

Groundwater Management—A Policy Perspective

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Abstract—Groundwater has become the most dependable source of fresh water for agriculture, domestic and industrial uses in the past few decades. This wide use of groundwater if left uncontrolled and unseen will lead to overexploitation causing sea water intrusion in the coastal areas and illegal water marketing. Several Policies and Acts have been enacted to regulate and manage the use of this valuable resource. In spite of this the over extraction of groundwater beyond the recharging capacity of aquifers and depletion in the quality of groundwater is continuing. The current study aims at reviewing the Acts and Policies existing in the State of Tamil Nadu and in the National level regarding groundwater regulation and management. Further an analysis is made on the rights associated with the usage of groundwater resources and the gaps in these policies have been analyzed. Some suggestions are made to reform the existing groundwater policies for better management and regulation of the resource.

Keywords—Act, groundwater, policy, reform

I. INTRODUCTION

WATER is a finite resource. The major sources of water are surface water and groundwater. The surface water sources have become very limited and polluted over the past few decades due to various anthropogenic activities and an increase in population. This has resulted in an increased pressure on the groundwater resources. India is the largest groundwater user in the world, with an estimated usage of around 230 cubic kilometres per year, with more than 60 percent of irrigated agriculture and 85 percent of drinking water supplies dependent on groundwater [1]. The poor service delivery received from public water supply, subsidized power for pumping water, the flexibility of groundwater supply and the legal ownership of land ensuring the ownership of groundwater has made it an attractive alternative. This tremendous increase in the use of groundwater causes over exploitation leading to steep fall in water table. As a result, groundwater is becoming unsustainable with several adverse effects. These adverse effects could not be tackled since the management of groundwater suffers from fragmentation of responsibility at both Central and State levels, understaffing and out-dated databases. In order to manage this groundwater crisis community participation is very essential. The community management of groundwater is not a totally new concept. This reminds us of the Kudimaramath system that existed in the pre-independence India with the farming community and was found to be very effective in managing large irrigation systems. The emphasis of this system is to inculcate the sense of ownership among the farmers.

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A. Need for the Study

The increased use of groundwater is not reflected in the legal instruments and it remains the same as it was during the period of marginal use of groundwater. The current legal framework is out-dated and inappropriate to manage this vast usage of groundwater. A relook into the legal frame work is needed to make them appropriate and workable so that it is applicable to the present situation. The reforms in the legal arrangements should include the delineation of groundwater rights and land rights, considering groundwater as a common property resource and management of groundwater with the community participation.

B. Objectives

- To study the existing policies and acts in the State of Tamil Nadu and India regarding groundwater.
- To identify the gaps in the existing legal system concerning groundwater regulation and management.
- To suggest reforms for better management.

II. REVIEW OF LITERATURE

These literature deals with the acts implemented by the Tamil Nadu State Government to regulate the use of groundwater, the drawbacks found in their implementation and the need for reforms in them. In addition to this, literature emphasizing on the community managed groundwater is also reviewed.

A. Community Managed Groundwater

The sharing of water from a common community well comes under the customary law of the *Indian Easements Act*, 1882, and it cannot be compared with sharing of common land [2]. This community managed groundwater needs an understanding among the users about aquifer characteristics, the nature of the soil and the existing wells, in the neighboring area.

There exist significant advantages of community managed groundwater [3]. If the community users share a common understanding of the resource and the effects of their actions on the resource, they usually agree upon a set of rules to address their problems and they could determine the causes and effects of spacing wells together. The community people would start realizing that negotiation would be better than having controls imposed by the Central and the State Authorities. This study was conducted in about 100 irrigation systems located around the world and it was observed that the community managed irrigation systems performed significantly better than the Government irrigation systems.

The effectiveness of community management of groundwater by creating a sense of ownership among the

people and its successful implementation are shown in the above literature.

