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Village Tanks and Community Based Management in Gondia District, Maharashtra State, India

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Glossary of local terms

Zilla Parishad: It is a local government body at the district level in India.

Taluka: A taluka is an administrative unit below the district level.

Gram Panchayat: It is an elected body of representatives at the village level. Also it is the lowest administrative unit

Scheduled Castes and Scheduled Tribes: They are historically disadvantaged people in India. Their status is constitutionally recognised.

Consumptive use: The use in which a resource unit is removed from available supplies without returning the same to the resource system

Non Consumptive water use: A use of is non-consumptive if resource unit/s can be put to additional use.

Abstract

The paper presents the case of village tanks in Gondia District of Maharashtra State in India. Essentially the village tanks are the source of irrigation. They are characterized by their comparatively smaller command area – a cluster of 3-4 villages at the most. This study is focused on a particular type of village tanks called the *Maji Malguzari* tanks (the MM tanks). The MM tanks have distinct community based management history. This study is an attempt to understand the change in community based management over the period of last 100 years as a result of certain policy initiatives at national level. The MM tanks is a classic case of changes at policy level leading to changes at operational level. This study argues that two policy initiatives in India, one related to land redistribution and the other to increasing productivity of the biomass based rural society , have resulted in disintegration of community based management of the MM tanks. However, the paper also sheds light on the positive externality of the policy initiatives. In the past, when there was effective community based management of the MM tanks, it was founded on social inequity built in caste based hierarchical society. The policy initiative helped a disadvantaged section of the society in establishing itself as a competent user group. Management implication of these changes is that it will be a limited view to base the MM tank management only on the irrigation aspect. The paper concludes that to be realistic it is necessary that in the planning of MM tanks fishery should be integrated.

Chapter 1

Introduction, Justification of the Research and Research Question

Introduction

Community based management of the village tanks in India is extensively documented (Centre for Science and Environment 1997, Mishra 1993, ADB, 2006, Pant and Verma 2010). The village tanks are a major source of traditional irrigation for the poor living in the Deccan Plateau region of India (Ananda et al 2006). The tanks obtain water from a range of sources such as rain-fed, river-fed, and rain-fed cascades. The predominance of village tanks in the Deccan Plateau regions, of which the study area is a part, is due to its unique topographic characteristics – gradually undulating terrain and the impermeable rocky substratum. This unique topography is a limiting condition for ground water extraction for irrigation. The village tanks are essentially water harvesting structures compensating for limitations on ground water extraction. A reliable estimate of the number of existing tanks and ponds in different states that cover the Deccan Plateau region is not known. The reported number varies anywhere between 200,000 and 350,000 (ADB 2006). As small-scale irrigation systems, the village tanks are easily adaptable to the system of decentralized village administration. The size of the tanks is determined by the terrain. Often it is observed in the Deccan Plateau region that there is an interconnected series of tanks to capture maximum water received in the rainy season. The overflow of the upstream tank moves into the tank downstream and so on. Maintaining such an extensive dispersed system and sharing the water needed equally dispersed community based management system. Therefore one should not be surprised to find that the village tanks were being managed by the local communities as common pool resource based on a variety of local customs and norms for centuries.

After independence the Indian Government has given limited attention to keep the traditional village tanks in a state of good repair. Most of the public investment in irrigation has gone to major and medium canal irrigation and development of groundwater under minor irrigation (ibid). This has resulted in decline of sizable part of the tank-irrigated areas. A consequent reason for the decline in tank irrigation is the disappearance of village institutions that were managing the tanks. Presently the village tanks are regarded as an “open access resource”. The village communities actively involved in the tank management in the past have lost the will to mobilize resource and labor to undertake regular maintenance activity to enforce norms and obligations (ibid).

The present study has taken lead from the India’s National Water Policy, 2002. It states that water sector reforms in India should have consideration for the existing institutional mechanisms (clause 4.1) Also it emphasises participatory community based management (clause 6.8 and clause 12). In this context, the traditional village tanks are important.

As a matter of fact, the village tanks are primarily the source of irrigation. However, they also serve other multitude of functions (Paranjpe et al 2008, Pant and Verma 2010). The ecosystem services rendered by the village tanks cannot be ignored. The village tanks are important for maintaining the groundwater level. Other ecosystem services provided by the village tanks include habitat for the unique

flora and fauna. In the economic terms, the village tanks contribute significantly in the inland fishery production. Bathing, washing of cloths, drinking water for the village community and the cattle, silt in the tank bed as fertilizer for the farms are the usual services hinged on the village tanks. Thus it will be short sightedness from the water resources management point of view to be focused on the irrigation function of the village tanks. Decline in the number of village tanks and subsequent disintegration of community based institutional mechanisms of the tank management are equally significant for these multitude of other services provided by the village tanks.

The present study is an attempt to understand the reasons of disintegration of community based management of the village tanks. It is based on the information and data collection in in Gondia district in Maharashtra State of India.

Justification of Gondia district as the Study Area

There are two reasons to select Gondia district as the study area. First is the prior acquaintance of the researcher with the study area. In 2008 and 2009, this researcher was involved in formulation of community based aquatic biodiversity conservation project in Bhandara and Gondia districts. At that time, the researcher was involved in conducting community level consultations along with BNSAM¹ to understand problems related to aquatic biodiversity conservation, in particular local fish diversity and the migratory birds. In these consultations and subsequent field visit to some village tanks, local community's perception that '*Maji Malguzari* tanks, a particular category of the village tanks with a unique history of community based management are in rapid deterioration state' was noticed. The local claim of deterioration of the village tanks is also substantiated in the report of the fact finding team of the Planning Commission of Government of India (Planning Commission, Government of India, 2006:26). The report mentions that it is necessary to 'restore' the *Maji Malguzari* tanks to augment the existing water potential of Vidarbha region (Gondia district is a part of the Vidarbha region).

Second reason to select Gondia district as the study area is the highest density of village tanks. On an average each village in Gondia district has 8 tanks It is the highest among all districts in Maharashtra state. Gondia and neighbouring Bhandara district are called lake districts of Maharashtra (Bhandara District Gazetteer 1979).

The Maji Malguzari Tanks as Focus of the Research

Maji Malguzari tanks, a particular category of the village tanks in Gondia district is the focus of this study. *Maji Malguzari* tanks have legacy of community based management (Mishra et al 2008, Marothia 2009). As per the official classification, there are two types of village tanks in Gondia district – the tanks constructed by the State (State or Zilla Parishad Irrigation Department) and the tanks constructed centuries ago by the community at the behest of rulers and dynasties in the historic past. The distinction between these two types is noticed in the local terminology as well. The tanks constructed by the State are referred as the ZP tanks (owing to their ownership vested in Zilla Parishad) and those constructed centuries ago by the community are referred as Maji Malguzari Tanks (MM tanks).

¹ Bhandara Nisarga Va Sanskruti Abhays Mandal (BNSAM) is a local NGO involved in revitalization of community based village tank management.

Most of the MM tanks were constructed centuries ago by ancestors of the Koholi, a farming community in Gondia district at the behest of then rulers (Russell 1908). The MM tanks in their traditional form are earthen structures constructed on a shallow trough on the flat lands or by impounding the water by constructing a wall at the base of two adjacent hills separated by short distance. Construction site of the MM tanks, water catchment and water release system are unique to this area (CSE 1997). Almost every village in Gondia and in neighbouring Bhandara district has at least one MM tank. Over the time, there developed a system of regulating the water distribution and maintenance of the tanks. Livelihood of all communities in the village would be related to the tank in some or the other way. However cultivators in the village dominated the MM tank management. In each village traditionally there was a revenue collector appointed by the rulers. He would be in charge of the management of the tanks. He was called *Malguzar*. The tanks looked after by him were referred as *Malguzari* tanks. After India's independence, this post was abolished by the Government through a special legislation in 1950. The prefix *Maji* in the title MM tanks refers to this i.e. these tanks were *Malguzari* in the past (*Maji*). *Maji Malguzari* (abbreviated *Ma Ma* in Marathi, the regional language) is the official term used in the administrative communication.

Research Question and Sub questions

General opinion of the local people in the study area is, 'the MM tanks are *not* in good condition compared to their condition in the *Malguzari* period' (personal communication, May 2008 and July 2011). The village tanks in general can be considered as the common pool resource (Jodha 1990, Sakurai and Palanisami 2001). The MM tanks in particular can be regarded as common *property* resources as well as the site of *collective action* owing to their history of community based management (Mishra et al 2008). The objective of this research paper is to understand the changes that have taken place in the management of the MM tanks over a period of last 100 years and their significance for the present state of the tanks.

The main research question is, why a successfully run community managed system (the MM tanks) fell apart?

The research question is divided into three sub questions. They are,

1. What are the causal factors of change?
2. What are the effects of each casual factor?
3. What is the implication of the change for overall management of the MM tanks?

Relevance of the Study

This study is important and relevant in the following contexts,

1. Livelihood of the biomass based poor in the developing world: The village tanks in India have a distinct past of community based management. They are among the range of natural resources held commonly on which poor, biomass based rural communities, especially disadvantaged sections (the so called Scheduled Castes and Scheduled Tribes) depend heavily for the daily needs. Jodha (1990) reports almost 42% of livelihood needs of the rural communities in India is

fulfilled from the rural commons. This situation is common in the developing and under developed parts of the world.

2. Decentralisation of water management: In case of developing countries, during the colonial rule village common including the water tanks constructed and maintained by the community were aggregated under the ownership of the state. In the post-colonial period, newly independent developing nations continued with the same. Two important justifications of involvement of the state in water management have been strategic importance of the resource and the scale of systems required. However, in the present global trend of economic liberalization heavy involvement of the state is being questioned (Swallow et al 1997:42). Revitalization of community based management of village commons is significant in this context.

Chapter 2

Conceptual framework

Few concepts relevant to this research are discussed below. They are related to community based collective action and cooperation. These concepts will further guide analyse the field observations on the MM tank management.

The game theory, in particular its prisoner's dilemma game is the foundation of quite many works on collective action and cooperation at the community level. The prisoner's dilemma game assumes actions of rational individuals lead to irrational outcome. It is a zero sum game. However, in the real life there are other variables like moderation by a facilitator, communication between the parties that help avoid the zero sum game situations. The theory of collective action and the theory of cooperative action try to understand what makes non zero sum game situations possible. Both the theories draw heavily from the real life cases pooled all across the world and from different settings.

