Challenges in Utilization of Potential Groundwater and the Hypotheses of River for Jaffna for Cultivating Productive Water

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Abstract— Problems of drinking water in the Jaffna is an upcoming problem which mostly depended with increasing the population, growing the cultivation activities, opening the sewage in uncontrollable manner and etc. People of the Jaffna area depend on the ground water for all the activities using open well or tube-well. For all activities, the people extract water from underground, induced the badly behaved of quality of water fluctuating the years and also which case usually not related to one, this related with all people in the Jaffna area. The knowledge area covers the potential effects of the ground water in the Jaffna area and improve the problems and effort to bargain the solution for approaching problems using the collected knowledge and information from four of the previous work done by others are reviewed in this articles. The following five articles are mainly reviewed with other literatures referred. "Groundwater potential in the Jaffna Peninsula and impacts of climate change", "River for Jaffna-cultivating productive water from salt water Lagoons in Northern Srilanka-What the water balance of Elephant Pass lagoon demonstrates", "Water problems in the Jaffna peninsula", "Jaffna peninsula water resources challenges" and," assessment of groundwater resources in Jaffna limestone aquifer".

Index Terms— Salinity, Lagoon, Water problem, Productive water, River for Jaffna, Ground water Potential, Jaffna Peninsula.

1 Introduction

WATER is a tremendous natural resource giving by the nature as a gift. Any person cannot live without drinking water. Drinking water, frequently in everyday basis is the greatest method we be able to provide to our bodies, is a very important thing to our bodies' health. Not only human, but also all of the organism's essentially important water to stay alive. The significance of drinking water for our bodies is dominant to our health, for the reason that it creates up to 70 percent of our bodies' weight. There are more achieving benefits of drinking water to our bodies, such as it can be optimizing our metabolisms, make our skins healthier, lose our weight, and stay alert.

Jaffna peninsula forms the northern part of Sri Lanka with an area of approximately 1017 km^2. The peninsula is about 70 km long and 10 to 36 km wide. It is bordered via the park strait on its western and northern side, by the Bay of Bengal on the east and by the main land Sri Lanka on the south. It is globally located between 79° 54'E and 80° 20'E longitudes and 09° 30'N and 09° 50'N latitudes. Jaffna peninsula have two internal lagoons, Thondamannaru and Upparu and the external lagoon, Elephant pass, which situates between the northern part of Sri Lanka and other parts of Sri Lanka. Thondamanaru and Upparu lagoon spread over the areas of 77.6 km^2 and 25.9 km^2 in view of that as well as catchment area of 298 km^2 and 220 km^2, the external lagoon with area of 78 km^2, water come to be from discharging of 940 km^2 regulated catchment.

Groundwater, is a water getting from underground, be in gap between the soil particles and rocks or rocky crevices, which are called aquifers. In Jaffna area be found below the land surface in some groundwater. Because of its availability and generally good quality, groundwater is commonly used for household needs and for other purposes. In Jaffna peninsula area mostly depended in ground water as well as the inhabitants of people in Jaffna area typically be governed by on the accumulation of sand aquifers easy for its drinking water in addition to irrigation to agricultural activities. These activities are done through extracted from the ground water using well or tube-wells in villages or towns. Pure drinking water is the main problem faced by the people in the Jaffna district because they depend on ground water. Water sources here are polluted with the use of chemicals including fertilizer for agricultural purposes and mixing of oil with ground water. And also inappropriate for drinking of water is a world wild intimidation problem which affects most island or land of covered more area by the sea or salt water.

Quality of water is important to alive the people aimed at healthy. In the meantime, drinking water must be respectable quality and this is well-defined in guideline by standards for an extensive variety of materials, organisms and properties of water in regulations. The standards are fixed to be protective of public health and the characterization of wholesome reflects the significance of guaranteeing that water quality is suitable to people. There is moral arrangement amongst worldwide on the science behind the setting of health based standards for drinking water and this skillful confirmation is recognized by

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the World Health Organization (WHO) in the Guidelines for Drinking Water Quality.

Future more, Sri Lanka, have a standard specification for the drinking water what limitation are to be dissolved particles or characterize the water. The primary purpose of the Guidelines for drinking water quality is the protection of public health. These quality is controlled by the organization of Sri Lanka, Sri Lanka Standards Institution (SLSI). The Guidelines provide the recommendations of the Sri Lanka Sri Lanka Standards Institution for managing the risk from hazards that may compromise the safety of drinking-water. The recommendations should be considered in the context of managing the risk from other sources of exposure to these hazards, such as waste, air, food and consumer products. Sri Lanka Standards Institution specify numbers for their every scope, in relation to a number of SLS 614:2003 for drinking water. The people consumable drinking water of Sri Lanka should be satisfying their guidelines of the standard SLS 614:2003

2 Potential challenges of groundwater

An early period of development, the water was take out using pulleys from open wells, the rate of extraction of the underground water was slow comparing of recharging the ground water through annual rainfall. In the later three decades, the water has varying not capable to drinking or challenging to use for cultivating activities as a result of countless reasons such as variability of rain fall, indiscriminate extraction of water, instruction of salt water, increasing the population of the area, increasing nitrate as a result of indiscriminate using of chemical fertilizers, some development with increasing the population, directly opening sewerage to soil or reservoir etc.