B. Status of Groundwater Policies at the National Level

Reference [4] deals with the Central and State level groundwater legislations. The *National Water Policy*, 1998, and the revised version in 2002 do not have statutory status, and thus cannot be legally enforced. But the State Governments find them useful in developing their own State water policies. The groundwater in the Indian legal system falls within a complex, multilayered framework in which both Central and State plays their role. At the Central level the Central Pollution Control Board (CPCB) and the Central Groundwater Board (CGWB) and at the State level the State Groundwater Authority (SGWA) and State Pollution Control Board (SPCB) are the main responsible agencies, but 14 other organizations also play a role. But they lack coordination among them and are under staffed. He has also stated that the Planning Commission's groundwater expert groups have argued that the legislative framework is reasonably robust for effective groundwater management, so it should be supported by innovative approaches such as an expansion of community based-management.

Some major drawbacks occur in formulating the laws and policies regarding groundwater [5]. He concluded that the groundwater laws are given lowest emphasis by the State Government and may be conceptually good but difficult to implement since they do not reflect the views of the local people. The main drawback is that the interdisciplinary approach is lacking while formulating a law. The practical application of these water laws at the field level is greatly missing and they have only limited publicity which makes the people unaware about the law. Further the bureaucracies that formulate the water laws are ill equipped, inadequate in number, under trained and often with Staffs who may not have any water subject orientation. He was also of the view that the water sector is related with other sectors like land, agriculture, power, mining, credit, environment etc., but this nexus is not being considered while formulating the Policies. According to the existing groundwater legislation there is no limit to the volume of groundwater a landowner may draw and only the landowners can own groundwater leaving all the landless and tribal, who may have community rights over land without any rights over the groundwater [5]. The existing groundwater laws are inadequate for the larger private users and the need for conjunctive use of groundwater and surface water have also been ignored by the State Governments. In the view of the author, there is an urgent need to systematically explore the legal alternatives in groundwater usage. The various drawbacks in formulating a new policy, the lack of co-ordination among various departments related to water sector, the status of the existing groundwater legislation and the need for further reforms are being dealt in the above literature.

C. Groundwater Policies in the State of Tamil Nadu

Tamil Nadu accounts for about 50% of total bottled water business in India and more than 400 registered units in the State exists at present, of which 220 are located in and around

Chennai [7]. The *Chennai Metropolitan Area Groundwater (Regulation) Act* enacted in 1987 prohibited the groundwater extraction in 229 Notified Areas around Chennai city. Since then the act was amended twice in the year 1995 and 2008 to increase the number of scheduled areas to 243 and then to 302. Even though the main purpose of this act was to control the illegal transportation of water from the peri-urban areas, private individuals and the State Government has violated the act. The current situation of groundwater crisis in Chennai warrants for a better policy reform.

The *Chennai Metropolitan Area Groundwater Act*, 1987, and the *Tamil Nadu Groundwater (Development and Management) Act*, 2003, are the two major Acts dealing with groundwater management and regulation in Tamil Nadu [8]. The former act aimed at the functioning of the Water Board Authority to regulate and control the extraction, use or transport of groundwater and to conserve groundwater. But the Tamil Nadu Government has consistently contravened the *Chennai Metropolitan Area Groundwater (Regulation) Act*, 1987. The Metro Water Board has been a party in the over exploitation of groundwater inside the city and also in the peri-urban areas of Chennai leading to an imbalance of water equity. The latter act was enacted in 2003, for the areas other than those mentioned in the 1987 Act. Though this Act has many good criteria, it also has some serious limitations. Some of the recommendations suggested by the author are the laws should be based on strategic planning processes and not on crisis management. There should be a good alignment of legislation and policies across different sectors (agriculture, power, industry, environment etc.) and these laws should also involve the principle of stakeholder participation, direct control and encouraged self-regulation. Before enacting a law cross party support must be developed.

The existing groundwater related policies in the State of Tamil Nadu, in the city of Chennai and the status of peri-urban areas in Chennai have been analyzed in the above literature. There is an urgent need, to reform the Policies related to groundwater [9].

D. Rights of the State and Individuals

Various rights are associated with the State and the people in using different sources of water [10].