Commons

Before going into the discussion of collective action and cooperation, we need to have clarification on the commons. A paper by Garret Hardin (1968) triggered development of the study of commons as a discipline. A common is an element of nature – forest, mountains, grazing lands, sacred groves – that is available to all to use. In his seminal paper, he asserted that in the absence of any external enforcement mechanism, the commons will be the victim of rational choice of individual users. However over the time, commons researchers have shown that Hardin's pessimism was not justified. There are numerous examples of commons being managed fairly well without compromising on the quality. Sacred groves (Gokhale et al 1998), Safety and Supply Forests in the North eastern India, Japanese Fishery System (Ruddle 1987, as cited in Fenny et al 1990:7) are some examples of commons perpetuating over the centuries without fail. Community based rules, norms and customary practices to regulate the use and harvesting constitute the basis of existence of these commons over long time.

Common-pool and *common-property* are two distinct concepts which are often confused with each other (Edwards and Stein 1998). A *common-pool* resource is the one from which many individuals draw 'resource units' (Ostrom 1990). This resource may or may not have formal rights attached to it concerning control of its use. A *common-property* resource is identified as such when rights can be attached to the flow of benefits from the resource. There are two important characteristics of a *common-property* resource. They are excludability and subtractability (Fenny et al 1999:3). Excludability refers to difficulty, often impossibility of controlling access of potential users to the resource. Subtractability refers to each user being capable of subtracting from the welfare of other users. Based on these two characteristics, Berkes (1989:91) defines common property resources as *a class of resources for which exclusion is difficult and joint use involves subtractability*.

Four basic property regimes are postulated (Fenny et al 1990:4). They are – open access, private property, communal (common) property and state property. On the continuum of the common property regime, exclusive possession (private property) is one end whereas open access is the other. Common

property, in which rights to use the resource are held by persons in common with others, lies between these two (Wade 1987:96). The discussion on the common *pool* and common *property* is the entry point of discussion on collective action.

Box 1: Four Basic Property *Regimes* (Fenny et al 1990)

Open access is the absence of well-defined property rights. Access to the resource is free and unregulated and open to everyone.

Private property is subjected to the right to exclude others from using the resource and the right is vested in an individual or a group of individuals. Unlike rights under open access, private property rights are transferable and exclusive.

Communal property refers to the resource held by an identifiable community of interdependent users. These users exclude outsiders while regulating use by members of the local community. Within the community, rights to the resource are unlikely to be either exclusive or transferable; they are often rights of equal access and use.

State property, or state governance, is subjected to rights to the resource are vested exclusively in government which in turn makes decisions concerning access to the resource and the level and nature of exploitation.

Collective Action

Wade (1987:97) states that '*Collective action is action by more than one person directed towards the achievement of a common goal or the satisfaction of a common interest (that is, a goal or interest that cannot be obtained by an individual acting on his own)*'. The core of collective action is to search the conditions under which a set of common-pool resource users may agree to follow a rule of restrained use without an external enforcer of the agreement (*ibid*).

There are diverse representations of the theory of collective action (Ostrom 1990: 7). However three models, Garrett Hardin's *tragedy of the commons*, prisoner's dilemma game and Mancur Olson's *logic of collective action* are the most frequently used. These three provide a foundation for recommending state or market solutions (Ostrom 1990:2). These three models are closely related. All of them emphasize perfect rational individuals produce irrational outcomes under some circumstances. These three models are extremely pessimistic (Wade 1987:97). However there are numerous cases in which users have been able to restrict access to the resource and establish rules for the sustainable use (Fenny et al 1990).

Ostrom (1990) and Wade (1987) put forth significant conditions necessary for the success of the common property resources. Ostrom refers to these conditions as Design Principles and Wade refers to them as facilitating conditions.

In brief, successful management of common property resources pertain to one of the four sets of variables (Agrawal 2003). They are,

- (1) Characteristics of resources. For example, well-defined boundaries of the resource, riskiness and unpredictability of resource flows, and mobility of the resource,
- (2) Nature of groups that depend on resources like size, levels of wealth and income, different types of heterogeneity, power relations among subgroups, and past experience,
- (3) Institutional arrangements concerning monitoring, sanctions, adjudication, and accountability and;
- (4) The nature of the relationship between a group and external forces and authorities such as markets, states, and technology

Oakerson (1986) mentions four different relationships among the users of the common *property* resource are significant for the collective action: (1) the capacity of individuals to act solely on the basis of personal discretion in matters to concern others, (2) the availability of potential sources of remedy to individuals adversely affected by others, (3) the capacity of an affected population to relax the rule of willing consent and make a collective decision binding on all parties; and (4) the presence of potential veto positions in any process of collective decision making – opportunities for one or more decision makers to say ‘no’.

Rights, rules and levels of action

These concepts are interconnected. Schalger and Ostrom (1992) mention that rule relates to shared understandings about prescriptions that apply to more than a single individual. The rights refer to authorized actions which are contingent on rules. A property right is the authority to undertake particular actions related to a specific domain (Commons 1968, as cited in Schalger and Ostrom 1992). For every right an individual holds, rules exist that authorize or require particular actions in exercising that property right. Schalger and Ostrom (1992) identify five property rights (Box3) that are relevant for the use of common property resources. Individuals or group of individuals may hold well defined property rights that include or do not include all five of the rights (Ostrom 2003)

Box 2: Types of Property rights (Schalger and Ostrom 1992)

Access: The right to enter a de-fined physical property

Withdrawal: The right to obtain the "products" of a resource

Management: The right to regulate internal use patterns and transform the resource by making improvements.

Exclusion: The right to determine who will have an access right, and how that right may be transferred

Alienation: The right to sell or lease either or both of the above collective-choice rights.

Kiser and Ostrom (1982, as cited in Ostrom 1990:52) identify three levels of action and corresponding rules – operational, collective choice and constitutional. The Operational level consists of interactions between resource users. The collective-choice level considers interactions between the collective-decision makers. The constitutional level considers decision-making arrangements external to the local community. In terms of property rights, the difference between the operational level and the collective choice level is the difference between exercising a right and participating in the definition of future rights to be exercised (ibid.)

Cooperation

In the context of community based management of natural resources, cooperation among the resource users is important. Universal definition of cooperation is not available. Online Webster's dictionary gives political economy meaning of cooperation as 'the association of a number of persons for their benefit'. Robert Axelrod (1988) in his seminal work on theory of cooperation mentions cooperation can evolve in three stages (box 3). Based on the iterations of the prisoner's dilemma game Axelrod has also postulated ways to promote cooperation.

Box 3: Stages of evolution of cooperation (Axelrod 1984: 21)

Cooperation can evolve from small clusters of individuals who base their cooperation on reciprocity and have even a small proportion of their interactions with each other.

A strategy based on reciprocity can thrive in a world where many different kinds of strategies being tried.

Once Established on the basis of reciprocity, cooperation can protect itself from invasion by less cooperative strategies

Multiple-Use Commons

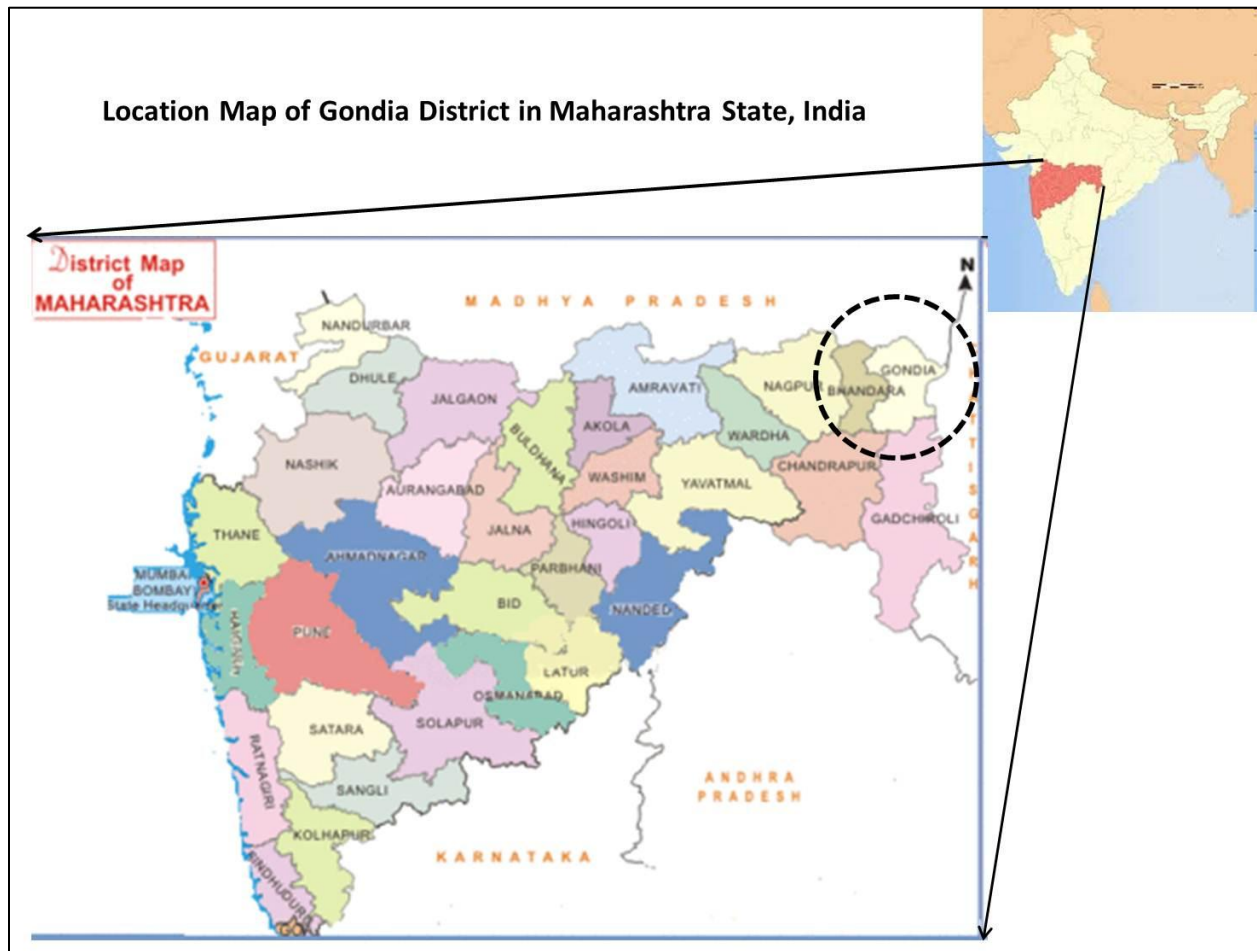
Common Pool Resources have been extensively studied world over. Much of the work on common pool resources has focused on resources that are subject to a single, extractive use. However it is not realistic to assume that people will demand only one use of a resource, if the same resource system also yields other resource units (Edwards and Steins 1998). For example, the same forest might be used for cutting timber and at the same time to graze cattle. Another point is demographic changes, technological developments and the integration of the resource in the market affect the demands placed on a resource and the extent and the type of use that might be made of it (Edwards 1996 as quoted in Edwards and Stein 1998). In this context the resource system will increasingly become subject to multiple uses.

