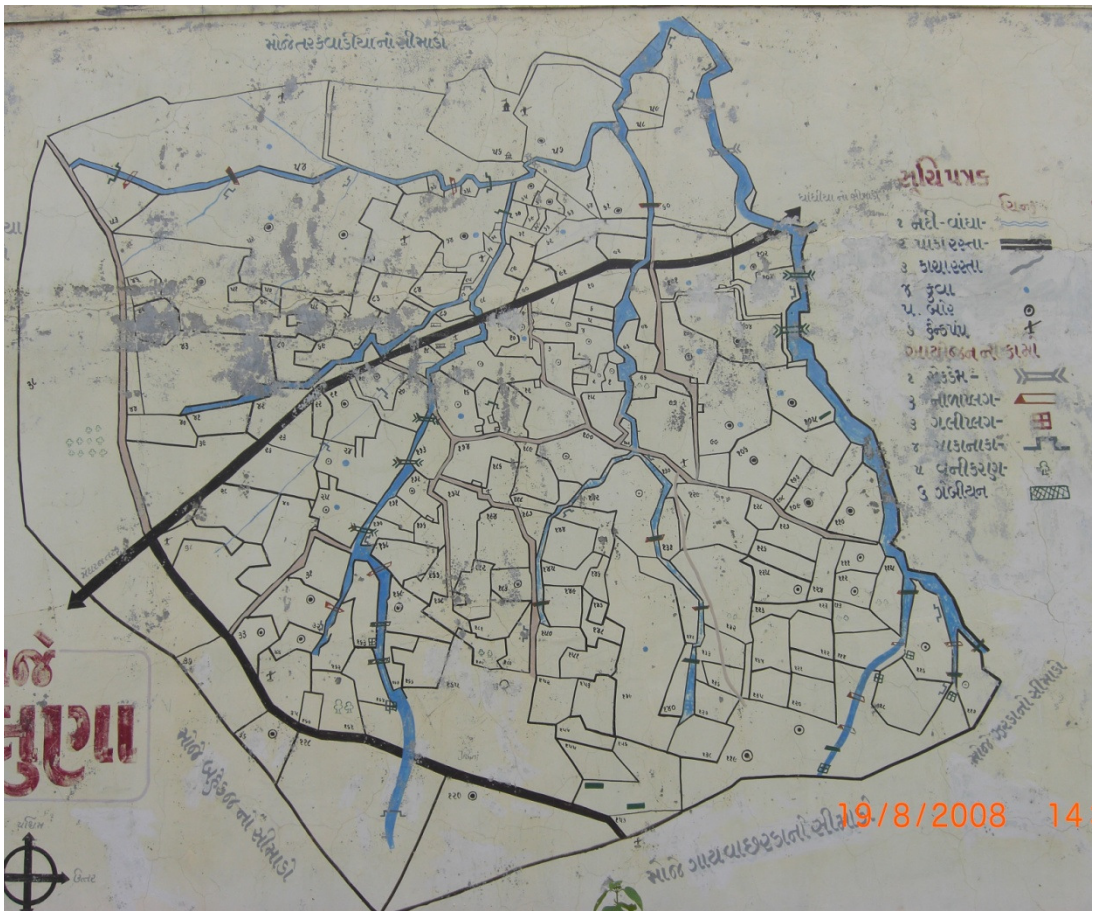
Annexure II: Colonial Myth of Kudimaramat

In order to bring all the bigger *tanks* under the direct control of Public Works Departments (PWDs) for repair and maintenance, a modern centralized administration for irrigation was evolved. The Public Works Department (PWD) tried to induce *kudimaramat* (people's maintenance by donated labor) in the mistaken belief that local communities would undertake voluntary labor to maintain the *tanks* as a tradition (Maloney and Raju, 1994; Mosse, 1999). The colonial government enacted the *Madras Compulsory Labour Act* of (1858) known as the *Kudimaramat* Act and later several *Kudimaramat* Bills were drafted (1869, 1883) to enforce the custom by law (Vani, 1992; Mosse, 1999).