III. REVIEW OF POLICIES AND ACTS IN NATIONAL LEVEL

The literature in par with the study is reviewed in this Chapter. Along with this the Central and State level policies, acts and Standing Orders of the Board of Revenue enacted to regulate and manage groundwater policies in Tamil Nadu regarding groundwater are also dealt in this Chapter. The Policies at the Central level are the *National Environment Policy*, 2006, the *National Water Policy*, 2002, the *Water Policy and Action Plan for 2020: An Alternative*, 2002, the *National Conservation Strategy and Policy Statement on Pollution on Environment and Development*, 1992, the *Policy Statement on Pollution Abatement*, 1992 and the *Water (Prevention and Control of Pollution) Act*, 1974. At the State level, the *Chennai Metropolitan Area Groundwater*

(Regulation) Act, 1987, and the *Tamil Nadu Groundwater (Development and Management) Act*, 2003, precisely deals with groundwater. Apart from these, the *Tamil Nadu State Water Policy*, 1994, the *Tamil Nadu Panchayat Act*, 1994, and the *Chennai City Municipal Corporation Act*, 1919, also deals with the groundwater. According to the Constitution of India, Article 372(1), the *common law* prevails in the absence of State laws so the *Indian Easements Act*, 1882, prevails in many cases [11].

TABLE I
RIGHTS TO USE GROUNDWATER

Source	Rights of Individuals	Rights of State
Open wells(Public)	Customary right for a group or community	Rights to regulate
Open wells (Private)	Absolute rights to the land owners	No rights except in the State of Gujarat
Tube-wells (Public)	Usufruct rights granted by the State	Rights to regulate use of water
Tube-wells (Private)	Unlimited right to draw water	No rights except in the State of Gujarat

Source: Singh, 1992

A. Constitutional Provisions

On January 26, 1950 the Constitution of India came into force. It consists of 395 Articles and 12 Schedules. The Constitution makes water as a State subject under the List – II, Entry 17 of the Seventh Schedule [12]. The Article 300 (A) endows the right to have the sub-soil water to the individuals. No person shall be prohibited from using a well on grounds of religion, race, caste, sex, place of birth or any of them of maintained by the State or dedicated to the use of public under Article 15 (2) Clause (b). Article 243 (G) endows power and Authority to the Panchayats to manage the water resources under the Eleventh Schedule. Thus the Constitution of India claims water rights to the State, panchayats and also to individuals.

B. The National Environment Policy, 2006

The *National Environment Policy*, 2006, was formulated by the Ministry of Environment and Forests as an outcome of extensive consultations with Experts from different disciplines, Central Ministries, Members of Parliament, State Governments, Industry Associations, Academic and Research Institutions, Civil Society, Non-Governmental Organizations (NGOs) and the Public [13]. It deals with the direct causes of groundwater depletion, pollution and the efficient means for utilizing and conserving the groundwater. Section 5(2) recommends on several actions to be taken as follows:

Take explicit account of impacts on water table by electricity tariffs and pricing of diesel.

Mandatory rain water harvesting in all new constructions as well as design techniques for road surfaces

and infrastructure to enhance groundwater recharge. Promote capacity development of relevant stakeholders and provide web-based information on water harvesting techniques.

Prepare and implement a comprehensive strategy for regulating the use of groundwater by large industrial and commercial establishments on the basis of careful evaluation of aquifer capacity and annual recharge.

Suitable sites for dumping the toxic waste material may be identified and remedial measures may be taken to prevent the movement of the toxic waste in the groundwater.

The optimum utilization of fertilizers, pesticides and insecticides should be encouraged for preventing the pollution of groundwater.

C. The National Water Policy, 2002

The *National Water Policy*, 2002, considers water as a prime natural resource, a basic human need and a precious National asset [14]. This policy emphasizes on the importance of groundwater in Section 1(6) stating there is a need for judicious and scientific resource management and conservation of groundwater. The groundwater monitoring is dealt under Section 7, stating that there should be a periodical reassessment of groundwater potential on a scientific basis considering the quality of water available and economic viability of its extraction. This policy emphasizes, to regulate the extraction of groundwater as not to exceed the recharging possibilities, to implement groundwater recharge projects and the conjunctive use of groundwater and surface water. It also states that over exploitation of groundwater should be avoided especially near the coastal regions to prevent ingress of seawater.