Chapter 3

The Study Area

Gondia district is situated in the far east of Maharashtra State. It was carved out of Bhandara district in 1999. It is connected to important cities in India through a national highway and broad gauge railway connecting Mumbai to Kolkata.

Map1: Location Map of Gondia District (Source:Wikipedia)



Geography

Gondia district is a part of the Deccan plateau, a geographical feature spanned over Central India. Annual average rainfall reported in the district is 1200 mm. Almost 90% of the rains is received by the south western monsoon in the months of June, July, August and September. Wainganga is the main river in the district which is drained by five tributaries. Geologically the district is a part of the Deccan plateau which is mostly formed of igneous basalt rock. Nevertheless, the district differs from the rest of the Deccan plateau region. There are large portions of Gneiss rocks found in the district which are older than the basalt and impervious (Gazetteer of Bhandara 1979, Paranjpye and Rajankar 2011).

Administration

There are 950 villages in the district spread over 8 taluka (blocks). These villages are grouped into 556 Gram Panchayats (village councils). There are 2 towns – Gondia and Tiroda - in the district. (Gondia District Socio Economic Review 2010:1)

Population

As per the Census 2001, the population in the district is reported to be 1200707. Out of this, 88% of the population resides in the rural part of the district. (ibid: 2). Average population density in the district is 213 per sq.km. Male to female ration in the district is reported to be 1000:1005. Scheduled Castes and Scheduled Tribes constitute 13.97% and 16.36% of the total population.

Forest and Agriculture

Total geographical area of the district is 585895 H. Area under the forest in the district is 283300 H i.e. 50.22% of the total geographical area of the district (Gondia District Socio Economic Review 2010:5). Net cultivated area in the district is 160809 H. In addition, there is 49202 H cultivated twice in the year. That means total area under cultivation is 210011 H. Area under irrigation is reported to be 110872 H (52.75% of total cultivated area) (ibid:6). Landholding pattern as per the latest count (1990-91) (ibid:6) is mentioned in the table below.

Table 1: Landholding pattern

Ser. No.	Landholding category	Landholder (%)	Area (%)
1	Up to 2 H	82	49
2	Between 2 and 5 H	15	34
3	Above 5 and Below 10 H	3	13
4	Above 10 and Below 20 H	.36	4
5	Above 20 H	.04	1

Source: Gondia District Social and Economic Review 2010

Rice is the staple crop in Gondia district. Mostly it is cultivated in the rainy season. However, if water facility is available, it is also cultivated as a summer crop. Other crops cultivated in the district are wheat, pigeon pea, Sugar cane and Soybean.

Irrigation

Total area under irrigation is 98560 H. Out of this, 67049 H is irrigated through surface irrigation sources (ibid: 7). In 2001-02, the latest count of wells in the district, it is reported that the number of wells is 6978.

In the Gondia District Socio Economic Review (2010) the irrigation sources are reported under the major irrigation projects, minor irrigation project under the state government and minor irrigation projects under the Zilla Parishad. It is under the last category – minor projects under the Zilla Parishad, the MM tanks are categories. However in the socio economic review, number of minor projects constructed by the Zilla Parishad only is reported. It is 181. In the calculation of the irrigation by canal the MM tanks are most likely not included. The last category in the table 3, irrigation through other means belongs to the MM tanks, which is 12300 H (12% of net irrigation in the district). The irrigation potential of the MM

tanks has drastically reduced. In 1971-72, the irrigation potential of the tanks was reported to be 38459 H.

Table 2: Irrigation details (2009-10)

Particulars	Area irrigated (H)	%
Area under irrigation	98560	61 (of total cultivable area in the district)
Irrigation through canal	67049	67 (of total area under irrigation)
Irrigation through Well	31500	31
Irrigation through other means	12300	12

Source: Gondia District Social and Economic Review 2010

Fishery

Total available area for fishery is 22265 H. It includes river courses (length 220 km reported in the district) and all surface water reservoirs (large, medium and minor). Almost 100% of the available fishery area is used every year. (ibid:8).

The Village Tanks in Gondia District

In general there are two classes of village tanks (Rusell 1908): (a) those constructed by a bund across a narrow valley between two hills spurs to intercept its drainage and (b) those constructed by a long low bund across the broad shallow drainage lines of the plain country. In tanks of first kind, the catchment area is of considerable size and it varies from 5 to 50 sq.km. In tanks of second kind, the catchment area is comparatively smaller sizing a few hectares.

Legally the State is the owner of all tanks². For administrative purpose, the tanks with irrigation potential above 250 H are under the State Irrigation Department where as those with irrigation potential below 250 H are under the State Rural Development and Water Conservation Department. The tanks with irrigation potential below 100 H are under the Minor Irrigation Department of Zilla Parishad (Irrigation Status Report, Maharashtra State 2002-03). The tanks with irrigation potential above 250 H are categorized as Major irrigation projects where as those with irrigation potential below 250 H are called minor irrigation projects.

In Gondia district there are four major irrigation tanks, seven medium irrigation projects (looked after by the State Irrigation Department) and 19 minor irrigation tanks looked after by the State Rural Development and Water Conservation Department. Put together these tanks irrigate 223000 H area in the district (Gondia District Social and Economic Review 2010:17). There are 181 tanks with irrigation potential below 100 H looked after by the Minor Irrigation Department of Gondia Zilla Parishad (the Zilla Parishad or ZP tanks in official terminology). These tanks irrigate 10384 H area (Zilla Parishad Gondia Website). In addition to all these, there are more than 1300 *Maji Malgujari* tanks whose construction dates back to historic period. Usually they serve a cluster of 2-3 villages at the most. In other terms, they are the village tanks

² Section 20(1) of Maharashtra Land Revenue Code 1966

Table 3: Distinction between the ZP Tanks and the MM Tanks

Aspect	ZP tanks	The MM Tanks
Period/Time of construction	After 1950	Before 1950 or record unknown
Physical and technological aspects	Masonry structure with shutter type metal sluice gates	Earthen structures with plug and socket type water outlets called <i>Tudum</i>
Community aspect - Nistar ³	No	Yes

Source: Primary Data

The ZP Tanks are constructed by the irrigation department of the state government or the Minor Irrigation Department of the Zilla Parishad. Construction of the ZP tanks is recent compared to the MM tanks. The ZP tanks are usually concrete masonry structures with sluice gates to release the water. The distribution channels are concretised to avoid seepage of the water.

The MM tanks are mostly earthen constructions. Usually the earthen tank wall has one to three water outlets depending on the water storage area of the tank. In its traditional form, an outlet is a plug and socket structure formed of a hollowed wooden log inserted across the tank wall. There is a staircase like structure to regulate flow of the water. It is called *Tudum*. Overflow of the tank is controlled by a waste weir called *Salang*. The water distribution channels called *Pat*. The water distribution was through gravity. The channels have stone pitching to avoid siltation. The water catchment of the tank called *Yeva*.

A community aspect to distinguish two types is based on *Nistar* irrigators. The MM tanks have associated *Nistar* rights.

³ Nistar is a customary right documented in *Wajib ul Arz*, a village register of customs and use rights

Chapter 4

Study Methodology and Data Collection

The present work is based on the field visits conducted in Gondia district in July 2011. Primary data are collected through focus group discussions and interviewing the resource persons. Given the limited time available to conduct the field work, fishery aspects of the village tanks were given priority over the irrigation aspects for want of information.

Primary Data Collection

It is essentially based on two techniques - semi structured interview of resource persons and focus group discussion. In addition to these interactive techniques, some village tanks were visited with the community members. Secondary data are collected from the sources like district gazetteers and district socio economic review.

Focus group discussions were conducted with three types of groups. Initially a mixed group of knowledgeable individuals was invited to understand various dimensions of tank management in the district. Details of the participants of the initial focus group discussion are mentioned in Appendix 1.

Major outcome of this focus group discussion was stakeholder identification and stakeholder analysis. The the participants shared history of the MM tank management, dynamics among various stakeholders and institutional mechanisms of tank management. In this discussion, the participants guided the researcher in identifying the villages in which irrigator's tank management associations are functional. Also the researcher identified fishery cooperatives to be visited for data collection. The second target group for the focus group discussion was members of irrigator's tank management associations. The third target group for the focus group discussion was members of fishery cooperatives. In Appendix 2 details of the visits to the villages and subsequent interaction with irrigators and fishermen are given.

In the focus group discussion with the irrigators and the fishermen, the discussion was based on change in the role and contribution of stakeholders in the tank management and interrelation among the stakeholders.

Information collected in the focus group discussions was cross checked in individual farmer's and fishermen's interviews. The semi structured interviews also covered role of various stakeholders in the past and in the present.

Limitations of Primary Data Collection

The information collected is based on a limited number of interviews. Some important limitations of the data collection are,

1. Gender aspect of the tank management
2. Interviewing the officials of the line departments – irrigation and fishery and,

3. Coverage of the focus group discussions and individual interviews related to irrigator's collectivities were limited to functional tank management associations. Resource persons that helped identifying study villages shared that such functional associations are very few.

Secondary Data Collection

Case studies on irrigation aspect of the tank management by some earlier researchers⁴ have been used to substantiate the limited coverage of irrigation aspect in the present study. These case studies conducted in 2010 essentially cover self-initiated community based irrigation management in two villages in adjoining Bhandara district. Gondia district shares a lot of similarity with Bhandara district. In fact it was carved out of Bhandara district in 1999.