These situations considerably be a significant different in time and space. The Jaffna area consists two major distinct weather conditions, wet and dry conditions. The wet season exists from September to December and dry season have from January to August. In wet season, the annual rainfall has to be 1300 mm and 70% of falls it fall from October to December. This rainfall in the Jaffna gets through monsoon rains which high intensity was 539 mm recorded as a maximum rainfall in one day. On average 80% of rainfall is get by Northeast monsoon between September and December and the balance rainfall get through Southwest monsoon season from April to May. When we consider topography, the maximum height of the land elevation approximately 11 m from the Mean sea level (MSL). Limestone spreads all over the Jaffna peninsula. Comparing the depth and sketchy the structures top layer be soil from without soil to 2 m height and under the soil the limestone has to be around 50 m and underneath of limestone the sand stone has to be as a layer of about 130 m.

Towards the end of the dry season, the water table fall below to sea level as a result of over extraction of ground water, the static equilibrium of the fresh water lens into smaller units and the salt water ingress in the wells the considerable distance from the lagoon. During the monsoon season, the salinity water spread over the cultivated area due to rising the level of water in the lagoon and damaging the soil and crops. Future more, the spread salinity water is removed and the salt is deposited which destroy the crop and pollute the air. As well as the climate change also affect the ground water resources and consequently influence the availability of fresh groundwater. As a result of increasing the population, concentration of carbon dioxide, the average temperature of world and the mean sea level are increase, expansion of oceans, melting of glaciers, snow and ice. According to the research article, "Groundwater potential in the Jaffna peninsula and impacts of climate change", concluded, groundwater outflows are increased for the climate change scenarios while groundwater inflows are reduced. This is potential upcoming serious challenge may be in future.

Future water polluted when people initiating farm the land and settle in villages and towns many years ago. For instance, the initial preparing for cultivating of land for growing cereals will have released significant quantities of nitrogen from the soil into rivers, lakes and as well as groundwater. Similarly, the sanitary disposal of domestic waste sit for a problem for our ancestors in the ancient villages and towns, and bacterial polluting activities of soil and water must have been mutual.

In frequently, adulteration of groundwater by chemical compounds consequent as of urban and industrial activities, from current agricultural activities and from waste disposal influences almost invisibly. The slow flow of water, from along the surface the unsaturated region to percolate aquifers or saturated with waste water gives it may be several years consequently, the property of a continuous and connected period of time chemical has go into the ground as a result of that it touches the quality of groundwater resources or supplies. In the Jaffna town area faces very serious problems due to disposed the waste water and wastage from hospital without treatment of water. These make displeased smells at the area and pollute the environment and also most of the chemicals may deposit in the soil after that produces the toxic and mixes with groundwater. Continue of these activities also create a significant microbiological pollutant load at the land surface such as, irrigation by waste water, exhaustive livestock raising and meat processing at the Jaffna area, on-site sanitation.

In contrast to chemical adulteration, resulting leachate may be highly acidic, have a large organic contents or surround a great attentiveness of ammonia, toxic metals or various organic compounds, all of which may pollute underlying groundwater, the occurrence of microbiological contaminants point to quick movement to the water table from ground surface because maximum pathogenic microorganisms have only limited persistence so bacteria for instance typically have survival times measured in days or months for forthcoming actions. Future more, an Aluminum factory was started at Tellipalai area, that wastage must be disposed or reuse without pollute the environment otherwise this factor may increase the aluminum percentage of the ground water.

In village areas, there has also been concern for some years over the rise in nitrate concentrations in many groundwater.

Ground water is recharged as a task of actual rainfall taking place in the annual period of September to January. In the rain fall, is recharged the ground water only 30-32 percentages of the total rainfall after losses, 10-15 percentage by direct run off and 40-48 percentage by evaporation. Even though the WHO approved the level of nitrate – nitrogen for drinking water as 10 ppm, it is increased the certain level, affect the health, giving high possibility to blue babies due to present of the higher level of toxic materials in the water and soil.