D. The Water Policy and Action Plan for India 2020: An Alternative, 2002

Even though the *National Water Policy*, 2002, has a number of positive elements, it is not enough to prepare the nation for the optimum management of water resources in the following century [15]. So considering the long term goals, an alternate water policy was proposed in November, 2002. The management of groundwater resources is described under Section 2(11). It emphasizes that the right to groundwater should be given to the concerned community and not to any individual on land-ownership basis. The respective community organizations should inspect and monitor the use of groundwater by private landowners to ensure that the groundwater beyond permissible limits is not being withdrawn. Diversion of groundwater to urban areas or for industrial use without consent of the Gram Sabha or Village community should not be permitted. In canal irrigated areas groundwater planning should be integrated with the water supplied through the canal system so as to avoid water logging. The over-exploitation of groundwater must be prevented by legislation and its enforcement by local Government bodies and Gram Sabhas. The permissible water depths to which groundwater depletion will be permitted for each region should be notified identifying the special problems of each area. Groundwater recharge projects should

be developed and implemented with community participation for augmenting the available supplies. There should be a reassessment of groundwater quantity and quality every 5 years. The Government should transfer the Authority for regulating groundwater use to the lowest level, the Gram Sabha. In order to minimize the excessive use of groundwater, the electricity and diesel should be supplied at the market rate and should not be subsidized. In case of subsidizing the electricity it should be given only to the marginal and poor farmers and not to the better-off farmers. Over exploitation of groundwater should be avoided near the coast to prevent ingress of sea water.

E. The National Conservation Strategy and Policy Statement on Environment and Development, 1992

The quality of groundwater is being affected due to chemical pollution and ingress of sea water in the coastal areas [16]. The Section 2(7) of this act states that, these effects are due to the absence of an integrated land and water use policy in the country. It also insists on building up a network for assessment and monitoring of groundwater quality throughout, the country on a permanent basis similar to the meteorological stations for the sustainable use of land and water resources under Section 5(2).

F. The Policy Statement on Pollution Abatement, 1992

This policy states that, new mechanisms should be evolved to reduce local concentration of pollutants in areas with high pollution loads in groundwater and the effect of the various types of pollutants should be considered under Section 4(1). The waste water generated have increased manifold recently and they are discharged or dumped on low lying areas without any pre-treatment, thereby contaminating groundwater [17]. The Section 4(3) of this policy demands for economical, safe and socially acceptable treatment technologies in addition to the biological waste water treatment, on land disposal using suitable vegetative cover. Section 6(4) of this policy has stated that the regulations will be formulated considering the environmental effects of hazardous and toxic substances and remedial actions will be taken in case of groundwater contamination.

G. The Water (Prevention and Control of Pollution) Act, 1974

This Act was enacted after the Stockholm Conference on Human Environment, 1972, to address the environmental problems [18]. The CPCB and SPCB were formulated under Section 4 of this act. Under the Section 25 of the *Water Act, 1974*, no industry should dispose the sewage or trade effluent into a well in excess of the standards and without the consent of the State Pollution Control Board. The violation of this is punishable with imprisonment for term not less than one and half year but which may extend to six years with a fine of ₹5000 to 10000 under Section 44 of the *Water Act, 1974*. In Section 17 it states the functions of the State Board as to evolve economical and reliable methods of treatment of sewage before discharging into the wells, to establish a laboratory or laboratories analysis of samples of water from

any well or sewage or trade effluents. Section 32 of this act provides power to take emergency measures in case of pollution of well by the State Board.

H. The Indian Easements Act, 1882

According to Article 372(1) of Constitution of India, common law prevails in the absence of State law. The term easement is of French origin which means a privilege that one neighbor has of another by writing or prescription, without profit. Right to take water from a well is a customary right and not a profit a prendre (i.e., something taken from the soil or right to take a part of soil or produce of soil and is more than easement) under Section 18. But a section of public or community cannot claim for customary right over a common well by depriving the use of well to some other community. The general rule is that, the owner of the land has got a natural right to all water that percolates or flow in channels within his/her land under the Section 7 Illustration (g) of this act.

In case of percolating water no easementary rights can be acquired unless it runs in a defined stream under Section 17 Clause (D) of the *Indian Easements Act, 1882*. Under Section 7 of this act, the groundwater does not acquire the easement by prescription since there is no visible means of knowing the water percolating in and out of the land. It also states in Section 60 Clause (A) that the licence to take water out of a well is irrevocable.