⁴ Vishwasrao, N. (2010) 'Sustainable Water Management in Semi-Arid India: Learning from the Gond and Koholi Indigenous Communities', Ph.D Thesis submitted to School of Architecture, Landscape Architecture and Urban Design, The University of Adelaide, Australia (Unpublished) Available online: <http://digital.library.adelaide.edu.au/dspace/handle/2440/65440>

Chapter 5

Observations and Analysis

In this section we discuss the MM tanks as the common property resources. In the context of the physical and technological aspects, a tank in the good state is desilted periodically, water channels are periodically cleaned, water catchment of the tank is maintained so that there is less silt load flowing into the tank due to maintained vegetation belts behind the water storage, water outlets do not leak, waste weir of the tank is such that there is maximum water storage but not at the cost of pressure on the earthen tank wall. In terms of community aspects of the tank management, a tank in the good state has compliance of rules and norms by maximum users, active involvement of users in upkeep, repair and maintenance of tank structure, sanctions and fine for the defaulters.

In the initial part of this chapter stakeholder analysis is presented. It is based on the present situation of the MM tanks. Later two case studies – one on the irrigation aspects of the MM tanks and the other on its fishery aspects are presented. Based on the stakeholder analysis and the case studies, important observations on overall tank management – past and present – are mentioned in the concluding part of this chapter.

Stakeholder Analysis

Participants of the focus group discussions (FGD) helped identify stakeholders in the MM tank management at present (Table 4). Brief description of each stakeholder is based on the information pooled from all FGDs and individual interview of resource persons.

Table 4: Stakeholders in the MM tank management

Stakeholder	Brief Description
Irrigators, with Nistar rights	Mostly they belong to Koholi and Kunbi ethnic communities. In the traditional village hierarchical set up, Koholi and Kunbi ethnic communities are the land holding castes. Their right to water is recognized, informally as well as formally. Being landed communities, they belonged to the ruling castes in the traditional set up. Koholi ethnic community's association with the village tank is over generations. The MM tanks were constructed by some entrepreneurial Koholi family or individual. Koholi ethnic community is proud of its traditional heritage (Rusell and Hiralal 1916)
Irrigators, without Nistar rights	Mostly they are the beneficiaries of land distribution programme of the government. Their lands are comparatively inferior. Mostly they belong to disadvantaged section of the society.
Individual fishermen	Mostly from Dhiwar ethnic community. In the traditional village hierarchical set up, Dhiwar ethnic community represents a serving caste.
Villagers dependent on the tanks for daily chores	These include community members using the tank as facility for bathing, washing the cattle, cloths etc. Mostly women of the village belong to this stakeholder group.
Tank Management Association of irrigators	In the Malguzar period, tank management associations existed. In the post Malguzar period most of them became nonfunctional. However in some

	villages they have been reformed as self-initiative of community members.
Fishery cooperatives	Fishery cooperatives represent formal association of the fishermen. Almost every village has a fishery cooperative.
Minor Irrigation Department of Zilla Parishad	After India's independence, the MM tanks were handed over to the Minor Irrigation Department of Zilla Parishad for upkeep and maintenance.
Fishery department of Maharashtra State Government	The fishery department is not directly involved in the tank management. However its role is significant for the fishery cooperatives.
NGOs	The NGOs contribute indirectly to the tank management. They are instrumental in community organization.

Source: Primary Data

The focus group discussions helped developing an interest –influence matrix of the stakeholders (Figure 1). The matrix represents present situation of interest and influence of each stakeholder in the tank management on the qualitative scale low to high.

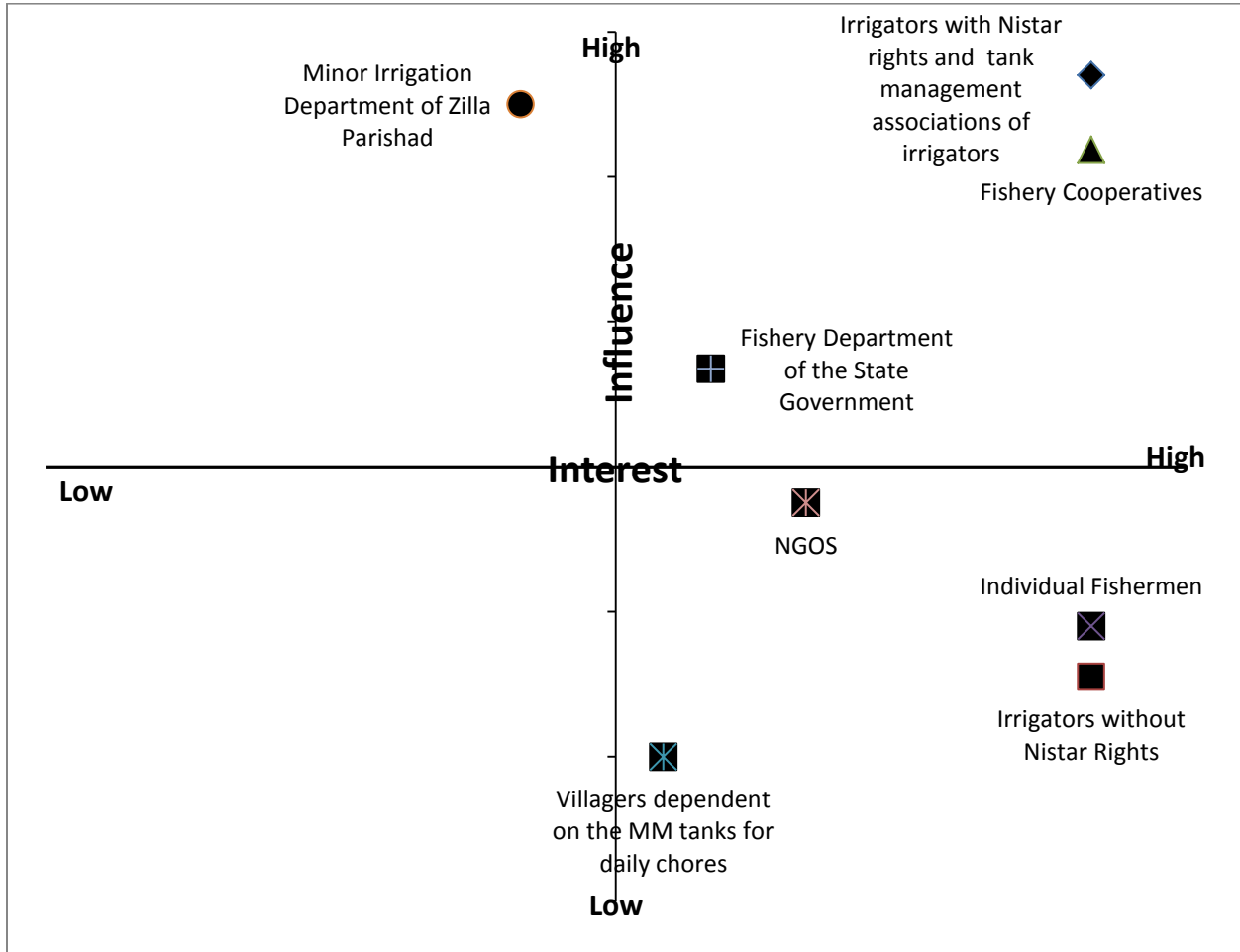
It is observed that irrigators with Nistar rights and fishermen, represented by the fishery cooperatives cluster into upper right corner of the matrix. As far as interest of these two stakeholders is concerned, they are on the same scale. However when the influence is concerned, the irrigators with Nistar rights prevail over the fishermen. Focus group discussants attributed higher influence of the irrigators to their traditional superior position in the rural hierarchical society. In fact, a retired fishery officer shared an incident in the past. In a draught situation, when the water level had reached to minimum the district administration over ruled fishermen's demand not to allow the irrigators to pump the water.

On the interest scale, Irrigators without Nistar rights and individual fishermen are placed higher but lower on the influence scale owing to their traditional position in the hierarchical society. At operational level the traditional hierarchy still prevails, albeit not at its intensity in the past.

The state is represented by the Minor Irrigation (MI) Department of the Zilla Parishad and the Fishery Department of the State Government. The MI Department is responsible for upkeep, repair and improvement of the MM tanks. Therefore it is placed higher on the influence scale. In case of the interest scale, the MI Department is ranked lower. There are two reasons for the lower interest of MI Department. First, the discussants contended, the MM tanks are a liability for the MI Department as far as revenue generation is considered. Due to recognition of Nistar rights associated with the MM tanks, water consumption by the irrigators is not chargeable. It is tax exempted. Second, due to Nistar rights, its decisive authority in water distribution is weakened. Irrigators with Nistar Rights dominate water distribution of the MM tanks. On the other hand, Fishermen represented by the Fishery Cooperative Societies, pay lease charges to the Zilla Parishad for appropriating the water in MM tanks for fish farming. Fishery Department does not have direct say in the MM tank management. Therefore it is ranked lower on the influence scale. However it ranks higher on the interest scale due to its significant involvement in introducing fish farming as a market oriented livelihood activity. This intervention has resulted in emergence of the fishermen as prominent stakeholders in the MM tank management.

NGOs instrumental in community organization do not have direct role in the MM tank management. Therefore they are placed lower on the influence scale. However they are placed comparatively higher on the interest scale because they are involved in the community based livelihood strengthening activities. The MM tanks have been a livelihood source for almost all rural communities. Therefore, on the interest scale NGOs associated with community livelihood strengthening interventions are placed moderately higher.

Figure 1: Interest-influence Matrix based on the stakeholder analysis (Source: Primary Data)



Villagers dependent on the MM tanks for daily chores include the community members using the tanks as a facility for bathing, washing clothes, as a source of drinking water for cattle and in some cases collection of aquatic edible plants like *Powan Kanda*, *Shingada* etc. This stakeholder group mainly consists of women. This group is placed lower on both the interest scale and the influence scale owing to the dispersed nature of interests and traditional lower position of women in the decision making.

From the stakeholder analysis it is clear that irrigation and fishery are the significant appropriation activities in case of the MM tanks management. Important stakeholders in the MM tank management are those associated with these activities. They are Irrigators – with Nistar rights and their tank

management associations, fishery cooperative societies, the MI Department of Zilla Parishad and the Fishery Department of the State Government.

Case Study on the MM tanks and Irrigation

This case study is based on the information collected from three villages in Gondia district and two villages in Bhandara district. These villages are situated within the periphery of 40 km and share common past marked by Malguzar regime. Details of the villages are given below.