Eventually, all this led to more destruction of the traditional management institutions as the Public Works Department (PWD) did not have the budget or the staff to take care of such widely scattered independent systems of *tanks*; besides people were under the impression that state would look after these *tanks* structure with the formation of Public Works Department (PWD) (Bottrall, 1992). The *Kudimaramat* was recreated as a myth; of a traditional autonomous village institution by the colonial government in order to invent a village tradition in the image of the state's planned irrigation administration (Mosse, 1999). The myth was build by the colonial government that the village communities would undertake voluntary customarily labor of *kudimaramat*, which they had abandoned (Agarwal and Narain, 1997). In fact in the pre-colonial time, cultivators did not voluntarily donate their labor for the maintenance of the *tanks* but were paid from the funds mobilized at the village level (Ibid).

Nonetheless the *kudimaramat* tradition of official discourse was recreated in order to fulfill two administrative crucial aspects. Firstly, diverse local irrigation maintenance practice was empirically fixed and rendered as a generalized standard, and this was set by engineering standards of efficiency; secondly the government's demands on village labor, resources and management acquired the legitimacy of custom (Mosse, 1999: 311-312). But in spite of all this the colonial government failed to get the support of the villagers for the upkeep of the *tanks*.

Annexure III: Watershed Map of Mathnaa



Annexure IV: Details of Focus Group Discussions

No of FGDs	Representative	No. of participants	Male (M)/Female (F)	Date of Discussion	Place	Theme of Discussion	Significant Findings
FGD1	User group	5	M	1-11-2008	Darbar *was* chopal	formation, working of the user group; quality and maintenance of the check dams	Members in the user group are from extended family and also own the borewell collectively; check dams in the vicinity of the upper caste is maintained by the lower caste women; full trust on the design and quality of the check dams.
FGD2	User group	7	4-M 3-F	27-10-2008	Harijan *was*	formation, working of the user group; quality and maintenance of the check dams	Check dams are made from cement and can stand heavy rainfall; upper caste check dams are maintained by lower caste women, elderly women distribute maintenance work of the check dams; women formally not members of the user groups but do all the maintenance work; no complete sense of ownership when it come to pay for damages on repairing the check dams.
FGD3	women of households of the user groups	6	F	17-10-2008	Harijan *was*	work distribution amongst members women for cleaning of the check dams	Yearly on rotation bases each family of the user groups distribute the work of maintenance amongst it women members in household, the distribution of work is done by the mother-in-law and all the maintenance work is managed by the women.
FGD4	same as above	5	F	15-10-2008	Tindoli Falia	work distribution amongst	The elderly women (mother-in-law) distribution of work

						members women for cleaning of the check dams	is respected by the women of the participating household in the user group for the maintenance of the check dams.
FGD5	same as above	4	F	21-10-2008	Jadeja Household	work distribution amongst members women for cleaning of the check dams	Upper caste check dams are maintained and cleaned by the lower caste and adivasi women; upper caste men nor women are involved in the cleaning process of check dams, existence of some kind of jajmani system in crude form in Mathnaa, (where the lower caste provide labor to upper caste).
FGD6	Farmers engaged in water market	5	M	31-12-2008	Village chopal	benefits of check dams and borewell	Groundwater level increase due to check dams; borewell owners in the command area of check dams are engaged actively in groundwater, being stakeholder in borewell and check dams leads to taking initiatives in the maintenance of check dams.
FGD7	First Harijan farmers to get borewell	6	M	13-11-2008	Harijan *was*	reason for installing borewell	Borewell technology make groundwater access easier; all the members in user groups are also having stake in the common borewells
FGD8	water sellers (consisting of different caste and adivasi)	5	M	5-01-2009	Village chopal	prevailing price of water in the groundwater market	Price are favored for the buyers related through caste and kinship ties for drinking water; In Post-JGS water market has shrieked (as electricity is expensive) and uniform water price prevail in Mathnaa; During Pre-JGS competition existed in water selling, hence there was no fixed water price in village
FGD9	same as above	6	F	3-01-2009	Tindoli Falia	prevailing price of water in the groundwater market	JGS shrink the market, water expensive due to JGS; Post-JGS uniform price for irrigation water through Mathnaa.

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