IV. REVIEW OF POLICIES AND ACTS IN STATE LEVEL

The Tamil Nadu State Government has passed several policies and enacted laws for regulating and managing groundwater in the State. Specific acts have been passed for Chennai, the Capital city of Tamil Nadu and its peri-urban areas predominantly dealing with the groundwater resources in these areas.

A. The Second Master Plan for Chennai Metropolitan Area, 2008

The *Second Master Plan for Chennai Metropolitan Area, 2008*, permits the installation of motor for pumping water in various zones classified as primary residential use zone, mixed residential use zone, commercial use zone, urbanisable use zone, non-urban use zone, agriculture use zone under normally permissible uses [19]. Annexure X is concerned about the coastal regulations in which Section 2 prohibits the withdrawal of groundwater within 200 m of high tide level and above a distance of 200 m to 500 m manual means of groundwater extraction is allowed for the purposes of drinking, horticulture and agriculture. In case of estuaries and bays water can be withdrawn within 50 to 200 m from high tide level provided no other source of water is available for drinking and domestic purposes. The guidelines for carrying out construction in the coastal regions states that, the basements can be allowed only if the no objection certificate is obtained from the SGWA to the free flow of groundwater. For this the State Government should consider the guidelines issued by the Central Government regarding the issue of no objection certificate. Annexure XI deals with the regulation

for developments in the aquifer recharge area in which certain areas are delineated as aquifer recharge areas and restricted for development. Major part of these areas should not be a paved surface and left as open space for infiltration of storm water to the aquifers. Rain water harvesting is dealt in Annexure XIX describing about seven methods of rain water harvesting to be adopted in different buildings. The Chapter IV of the *Second Master Plan for Chennai Metropolitan Area*, 2002, is about Traffic and Transportation. In this it has been suggested to use the stagnated water in the sub-ways during monsoons as a means for groundwater recharge. This plan also recommends for preparation of water map that indicates all the surface and groundwater sources available in Chennai under the Chapter VI dealing about infrastructure.

B. The Tamil Nadu Groundwater (Development and Management) Act, 2003

The *Tamil Nadu Groundwater (Development and Management) Act*, 2003, is similar to that of the *Chennai Metropolitan Area Groundwater (Regulation) Act*, 1987, except the areas in which it is functional [20]. This *Act* extends to the whole State of Tamil Nadu except the areas in which the *Chennai Metropolitan Area Groundwater (Regulation) Act*, 1987, is applied. This *Act* insists on conjunctive use of surface water and groundwater wherever it is feasible and the Authority may identify and notify suitable areas for conjunctive use to be practiced under Section 4. A new Authority named Tamil Nadu Groundwater Authority was formulated under Section 7 of this act to conserve and maintain the groundwater resources in the Tamil Nadu. The Authority comprises of a Technical Officer and Experts in groundwater.

This act directs the Tamil Nadu Electricity Board not to supply electricity for energizing any well sunk in contravention of the provisions of this act and if the permit for groundwater with drawl has not been granted or cancelled.

C. The Water Policy of Tamil Nadu, 1994

The *National Water Policy*, 1987, has insisted the States to frame the *State Water Policy* [21]. As per this the *Tamil Nadu State Water Policy* was formulated in 1994. The Preamble of the policy insists on the conjunctive use of surface water and groundwater and maintenance of the groundwater quality within the standards and the timely control of groundwater levels by the appropriate agencies. The Section 11 of this policy states that, the pollution of groundwater should be eliminated in order to improve the quality of water. A phased programme should be undertaken for this under Section 12. The groundwater potential of the areas will be identified and farmers will be trained on the specific exploitation methods and suitable legislation will be framed and enacted for preventing over extraction of groundwater under Section 35 and 36 respectively which is yet to be achieved.

D. The Tamil Nadu Panchayat Act, 1994

This act vested powers with the Village panchayat for sinking of wells and let them for open use and enjoyment of all individuals, irrespective of their caste or creed under

section 110(g). Under Section 236 of this act the repair and maintenance of these wells need to be done by the Village Panchayats [22]. This also deals with the artificial recharge of groundwater through the rainwater harvesting schemes under Section 257 making it mandatory in every building and if this is not executed, the water supply connection provided to those building will disconnected till rain water harvesting structure is provided after the Second amendment in 2003.