Table 5: Irrigation Case Study Villages

No.	Village	Taluka	District	Data collection
1	Bolde	Arjuni Morgaon	Gondia	Based on primary data
2	Channa Bakti			
3	Jambhali			
4	Rajapur	Tumsar	Bhandara	Based on secondary data
5	Aashti	Tumsar		

Source: Primary Data

In the primary data collection, information is based on interview of the resource persons – those involved in management of the informal tank management association - in these villages and visit to the MM tanks in that village with the interviewee.

In the past, in most of the villages in Gondia and Bhandara districts informal tank management associations of irrigators were organized by the Malguzars. However after Malguzari abolition, these associations disintegrated. At present it is a common scene in most of the villages in Gondia and Bhandara districts to find the MM tanks as dilapidated structures owing to absence of effective upkeep and management system. Village Jambhali among the case study villages is representative of the negligence of the MM tanks and subsequent disintegration of the MM tanks. Remaining four case study villages are exception to this general trend. They are the example of comparatively well maintained MM tanks and revitalized functional tank management associations. The tank irrigation is significant in these villages. For the rice crop, irrigation is necessary in October -November, in particular for the long duration varieties. Often there is cultivation in the second season depending on the soil moisture and availability of the water in the tanks. In Rajapur and Bolde, some sugar cane cultivation is also observed.

Community Composition and Land Holding

The study villages are representative of the region. Major livelihood activity is Rice cultivation and fishery. Occasionally, Sugarcane cultivation is also reported. Koholi and Kunbi constitute the farming communities and Dhiwar is the fishing community. As far as land holding is concerned, Koholi and Kunbi are the landed communities. Some Dhiwar community members did own land in the past during the Malguzar period but mostly their land would be inferior quality and without any assured irrigation source. Most of them were landless. Most of them worked as Palaquin bearers and as servants of the Malguzar or some well to do landed family in the village. Some of them cultivated the land as subtenants. During the land reformation coinciding with implementation of the Malguzari Abolition Act that soon followed India's independence in 1947, the subtenants mostly belonging to the lower castes were provided ownership of the lands they cultivated over the generations. At present average land

holding per family is 2 hectares but the distribution is skewed. Some families belonging to the Malguzar families and elites in the village have substantial land holding.

In the context of right to water in the MM tanks to irrigate the fields, there are two classes of land holders. They are Nistar holders and non-Nistar land holders. A Nistar land holder's right to the water is documented in the *Wajib ul Arz*, a documentation of rights and customs in the villages. This documentation is typically found in the villages looked after by the Malguzars. More or less all Nistar holders belong to either Koholi or Kunbi community. Non-Nistar holders mostly belong to the lower caste that did not own any land in the Malguzar regime but received it after the land reformation.

The MM tanks in the Study Villages

In case of Bolde, Channa Bakti and Jambhali, there are two MM tanks and in case of Rajapur and Aashti, there are more than five MM tanks. In fact, in these two villages there is a series of tanks from upstream to downstream so as to capture maximum rainfall and ensure water harvesting. All these villages have at least one perennial tank which stores water until next rainy season. Otherwise most of the MM tanks are seasonal lasting for just 4-5 months. The water spread area of the MM tanks in the study villages ranges between 2 hectares to 20 hectares.

Physical Structure

Typically the MM tanks are earthen structures built on a shallow trough in the flat lands. The Koholi community in these villages is given credit of constructing the tanks at the behest of rulers of the Gond kingdom that existed until 17th century. Usually the earthen tank wall has one to three water outlets depending on the water storage area of the tank. In its traditional form, the outlets would be formed of a hollowed wooden log inserted across the tank wall. On the upstream side of the wall a platform would be constructed with staircase like structure. There would be three to four steps. Each step of the staircase would have a hollowed log of smaller diameter placed vertically. These vertical logs in each step of the staircase would be connected to the main wooden log placed beneath across the tank wall. This arrangement would facilitate gradual release of water. Each vertically placed log would be closed before the rainy season. In local terminology the staircase like structure is called *Tudum*. Overflow of the tank would be controlled through a waste weir called *Salang*. On the downstream side of the tank wall, the outlets would be connected to water distribution channel called *Pat*. The water distribution was through gravity. Each channel would have secondary and tertiary distributaries depending on the water storage capacity. The distributaries would have stone pitching so as to avoid siltation. The water catchment of the tank called *Yeva* would consist of a few streams flowing into the tank.

Management System in the Malguzar Period

It is not clear whether the Malguzars legally owned the tanks but they certainly enjoyed de facto ownership. In the Malguzar period, not only management of the tanks but management of all types of cultivable lands in the village was the discretion of the Malguzars. In brief, cultivation of the lands and the tank management were related to revenue collection. Revenue collection from each village for each year would be fixed by the rulers. Accordingly each Malguzar was bound to pay the fixed amount of revenue every year. He would retain certain portion of the revenue as remuneration. The tax

assessment of the irrigated lands would be higher. Whether the tenant cultivators paid separate tax for water use is not clear.

Each village had at least one Malguzar. In case of Rajapur village it is reported that there were three Malguzars. Being the biggest landholder in the village and the revenue collector, it was in the Malguzar's interest to ensure that tanks were in good condition and each farmer would get water to irrigate the fields. There would a village level tank management committee organized by the Malguzar. The committee would look after the water distribution. The committee would be served by a *Pankar* (water man) to release the water from the tank and subsequent distribution of the water to individual fields. He would be selected from either the farmers or the landless communities in the village.

There were rules and regulation of water distribution. Every year after the rainy season, depending on the water availability quantity of water to be given to each farmer would be decided. It would be depending on the area under cultivation. The pattern of water distribution – whether to irrigate first the fields adjoining the tank wall or the fields farthest downstream – was not uniform. It varied from case to case. In Rajapur it is reported that in the Malguzar period it would be from the tank wall to the farthest fields. In Bolde, it is reported that it was the other way, from the farthest to the tank wall. The water amount allocated to each field was based on the area under cultivation. Each farmer availing the water facility would contribute in annual maintenance of the tanks –either in kind or in cash. In Channa Bakti, the well to do families would prefer to pay for the hired labour than contribute physically. It is reported that in some villages Malguzar would compel the farmers and the labours alike to contribute to the tank management by force.

Usual maintenance of the tanks and the water distribution network would be cleaning of the channels and distributaries before and after the rainy season, repair of the tank wall, water outlets and waste weir to check seepage, periodic desiltation of the tank bed and upkeep of *Yeva* and the inlet streams.

Management System in the Post Malguzar Period

After enactment of the Malguzari Abolition Act, the state is the owner of the village commons including the village tanks. In case of the MM tanks having command area less than 200 hectares, the ownership is vested in the *Gram Panchayat*. However, the repair and the upkeep of all tanks is the responsibility of the Minor Irrigation Department of the Zilla Parishad. Over the years, the community involvement in the tank management has disintegrated. The tank management committees organized by the Malguzars have become non-functional. As a result the tanks have become dilapidated structures with leakage, seepage and heavy siltation affecting water storage capacity of the tanks. Encroachments in the tank beds and on the distributaries for cultivation have become common. In the Malguzar period this would not have happened due to strict monitoring and sanctions to the erring farmers. In the study villages this situation prevailed for some time. However some individual farmers took initiative in revitalization of the tank management associations. These associations function on the lines of earlier tank management associations. A few salient points of these revitalized community based tank management are,

1. They are subscription based organisations. Individual subscription of the members is calculated on basis of water requirement and the area irrigated. The charge per acre is fixed. But it is

variable for the season. For example, in Bolde the charge per acre for the crop cultivated in rainy season that needs just one cycle of irrigation or two in late October is rupees 75 per acre whereas the crops cultivated in summer are charged Rupees 750 per acre. The crops cultivated in summer are totally dependent on the irrigation resulting in being charged almost ten times the usual charge. There are two consequences of the variable charge. They are, (a) members with large land holding pay more than the members with smaller land holdings, and, (b) those cultivate the lands in summer pay more.

2. Water is not supplied unless a member has paid his contribution. However, the rules are not very strict and considerate of the genuine reasons like crop failure in earlier year due to pest attack or low germination or family problems like death, illness etc.
3. In case a member violates the water distribution cycle decided by the general assembly, he is fined. In Bolde it is reported to be Rupees 1000/-
4. The subscription collected from the members is utilized in maintenance of the tanks and the distributaries.
5. Each association has an executive committee headed by the chairman and assisted by the secretary. The executive committee is elected in the general assembly of members of the association held every year before the onset of rainy season.
6. The executive committee is responsible to maintain the account of the subscription of the members. Also the executive committee ensures upkeep and maintenance of the tank structure, in particular water distributaries through paid labour from the village
7. Each association has employed a *Pankar* to ensure timely release and distribution of water. The *Pankar* is selected from the members. In Bolde, it is reported that Pankar is paid Rupees 80 per day during the watering season.
8. In all villages the associations have included non-Nistar farmers in their membership.
9. The tank management associations have limited financial means to ensure upkeep of the tank structure. Key informants in all study villages shared that storage capacity of their MM tanks has drastically reduced due to heavy siltation. Another common problem of the tank management associations is encroachment in the tank bed by some influential farmer. The informants shared that in the Malguzar period it was comparatively easy to access him for redressal. Now the tanks are under the ownership of the Gram Panchayat. Any decision of the Gram Panchayat can be repealed by the district revenue authority or the Minor Irrigation Department of the Zilla Parishad. Thus it is cumbersome and time consuming to solve these problems.
10. All informants shared that increase in number of individual wells has negatively affected involvement of the community in the tank management.
11. At Bolde, the informant shared that until his generation the tank is being looked after by the revitalized association. There are some members who keep the association working. Most of the members pay the required subscription. They hardly bother to help the executive committee in arranging the labour and personnel for tank maintenance which is the most difficult tasks of the executive committee. Another concern of this informant was out migration of the community members to town places. He said this might affect the future of the tank management association.

12. In Jambhali, the village among the case study villages, where there is not any tank water management committee, the tanks are in poor state. During the field visit we found that the tank wall was broken and water being pumped out by a diesel engine. The tank bed of the other tank in this village was found to be excavated unevenly. On enquiry with the villagers it was told that a civil contractor in connivance with some influential people in the village has mined out the soil. Since there is not community based organisation as far as the tanks, which were under the private ownership of the Malguzar, is concerned.