E. The Chennai Metropolitan Area Groundwater (Regulation) Act, 1987

The main objective of this act was to regulate and control the use or the transport of groundwater and to conserve groundwater in whole Chennai city and 229 Notified Areas in Chengalpattu district [23]. These areas which come under the *Chennai Metropolitan Area Groundwater (Regulation) Act*, 1987, are known as Scheduled Areas. Every well in the Scheduled Area should be Licensed before it is sunk and the competent Authority may grant or refuse the permit for licence under Section 3(6) based on the purpose for which groundwater is to be used, the existence of other competitive users, the availability of groundwater, its effect on other sources of water supply, the compatibility with the existing water supply system and the factors controlling or preventing pollution. The details of the licensed wells are maintained in a register under Section 4(2) along with other particulars such as type of well, its exact location, the device used for lifting, the date from which the groundwater is being used, the purpose for which groundwater is used, the quantity of groundwater utilized and the extent of area if the well is used for agricultural purposes.

Licence can also be obtained in the Scheduled Areas to extract groundwater for transporting or using it other than domestic purposes under Section 5(2). This act is exempted for the wells in which water is extracted without the aid of any devices or with the pump not exceeding 0.5hp and for the wells used for agriculture before the commencement of the Act under Section 7 and Section 13(2) respectively. The competent Authority mentioned in this act denotes the Metro Water Board in the city of Chennai and in relation to the Villages specified in the Schedule, the respective Collectors of the Taluks in which the Villages fall.

The offences and penalties for any person who contravenes or fails to comply with this act under Section 10 are: For the First offence with fine of ₹ 500 and for the Second offence, imprisonment for a term of six months or fine of ₹1000 or with both. If the person continues to commit the same offence shall be punished with a further fine of ₹100, for every day and in case of companies, every person in charge of the company and was responsible for the offence will be punished under Section 11. But the person will not be liable to any punishment, if he/she proves that offence was committed without his/her knowledge.

Amendments: The *Chennai Metropolitan Area Groundwater (Regulation) Act* was passed in the year 1987 and until now four amendments have been made to the *Act* in the years 1995, 1997, 2002 and 2008.

In the 1995 amendment the number of Scheduled areas listed under the *Act* was increased from about 229 to 243.

In 1997 amendment a licensing fee of ₹250 was included for sinking well for domestic purposes. For wells used other than domestic purposes licence fee of ₹ 5000 was incorporated.

The amendment 2002 was made to consider further particulars such as the existence of other sources of water other than wells, the compatibility with the existing water resources, the factors that affect, control or prevent pollution, the possibility of rain water harvesting and conservation while issuing the licence for the wells by the competent Authority. The hydrogeological conditions, water table conditions, groundwater potential and yield of the aquifer should also be considered and the depth of the well must be restricted based on that. The register maintained by the Authority should also contain the details of the methods adopted for groundwater conservation and rain water harvesting, the quality of water with scientific evidences.

This amendment also increased the penalty for first offence from ₹500 to 2000 and for the second offence it was increased to ₹5000 and for continued offences the penalty was increased to ₹500 per day. The competent Authority was endowed with the powers to seize any vehicle or other article including pump, tube, tool or equipment used in committing offence.

A new principle was also included which states that in every building owned by the Government or any other institution or the residential areas must have a provision for rain water harvesting.

After the 2008 amendment the Scheduled Area mentioned in this *Act* as Chengalpattu district was replaced by Tiruvallur and Kancheepuram district of State of Tamil Nadu.

F. The Chennai City Municipal Corporation Act, 1919

This act entitles the Authority to the Commissioner, appointed by the State Government under Section 7 of this act for providing approval to sink the wells and to remove them if it is sunk without the approval under Section 247 and 256(1) respectively [24]. This act also states that the Commissioner should notice the owner of the private well to clean and protect it, in case of any pollution from surface drainage or some other under Section 265(1) and the Commissioner can order to refrain the people from using the private or public well water or to close off the well which is unfit for domestic purposes under Section 265(2) and 266 respectively.

G. Standing Orders of the Board of Revenue

Standing Order is a rule held to be in force until specifically changed or withdrawn, especially a regulation relating to parliamentary procedure. The Standing Orders of the Board of Revenue related to groundwater are dealt with here.

H. RSO 6 - Private Wells

This Revenue Standing Order (RSO) – 6, insists on the record of construction of wells in any area [24]. When wells are about to be sunk, notice need not be given to the Collector. It will suffice if the fact of construction of a well is recorded in the permanent Adangal register or the Karnam records. The restrictions for the wells near Government irrigation works are

abolished under this, provided they are sunk in land which belongs to the person sinking well. The well register will be maintained containing the particulars of nature and the condition of the well with its dimensions and the normal depth of the water and its irrigation capacity.

But according to this Standing Order of the Board of Revenue the wells sunk near the Government irrigation works may affect the flow of surface water in the irrigation channels. This may yield more water to an individual well owner rather than the public. So sinking of wells around government irrigation works has to be restricted based on the wells being situated in head reach, middle or tail end of the channel. In the head reach the wells can be sunk since it can prevent the water logging in the adjacent fields. But wells should not be sunk adjacent to the middle reach of the Government irrigation works since the surface water acts as a recharge to the wells and so the tail ends will not have sufficient water from the surface water sources.

I. RSO 21 - Assignment of House Site in Villages and Town

This states that if the wells are located in the site allocated for houses and need to be closed for construction purposes then the value of wells should be collected if they are not useful for agricultural purposes. These wells can be closed only if it cannot be used in anyway without further investment. Payment should be made in compensation to the well and cost paid for well shall not exceed 50% of their market value.

But this payment for well closures does not compensate the benefits received from it. Instead this can be utilized as artificial recharge structures in the house sites allotted to the people.

V. ANALYSIS

The rights pertaining to the extraction and usage of groundwater falls under different perspectives such as private property rights, common property rights and public property rights.

A. Private Property Rights

Generally groundwater is considered as a private property. This property rights belong to an individual or a company and may be transferred to other users. Non-owners do not have access to the resource. In the common law countries like India groundwater is being considered under the real property and the owner of such property has an exclusive right to enjoy and dispose all the products. To be subject to private property, groundwater must be an immovable good which is not so. According to the *Indian Easements Act*, 1882, Section 7 Illustration (g) the owner of the land has got a natural right to all the water that percolates within the land. Article 300(A) of the Constitution of India endows the right to have subsoil water to all individuals.

This private property right is not suitable since technically the groundwater occurring beneath the land surface is common. For example if the water is pumped from one plot the water table below this land decreases, so in order to fill this space groundwater from the adjacent plots moves in.

Hence the user of nearby plot enjoys his own private property rights but exploiting the neighboring users. Thus the groundwater cannot be delineated as that of the land above and the usage of it affects the others.

B. Common Property Rights

This means that the resource is owned by a community of users excluding non-members. In general, the *rights* linked to common property are nonexclusive within the community and provide equal access to all the owners.

The 73rd Amendment to the Constitution of India, Article 243(G) entitles Authority to the Panchayat to manage their water resources and community asserts under the 11th Schedule Entry 3 and 29 respectively. According to the Indian Easements Act 1882, undivided co-ownership could be considered as common property with respect to groundwater under Section 7 and 17 of Illustration (g).

However, the application of this type of private ownership to groundwater would face significant problems. The undivided coownership is not permanent and partition may be demanded at any time. But it is impossible to perform the division with respect to groundwater. Apart from an assumption of equal usage of groundwater, undivided co-ownership has no means to apportion property usage between owners. As a result, undivided co-ownership cannot be used as a legal mechanism for the allocation of groundwater. No other type of private property ownership is relevant to groundwater quantity management.

C. Public Property Rights

This means that the ownership is vested with the State, which defines, manages and enforces the *rights* to use the resource. The usage of the groundwater is not transferable on a consensual basis between users.

The *Constitution of India* makes water as State subject under List II, Entry 17 of the Seventh Schedule. *The National Water Policy*, 2002, provides Authority to the state to maintain and regulate the use of groundwater.