Irrigator's relation with other users

In the past, the tank management was dominated by the irrigators. If possible, there would be a separate tank for water consumption by the community members. Its water quality would be voluntarily maintained by all in the village by not letting the cattle to enter in that tank or refraining from washing the clothes etc. Also the fishers were strictly not allowed to fish in that tank in summer so as to avoid the water from getting muddy and undrinkable. In general there would not be conflict between the daily needs users of tank water and the irrigators.

Case Study on the MM tanks and fishery

This case study is based on the information collected from five villages in Arjuni Morgaon taluka of Gondia district⁵. The information was collected by interviewing members of the executive committee fishery cooperative societies, some individual fishermen and field visit to the tanks with the executive committee members of the fishery cooperative societies. The study villages and the fishery cooperative societies in these villages are mentioned below.

Table 6: Fishery Case Study Villages

No.	Village	Name of the fishery cooperative society
1	Channa Bakti	Valmiki Matsya Palan Sahakari Sanstha
2	Tadgaon	Panchashil Matsya Palan Sahakari Sanstha
3	Tidka	Machchindra Matsya Palan Sahakari Sanstha
4	Barabhati	Saibaba Matsya Palan Sahakari Sanstha
5	Salai	Matsyagandha Matsya Palan Sahakari Sanstha

Source: Primary Data

Compared to the existence of the MM tanks over three centuries at least, the fishery cooperatives are fairly recent. Most of them were founded after 1970s. In order to improve table fish consumption as an important source of protein, creating employment and rural development, Government of India initiated a centrally sponsored scheme⁶ in 1972 in collaboration with various State Governments. Under this scheme Fish Farming Development Agencies (FFDAs) to promote the fish farming as an income generation activity and educate the fish farmers on production high yielding varieties of fish. Under this

⁵ Selection of these villages was based on the suggestion of Mr. Ghusaji Meshram (Age 82 years), a veteran of the Dhiwar community and President of Gondia district level federation of the fishery cooperatives. He suggested these villages based on their effectively functioning fishery cooperatives.

⁶ FAO. (2005) National Aquaculture Sector Overview. India. National Aquaculture Sector Overview Fact Sheets. Text by Ayyappan, S. In: FAO Fisheries and Aquaculture Department, Rome. [online]: http://www.fao.org/fishery/countrysector/naso_india/en [Accessed on 13 November 2011].

project, in 1976 Bhandara district (undivided that time including Gondia) was selected in Maharashtra to set up first FFDA in the state owing to its physiographical coverage of small tanks. As a part of the scheme, state fishery department was involved in setting up an experimental research station focused on introducing 6 fish species known for high yield. Extension wing of the fishery department was involved in training the fishermen in hatchery development and production of the focal species of the scheme. As a part of the scheme, the State Government arranged lease of the MM tanks from the irrigation department to the fishery cooperatives. Also soft loans and equipment support was provided to the fishery cooperatives. Over the time, where there is a village tank and presence of the Dhiwar community, a fishery cooperative was formed.

The MM tanks, Fishery and the Dhiwar Community in the Malguzari Period

In the caste based hierarchical rural society, the Dhiwar community is considered as a lower caste. There would a few Dhiwar households in every village. It was among the subservient landless communities in the village. Exceptionally some Dhiwar families owned inferior lands. Some Dhiwar families practiced cultivation as sub tenants of the landed families in the village. Principal livelihood activity of the Dhiwar community was fishing using traditional techniques of fishing. But it was not the only livelihood activity of the Dhiwars. They also worked as Palaquin bearers, boat men and servants of the well to do families including the Malguzar family in the village (Rusell and Hiralal, 1916). Petty businesses like tusser cultivation and selling of parched rice were among the other livelihood activities of the Dhiwar community. In return of their services they would be allowed to fish the MM tanks. Some part of the catch would be shared with the Malguzar and rest would be consumed locally in the households or sold in the local weekly market. In brief the fishery was not a market oriented intensive activity in the Malguzar period.

It is interesting to note that the Dhiwars had a typical association with the MM tanks in the context of emergency in the rainy season. Being earthen structures, the MM tanks were prone to breakage of the tank wall if it rained heavily. In such cases the Dhiwars would be called to control the breakage and flooding of the fields downstream (Personal communication with Mr. Ghusaji Meshram, a veteran fisherman).

In case of the Dhiwar community, fishing in the MM tanks was more of a privilege and not a recognized right unlike the right of irrigators documented in the Wajib ul Arz.

The MM Tanks and Fishery in the Post Malguzar period

As mentioned earlier, fish farming introduced in 1970s triggered formation of fishery cooperatives and thereby emergence of the Dhiwar community as a prominent stakeholder in the management of the MM tanks. They are federated at the district level and also at the state level. The fishery cooperatives are registered under the Maharashtra Cooperative Societies Act 1960. Almost every village in the district has a fishery cooperative society. At present there are 137 fishery cooperative societies registered in Gondia district (Gondia district Socio Economic Information 2010). Below are some salient points of the fishery cooperative societies

1. They are membership based organisations. The membership is confined to the Dhiwar community members. Financial capital of the society is raised from the shares sold to the members and soft loan from the government. Each member is allowed to hold maximum shares amounting to 1/5 of the total financial capital. This arrangement avoids undesirable influence of few members.
2. The fishing is carried out by traditional techniques – throw nets and drag nets. Usually the fishing is carried out in the months of December to March.
3. The fishery societies are provided subsidy in purchase of equipment – fishing net, diesel engines, boat, seed culture and in construction of fish breeding nursery. Also to strengthen role of community in the fish farming, it is government policy to give the tanks on lease on priority basis to the fishery societies. Lease period usually lasts for five years. Fishery cooperatives pay the lease fee to the government⁷
4. Being a registered society under the Cooperative Societies Act 1960, each society is mandated to conduct regular meetings of general assembly as well as the executive committee and keep minutes of these meetings. Also it is mandatory to have women representation in the executive committee as well as in the general membership of the society. This is important because in the traditional structure of the Dhiwar community, like other communities in the rural area, women hardly have any decision making authority.
5. Jurisdiction of each society is defined in its registration document. On average the jurisdiction is limited to the tanks in the village in which the society is registered.
6. The fishery societies are essentially focused on production of six high yielding varieties of fish introduced by the fishery department in 1970s. These fish species include three Indian carp species namely *Catla* (*Catla catla*), *Rohu* (*Labeo rohita*) and *Mrigal* (*Cirrhinus mrigala*) and three exotic carp species namely Silver Carp (*Hypophthalmichthys molitrix*); Grass Carp (*Ctenopharyngodon idellus*) and Common Carp (*Cyprinus carpio*) (FAO 2005). These species not being native species find difficult to breed in the tanks. Therefore special hatcheries are set up by the cooperative societies for breeding of these commercial species. Thus most of the fishery societies also run hatcheries to produce fingerlings of these fish species and sale them commercially. Each fishery society in the study villages has at least one expert of hatchery techniques trained by the fishery department.
7. Other than mandatory provisions of the Act, the societies have formulated certain operational rules that help check free riding by the members of the society and ensure distribution of the profit proportionate to the input of individual members.
8. Theft is a common problem faced by all societies. Therefore all societies in the study villages have employed a team of paid watchers to invigilate the tanks taken on lease at night in

⁷ This is significant in comparison to the Nistar holder irrigators which are exempted from paying any fee/tax on the use of water from the MM tanks. In brief, customary water right of the irrigators is recognized by law but not the customary right of the fishermen. In a judgment related to customary rights of the Dhiwars, the Bombay high court attributed this to the lower status of the Dhiwar community in the caste hierachy and illiteracy in the past that resulted in inadequate information reaching the revenue settlement officer (AIR 2003 SC 3286, 2004 (1) JCR 24 SC (Ramchandra Wahiwatdar ... vs Narayan And Ors. on 26 August, 2003)

particular. Sometimes the watcher team even camps on the tank bund. Such a camp was observed in Salai village.

9. Individual members are not allowed to fish in the tanks leased to the society. The fishing is conducted as the all member's activity. A person from each member family has to participate in the fishing. The days of fishing are notified publically. Typically women contribute in menial jobs like fetching the drinking water and food for the men. The members participating in fishing are paid the daily wage. The fish catch is sold to the traders in front of all members. At the end of the fishing season, the earning is divided into depositing in the corpus fund of the society and distributing to the members according to the shareholding.
10. In case of Tadgaon fishery society, we came across a notification conveying the members that a particular tank leased to the society was reserved and protected from fishing to conserve the local species (locally called *Mulki*).
11. It is observed that, even though there is willingness on the fishery cooperative society's part and the provision of subsidy in the FFDA scheme to contribute to repair and improve the MM tanks, it is limited by the time taken to get permissions and approvals from the Minor Irrigation Department of the Zilla Parishad. Nevertheless, informally the fishery societies do carry out certain repairs to check seepage of water from the tank wall.

Relation with irrigators and other users

As far as use of the water in the MM tanks is concerned, fishery is a non-consumptive activity. Fishery does not subtract the amount of water available to other users.

There is a customary practice in the study villages that water is not extracted if it has reached to its dead stock level i.e. it cannot be withdrawn through the outlet by gravity. This practice ensures survival of the fish stock. Another customary practice in the villages is not to carry out fishing in the perennial tanks in late summer to avoid the water turning muddy and undrinkable.

In the Malguzari period, catching of fish was more of subsistence activity than market oriented activity. The Dhiwar hardly had any decision making authority in the MM tank management. The village community in general would observe customary right of the fishermen over the tank water. However as mentioned earlier this customary right was not documented officially. In the Malguzar period and until 1970s the Dhiwar were not at all prominent stakeholders in the MM tank management. Post 1970s, with the implementation of FFDA scheme, the fishery developed as a market oriented activity. The fishery cooperatives represent collectivities of the fishermen helpful in establishing their stake in the tank management. When enquired about their relation with the irrigators at present time, the answer was it's been usually cordial. It gets strained if some irrigator tries to pump out the water even if it has reached to the minimum level so that it cannot be withdrawn through the outlet by gravity. In the past i.e. in the Malguzar period, it was not possible to the Dhiwars to resist this infraction. However the situation has changed now. The fishery cooperative in association with the Gram Panchayat makes sure that such an infraction does not take place. Nevertheless, it is reported in our interaction with the individual community members that interest of the irrigators prevails over the fishermen in the draught situation.

The Malguzar System

The Malguzar system was prevalent until 1950. The Malguzars functioned as the middlemen between the government and the cultivators (Baden Powell 1894:150). The Malguzar system had its origin in the Maratha Empire which dates back to pre-British regime. Bakshi and Ralhan (2007:158) argue that in the Maratha regime and the Gond regime that preceded the British regime, the revenue collecting middlemen were called Patel/Patil . The British took over the Central Provinces (of which Gondia district was the part) in the initial part of the 19th century. The Malguzar system continued to be operational in the British regime. The term Malguzar was introduced in 1860 by the Commissioner of Revenue of Nagpur Province. Usually the position of revenue collecting middleman was conferred by grant on the village headmen (Baden Powell 1894:94). Tenure (duration) and proprietary rights of the revenue collecting middleman (Patel/Patil until Maratha regime and the Malguzar since British regime) varied as per the priorities and policies of the rulers. They were reflected in the revenue settlements formulated by the rulers. In general, until the Maratha regime revenue settlement would be annually renewed and so did the tenure of the Malguzar. In the British regime, initially the revenue settlement was fixed for three years and so did the tenure of the Malguzar. In 1860, the Malguzari Revenue Settlement of the Central Provinces was implemented. It was fixed for the period of twenty years. That means the land revenue assessment was to operational for the period of 20 years. Later this period was extended to 30 years. The tenure of the Malguzar generally was in consonance with the tenure of the existing revenue settlement. The Malguzars enjoyed absolute proprietary rights (primarily over the village lands – under cultivation and potentially cultivable called culturable waste - and certain natural resources), with certain tenancy exceptions. The cultivators were called tenants. Tenancy tenure of the cultivators would also vary with the existing revenue settlement. The Malguzar would have formal staff at his disposal to assess the revenue to be collected from every piece of cultivated land. Initially the revenue from the cultivators would be collected in the form of grains. Usually it ranged between 1/6 of the total produce in the ordinary situation to 1/3 in the stressful situation (for example feudal wars). Out of this, the Malguzar would retain certain portion. In the later part of Maratha regime, the revenue collection shifted from the kind to cash payments. The Malguzar post was by grant and not hereditary. However, de facto the Malguzars enjoyed immense power. Therefore their relation with the tenants was that of patron and client (Bakshi and Ralhan 2007).

The Malguzars had substantial stake involved in the tank management since it ensured irrigation, land productivity and land revenue. It was in the interest of the Malguzar to construct the village tanks and subsequently ensure their periodic upkeep and repair. Also it was obvious that after the establishment of the village, over the time with growing population more and more land would be brought under cultivation. This would result into construction of more village tanks to keep pace with this increase in the area under cultivation. This might be the rationale of numerous village tanks in a single village.

The Irrigators and The Fishermen

In the study area, community composition in the traditional agrarian villages is heterogeneous. It is a caste society. There are land holding communities (upper castes -the elites) and service communities (lower castes – the subservient).

Historically the Koholi ethnic community in the study region is given credit to have established the villages and constructed the village tanks in such a large number (Bhandara District Gazetteer 1979; Rusell and Hiralal, 1916). Also the Koholi ethnic community is described as keen cultivators and possessive about the tank water (Singh and Bhanu 2004a). Rice and Sugarcane have been their staple crops. Often the Malguzar would belong to the Koholi ethnic community. The Kunbi ethnic community is the other major land owning and cultivator community.

The Dhiwar community has traditionally been involved in fishery and is considered as the traditional fishers. The Dhiwars in the Malguzar period and until 1970s by the time fish farming was introduced, fishery was one of their livelihood activities. The Dhiwars were also into Tusser silk worm rearing and working as servant of the village elites (Russel and Hiralal 1916: 509-11, Singh and Bhanu 2004b: 518).

MM tanks in the Malguzari period

1. Irrigators enjoyed access and withdrawal rights. These rights are mentioned in the Wajib ul Arz a village level register containing specifications of village customs based on which the Malguzars would treat the tenants (Bakshi and Ralhan 2007:128).
2. In return of these rights, the irrigators contributed to the maintenance of the resource system – cleaning of the channels, repair of the tank wall, desiltation, maintenance of the catchment of the tank etc. However it is not clear whether this duty in return of rights enjoyed was voluntary or enforced (a consequence of their patron-client relationship with the Malguzars)
3. Management rights were vested with the irrigators as well as with the Malguzar. The irrigator's involvement was limited to regulating internal use pattern. But the authority to transform the resource (the MM tanks) by making improvements was with the discretion of Malguzars.
4. Social power relations and malevolent interests apart, the Malguzar was among the local community and often resident of the village. This has two implications, (a) lower transaction cost of accessing the authority in adjudication of disputes and, (b) greater likeliness of shared belief and customs between him and the irrigators which in turn has bearing over the institutional arrangement. Thus Malguzars were the catalysts for the functioning of institutional arrangement.
5. The MM tanks as resource systems were indeed in the better state compared to their present state (free ridership, dilapidated tank wall, unrepaired tank walls prone to leakage, drastically reduced storage capacity, broken, unattended and often encroached water distribution channels). The positive externality of this was the tanks could provide their ecosystem services.
6. Kinship and social relations are important in the CPR management (Ostrom, 1990). The Dhiwars were among the subservient communities in the traditional village set up. The subservient communities had hardly had any say and position in the decision making related to the tanks. The institutional arrangement was dominated by the elites (irrigators – the landed community) in the village.
7. It is documented (primary data collection; Misra et al 2008: 98, Rajankar and Dolke 2006a, Vishwasrao 2010) that as far as water distribution aspect is considered; the institutional arrangement – monitoring, sanctions, adjudications and accountability - was flexible and need based.

8. Fishery as an appropriation activity was one of the livelihood activities of a small section of the entire village community. It was limited to occasional fishing by the fishers for self-consumption and to a lesser extent to sell in the weekly markets. Also the fish catch was limited to the local species which are considered low in productivity. Captive breeding of and rearing of high yielding fish breeds was absent. Thus in general, compared to irrigation it was an activity of lower economic scale of operation.
9. Disadvantaged sections of the society, in particular women and the subservient communities did not have any standing in the decision making even though a large part of their livelihood was dependent on the tanks

MM tanks in the Post Malguzar Period

The post Malguzar Period coincides with the post- independence period in India. In the context of village tanks as community managed CPRs, this period is marked by abolition of land lordship that prevailed in the colonial rule and vesting of the lands and properties held by the land lords in the government. Also this period is marked by vesting the ownership of village commons (forests, tanks etc.) in the government. The post Malguzar period consists of 1950 to the present. As an effect of Madhya Pradesh Abolition of Proprietary Rights (Estates, Mahals, Alienated Lands) Act 1950, popularly called Malguzari Abolition Act, the lands held by the Malguzars vested in Government and consequently the tenants of the Malguzars became lessees of Government. The Act also provided the tenants a right to become owner of land on payment of certain multiples of rent as premium (Gazetteer of Bhandara District, 1978). As an effect of the Maharashtra Land revenue Code 1966, all commons including the village tanks became property of the state (Section 20(1)). These two legislations brought in a watershed of change in the management of the MM tanks.

As discussed in the case study on fishery, Post 1970s, the Fishery Department of the state government introduced fish farming based on high yielding imported fish varieties. It took almost two decades for the intensive fish farming to develop a strong foothold in the study area. This is reflected in the low number registered fishery cooperatives at the district level that increased dramatically in the decade following 1990 (Table 5). The fishery department in the initial period helped the fishers also in marketing the produce in large towns like Nagpur, Jabalpur etc. A part of the fishery extension dealt with community organisation. Extension workers of the fishery department helped the fishers to form the cooperatives and get registered with the government.

Some salient points of the MM tanks in the post Malguzar period are,

1. The Malguzar was replaced by the state. As far as upkeep and maintenance is concerned, the state is represented by the Minor Irrigation (MI) Department of the Zilla Parishad. Transaction cost of accessing this external authority is high.

Table 7: Fishery Cooperatives in Gondia District⁸

No.	Particulars	Unit	Reference Year						
			1970-71	1980-81	1990-91	2000-01	2007-08	2008-09	2009-10
1	Fishery Production	MT	NA	284	1840	21065	9818	15143	15766
2	Fishery Cooperative Societies	Number	59	128	191	198	136	137	137
3	Members of co-op. societies	Number	NA	NA	NA	16421	8659	8710	8710

Source: Gondia District Social and Economic Review (2010:47)

2. The state assumed entire responsibility of the welfare of the people. This resulted in overlooking the existing community based management associated with the village commons. In the Malguzar period, tank maintenance hardly needed any intervention or permission from the state which is not the case now. Over the time this has resulted in development over dependence of the community on the MI Department. The duty function that the community members would comply with in the Malguzar period is no more delivered.
3. The department is always understaffed and engineering oriented. Community management aspect of the tanks is overlooked over long time. It is after water sector reforms initiated in Maharashtra, the department has initiated with the community involvement in the rural water management. However this has its own limitation. It is observed that the department has set up water users associations with respect to the ZP tanks only. The MM tanks are not considered.
4. Local knowledge, technology and their cost effectiveness is overlooked by the MI Department. This is reflected in replacement of traditional systems with the so called modern systems. For example, the water release system of the MM tanks was unique to this area. It was called *Tudum* in the local terminology. In case of malfunctioning, local knowledge and expertise would suffice to fix the malfunctioning. After taking over from the Malguzars, the department replaced the local technology with sliding metal sluice gates. Initially they worked efficiently. But over the time they get rusted and give a way to water leakage. It is out of the community's bounds to fix the malfunctioning of the metal sluice gates. Complexity of the situation is compounded by the earlier mentioned over dependence of the community on the MI Department. As a result the tanks suffer from the water leakage and the storage of water goes down.
5. In the post Malguzar period the MM tank management is compartmentalized. Different departments of the state are responsible for the different aspects. Regulation, monitoring and sanction functions of the institutional arrangement in the Malguzar period have almost lost their relevance. Some significant manifestations in this context are, encroachment in the tank bed and over the water distribution channels, neglect of the water catchment – cutting of forest and disappearance of the vegetation bed specifically maintained to check siltation load, unlawful

⁸ The figures until 2000-01 refer to undivided Bhandara District of which Gondia was a part. Gondia was carved out as a separate district in 1999 (<http://zpgondia.gov.in/>)

appropriation of water for irrigation by the powerful members of the community – breaking the tank wall or using the diesel pump disregarding sustainability of the resource system and reciprocity towards other members of the community.

Summary

In table 8 and table 9, the change in rights and role of important stakeholders and change in the management of the MM tanks over last hundred years is presented.