The Public Trust Doctrine was held in India by the Supreme Court after the landmark case *M. C. Mehta v. Kamal Nath* in the Indian Environmental Law. It states that certain common properties such as water, forests and the air were held by Government in trusteeship for the free and unimpeded use of the general public which means that these resources were either owned by no one (*Res nullius*) or by everyone in common (*Res communis*). According to this doctrine no individual can own the groundwater which is a natural resource and it should be considered as a Common Property Resource.

Thus the poorly defined property rights on groundwater induce spoliation of the resource, by the users and worsen the legal frameworks and reduce the effectiveness of its implementation. The individual rights, community rights and the State rights together are vested on the use of groundwater. This legal pluralism should be avoided and proper delineation of the rights associated with groundwater is prime need to formulate the policies and laws.

D. Gaps in Existing Groundwater Legislation in Tamil Nadu

The policies and acts existing in the State of Tamil Nadu and in India relating to groundwater regulation and management are analyzed and the main drawbacks are analyzed. These Acts aims only licensing system is provided to all the areas in and around the State irrespective of the block being in overexploited or safe category. The SGWA has categorized the areas into different blocks based on the existing groundwater potential. According to this overexploited, critical, semi-critical, and the safe blocks exists in and around the State of Tamil Nadu and in Chennai. Considering this a ban could be enforced for the extraction of groundwater in the overexploited areas and for the remaining blocks licence can be issued by limiting the well depths.

Further no punishment will be given to the in charge of the companies if he/she proves that the offence was committed without his/her knowledge under Section 11 of this the *Chennai Metropolitan Area Groundwater (Regulation) Act, 1987*. This remains as a loop hole to violate the *Act* since the officials in charge of the company can very well prove in the Court of law that they were not involved in the offence.

The exemption of licence for 0.5 hp pump and wells used for agriculture before the *Chennai Metropolitan Area Groundwater (Regulation) Act, 1987*, will leave space for contraventions since the wells may be used for agricultural purposes before the act but now it can be used for domestic or industrial uses. So irrespective of wells used for agriculture, industry or any other purposes be it sunk before or after the implementation of the act should be licensed without any exemption.

These acts do not recommend the Authority for the scrutiny for the well licence and for the periodic update of register containing the well details. No provision exists for renewal of the licence. They insist only for the rain water harvesting methods but it does not consider the need for an assessment of how genuinely they were implemented and does not have any prioritization of usage of groundwater as it is mentioned in the *National Water Policy, 2002*, for water. These acts does not specify the depth of the well, distance between the adjacent wells based on the aquifer characteristics, cone of influence and hydrogeology to be considered in any area in which the well is to be sunk.

E. Reforms to the Policy

Some reforms have been suggested to the *State Water Policy of Tamil Nadu* for a better management of the groundwater resource. The importance of local users should be felt and they should be given authority in managing the groundwater resources. Technical knowledge and skills should be imparted to the community people so that they could have a better understanding of the water demand and efficient utilization of it. Participation of the local users can only be effective in managing the resource. The organizational structure should be made as a bottom up approach so that the groundwater users should be given importance in managing it. The awareness of the acts and policies to the people is very less. This has to be published and made available to all in local

language. In the over exploited regions where the groundwater is very less, a ban has to put for the construction of new wells. The policies should also include provisions for the renewal of licence and scrutiny of the well licence possessed by the people. The Government departments should maintain the Hydraulic particulars like aquifer type, aquifer recharge capacity, aquifer yield, depth of groundwater table, spacing between the individual wells, cone of depression in the groundwater etc., related to groundwater and must update them regularly. The permission to dig a new well in any region should be given based on these data maintained by the Government departments and this can avoid overcrowding of wells in that region. Improving the surface water resources is also a technique to reduce the stress on groundwater. So it must also be concentrated along with groundwater. The recharge of the groundwater is equally important. The rain water harvesting has been implemented in the State of Tamil Nadu but the reality of the structure and the functioning of it, is not being analyzed by any authority. Groundwater rights should be separated from land rights. The rights related to groundwater like the private property rights, public property rights and the common property rights must be delineated properly for avoiding interruptions in the usage of it. The groundwater should be made as a common property to all and the usage of it should be taken care by the Government so that the over exploitation and misuse of the resource will be minimized.

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