Table 8: Change in management of the MM tanks and role of stakeholders

Period	Stakeholders				The resource system
	Malguzar	Irrigators	Fishermen	The state	
before 1950s	De facto owner and catalyst for community based management	Dominated community based management for two reasons – social status and the nature of resource use i.e irrigation centered; Access, withdrawal and to some extent management right were recognized legally	‘Minor’ users; Had access and withdrawal rights. However the nature was of privilege. No management right.	No direct role. Relied on the Malguzar	It was an irrigation CPR. Community based management system had all elements of long enduring CPR institutional regime – monitoring, sanctions, adjudication with less transaction costs and accountability
After 1950s and before 1970s	The post ended and also the role played by the Malguzars.	Availability of individual irrigation sources and other income generation avenues like migrating to industrial areas resulted in disregard towards the MM tanks	Traditional caste based management started disintegrating but not significant enough to improve economic status and the role in management	Legal owner of the tanks – Management, exclusion and alienation rights vested in it. Takes over upkeep of the tanks which was earlier with the community.	Regular upkeep discontinued. Deterioration started. Construction of new tanks and large dams contributed to lowering the significance
After 1970s	Validity totally ended	Disregard continued. However at some places revitalization of the associations of irrigators observed. Access and withdrawal rights remain.	Fish farming results in to economic upliftment to some extent and also the say in the tank management. Access and withdrawal privileges turn into rights.	Introduction of fish farming as a policy initiative. Community’s say in the upkeep at its lowest.	Deterioration continued. Fish farming as a significant appropriation activity. Introduction of high yielding non-native fish species take toll of local species.

Source: Self field observations

Table 9: Change in rights and role of various stakeholders in the MM tank management

Stakeholder	Period ⁹	Rights ¹⁰					Level of action to which the role is confined ¹¹		
		Access	Withdrawal	Management	Exclusion	Alienation	Operational	Collective choice	Constitutional
Malguzar	M	Y	Y	Y	Y	Y	Y	Y	N
	PM	NA	NA	NA	NA	NA	NA	NA	NA
Irrigators	M	Y	Y	Y	N	N	Y	Y	N
	PM	Y	Y	Partially	N	N	Y	N	N
Fishermen	M	Y More in the form of privilege than rights		N	N	N	N	N	N
	PM	Y	Y	Partially	N	N	Y	N	N
State	M	Y Facilitated through Malguzar			Y	Y	Y Facilitated through Malguzar		Y
	PM	Y	Y	Y	Y	Y	Y	Y	Y

(Source: Self-observations and analysis)

⁹ M=Malguzar Period, PM = Post Malguzar Period

¹⁰ Based on types of property described by Schalger and Ostrom (1992)

¹¹ Based on Kiser and Ostrom (1982) cited in Ostrom 1990:52

Chapter 6

Conclusion

From the policy analysis point of view, it is clear there are two important causal factors of change in the context of the MM tanks management. At macro level, in case of the MM tanks, the enactment and subsequent implementation of the Madhya Pradesh Abolition of Proprietary Rights (Estates, Mahals, Alienated Lands) Act 1950, popularly called Malguzari Abolition Act proved to be a the turning point for change in the property regime. Another equally important event from the management point of view is introduction of fish farming in 1970s as the use activity which helped the fishermen to establish as the users of the MM tanks as competent as the irrigators. Over the time, starting from subsistence activity, fishery has developed into a major livelihood activity of the Dhiwar community. These two – the implementation of the Malguzari Abolition Act 1950 and introduction of fish farming are the important causal factors in disintegration of the traditional community based management system associated with the MM tanks.

This research paper is an attempt to understand the community based management of the MM tanks. In the contemporary research on the village tanks in India as common property resources, generally the tanks are described as failure of community based management system. The often cited causal factor of the failure is vesting of the ownership of the tanks in the state which in turn determines rights of various user groups to water (Swallow et al 1997, Mishra et al 2008). The change in ownership, representing a form of change in property rights regime, from the community to the state has impacted community control over the resource. This paper in a way confirms the observation of the earlier researchers.

The social inequalities in the Malguzar period apart, the Malguzars were the catalysts and binding force of the community based management of the MM tanks. The Malguzar post was significant because large extent of the revenue generation for the consecutive governments (Gond rulers, Maratha Empire and the British rule) was dependent on the productivity of cultivated lands. Irrigation through the village tanks ensured land productivity and consequently the revenue for the government. Combined effect of all these was irrigation as the major appropriation activity and irrigators as the major resource users playing decisive role in the tank management. The Malguzari Abolition Act resulted into total disintegration of the community based management system of the MM tanks.

Irrigation related community based institutional mechanisms are in existence over long time, perhaps since their construction. It is interesting to note that, over the last forty years, institutional mechanisms - monitoring, sanctions, adjudication and accountability - related to fishery as an appropriation function of the MM tanks have also evolved.

Introduction of fish farming has contributed to disintegration of the community based system of the MM tanks. However, this disintegration has positive externalities as far as fishers are concerned. Until 1970s, the fishermen were the minor users without any decisive role in the tank management. For these 'minor' users, access to tanks was more of a favour done to them by the village elites than a right.

It will be too naïve to refer to only two causal factors as ‘the’ causal factors. These two factors represent a watershed of other causal factors that subsequently contributed to the change in property regime and management of the MM tanks. Some of these factors are,

1. Increase in number of individual wells - bore wells and dug wells and ground water extraction devices – diesel engines and electric motors due to soft loans and subsidies (general effect – decrease in community involvement in the MM tanks management due to decreased dependence on the tanks)
2. Preference in government irrigation policy to canal irrigation and large projects (general effect – neglect of the MM tanks)
3. Demographic changes due to population increase and migration (general effect – fragmentation of the land holding)
4. Introduction of new techniques in agriculture like high yielding rice and wheat varieties that need assured irrigation (general effect – increase in irrigation needs).

Management implication – single use to multiple use

The MM tanks have peculiar history of community based management. There were elaborate institutional arrangements which qualified them as the CPRs (Jodha, 1990; Mishra et al, 2008). The Malguzars played a role of catalysts in functioning of the MM tanks as the CPRs. Until enactment of the Malguzari Abolition Act, the MM tanks were indeed an example of long enduring CPRs (Ostrom,1990:90) owing to the associated well defined institutional arrangement. Consequently the tanks as the resource system were looked after well and enjoyed being in the ‘good’ state.

Introduction of fish farming as an appropriation activity and consequent emergence of fishers as a prominent user group have a strong bearing over describing the MM tanks as CPRs. It is important here to recall that fish farming was introduced in Gondia district in 1970s. Before the introduction of fish farming, the institutional mechanism of the MM tanks management was profoundly irrigation centered. One could have described the MM tanks as irrigation CPRs in the period before 1970s. However, it is simply unavoidable at present time to describe the MM tanks based only on irrigation.

Indeed, from the point of view of irrigation the MM tanks have been the long enduring CPRs. However our analysis shows that to treat the MM tanks as the long enduring CPRs in this way presents a limited view. Over the time, especially after India’s independence the change in policy and subsequent implementation focused on empowering the backward communities provided a space to the fishers to practice their rights over water. As a result the fishery has emerged as an appropriation activity of the MM tanks. It is as important as the irrigation from the tank management point of view. It is observed that the fishery cooperatives have all potential to function as an institutional arrangement necessary in the management of long enduring CPRs. Therefore, at present it is necessary that the management of the MM tanks should be based on the tanks as multiple use water bodies and not on only the irrigation as the use.

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Appendices

Appendix 1: Details of the participants of the initial focus group discussion

Number	Name	Age	Occupation and Background	Association with tank management
1.	Ghusaji Meshram	80 years	Dhiwar community leader, President of district federation of fishery cooperatives in Gondia district	He is associated with Dhiwar community organization for over 30 years. He has also witnessed Malguzari period
2.	Manohar Bhrushundi	65 years	Retired Deputy Director of Fishery Department	He has contributed in development of fish farming in the district since 1970.
3.	Manish Rajankar	39 years	Community organizer and Secretary, BNSAM ¹²	Over last ten years involved in community organization for aquatic biodiversity conservation and restoration of tank ecosystem in Bhandara and Gondia districts
4.	Dilip Pandhare	30 years	Volunteer, BNSAM and community organizer	Working in close association with farmer's and fishery cooperatives to involve them in tank ecosystem restoration
5.	Keshav Gurnule	48 years	Farmer and Convener of SRISHTI, a local human rights NGO	Over 20 years associated with community organization and biodiversity based livelihood issues

¹² Bhandara Nisarga Va Sanskruti Abhyas Mandal (BNSAM) is a local NGO involved in biodiversity conservation

Appendix 2: Details of field visits

Date	Village	Fieldwork particulars
12 July and 21 July 2011	Channa Bakti	Interview of fishery cooperative executive committee and going through its records
		Visit to community tank with the members of the fishery cooperative society
13 July 2011	Tadgaon	Interview of fishery cooperative executive committee and going through its records
		Visit to community tanks with the members of the fishery cooperative society
13 July 2011	Tidka	Interview of Secretary of fishery cooperative society
		Visit to community tank with the members of the fishery cooperative
11 July 2011	Barabhati	Interview of Secretary of fishery cooperative society
		Interaction with individual irrigators
		Visit to community tank with the village community members
15 July 2011	Bolde	Interview of chairman, vice chairman and secretary of Irrigator's Tank Management Association
		Visit to community tank with members of Irrigator's Tank Management Association
15 July 2011	Salai	Interview of members of the executive committee of fishery cooperative
		Visit to community tank with the members of fishery cooperative
19 July 2011	Jambhali	Meeting with members of SHG of men
		Meeting with village elders
		Meeting with members of fishery cooperative
		Meeting with farmers

Appendix 3: Guiding questions for the focus group discussions and the semi structured interviews

1. Who are the traditional users of the MM tanks?
2. Describe inter relation among various users?
3. What role did Malguzar/Patil play in the past in the management of the MM tanks?
4. What role did government play in the past in the management of the MM tanks?
5. How did irrigation function/operate in the Malguzar period?
6. What role did the Dhiwars have in the tank management in the past?
7. Describe relation between the irrigators and the fishers in the past.
8. Describe change in status and role of the Dhiwar community over the time.
9. What role do fishery societies play in the fishing in the MM tanks?
10. What kind of role do the MM tanks play in social and religious aspects of the village life?

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