The research covered the water samples was collected from the wells of Jaffna town, Kopay, Kokuvil, Uduvil, Nallur, Tellippalai, Mirusivil, Naranthanai and Karavedddy, for testing the amount of nitrate, the uncultivated areas have the nitrate level less than 18 ppm, cultivated areas have the nitrate-nitrogen levels among 20-50 ppm. The water samples of Thirunelwelly and Kondavil have the high nitrate-nitrogen level and the amount of deposited nitrogen-nitrate is increase with year.

There is certainly that agricultural activities, together with the heavy use of nitrogenous fertilizers that are an integral part of concentrated arable farming, some cultivation systems and concentrated stock rearing have subsidized directly to the rise. Direct discharges of nitrogen compounds from onsite sanitation and from sewer runoff also make worse the problem. The other area of taken dishonesties with pesticide pollution, the extent of this remains unidentified for the reason that of the very wide range of chemicals involved and the difficulty of the deterioration processes, some of which may provide increase to degradation outcomes more toxic than the close relative compound. Given the time wait between chemicals being applied to the soil and their entrance in water supply wells, it is possible that adulteration of groundwater sources with nitrate and pesticides will stay and definitely intensification during the coming years as well as a result of increasing the population, the demand of houses, the public administrators provide the authorization to reduce the distance between wells and septic tank.

Urbanization progressions are one of the reason of wide on the other hand basically diffuse, contamination of groundwater by nitrogen and Sulphur compounds and rising levels of salinity. These combinations may not be of serious health significance, but can serve as indicators of more widespread groundwater contamination by manufacturing or industrial chemicals, petroleum products such as oil, bitumen, etc., solvents and additional synthetic compounds that are not readily degradable. Groundwater of the Chunnakam area is affected by waste oil or hydrocarbon product on most recently.

In resource investigation programs most of these compounds may not be analyzed for on a regular basis due to limitations of cost and capacity. Future more localized basis, contamination by pathogenic bacteria, protozoa and viruses is also met, but the capability of numerous aquifers to eliminate or reduce, these pollutants should not be taken at least too lightly. The looking after of sanitary well and borehole construction standards and suitable well leaving behind practices can contribute significantly to the control of microbial contamination in all the most at risk aquifers.

The occurrence of more serious contaminants in aquifers appointed at depth for urban supply will depend on the individualities of the impurities such as physical properties, mode of disposition to the urban subsurface, concentration and period of the amount, weakening capacity of the intervening strata for example, soil type that easily able to percolate water to water table., way the aquifer system responds geochemically to the enforced impurity amount in urban recharge. The urbanizing demand for houses, the local authorities or public administrators are allow to reduce the maximum distance between wells and septic tanks from 15 to 5 meters. The research, "Water problems in the Jaffna peninsula", is comprehensive and relevant to the consume water for drinking and design of the prevention of the intrusion of salt water.

The authors exhibit the efficiency of research, frequently key sources, to rationalize the stuffing of their intervention. For example, the authors refer to a study indicating that containing level of nitrates and nitrites are in drinking water is allowed by the WHO because of above nitrates and nitrites formed serious problems due to their toxicity. Therefore, the authors developed their motivation to take account of percentage of nitrate-nitrogen in the soil.

The research obviously gives responsibility of every one through a brief introduction of the literature and its suggestions for the problem being investigated. Acceptable level of water same time maintaining the salinity and nitrate- nitrogen are taken to the account in order to keep up the quality of water in the Jaffna peninsula. Some suggestions consider for keeping the quality of water, acceptable system of waste water disposal system for the municipal town area and other urban populated areas such as purification or treatment systems, encourage the usage of bio fertilizers rather than using chemical fertilizers in agricultural activities, increase the recharge to the underground rain or fresh water reservoirs, development of tanks and ponds in the peninsula.

Increasing salinity from the effects of irrigation is probably the most significant and widespread form of groundwater quality pollution. The lagoons grew to relatively important on the basis of irrigated agriculture, however the continuing collection of salt in the soil and water inhibited food making and subsidized to the final failure of their culture. Deterioration of soil and groundwater quality associated to irrigated agriculture carry on to the current day, and root major environmental damage and following financial loss to affected farmers and rural communities. Waterlogging and salinization is a mutual feature of irrigated lands from place to place in the Jaffna because the construction of suitable and adequate drainage determines was often discounted or up in the air, rather than existence executed at the same time as the water spreading system. Although this was regularly a simple engineering and financial conclusion that has afterward turned out to be extremely costly, it was in some cases exacerbated if duties for irrigation and drainage raring to go with different institutions.

For example, a scheme, was launched in 1952 and finished in 1970 by department of irrigation to flush out salt water from lagoon using the monsoon in natural manner, but now it is unfit to use as a result of poor maintenances of the scheme and other various factors.

While more than a few mechanisms provide to the related complications of waterlogging and salinization, the fundamental reason is the collection and transport of large volumes of water and its application to the land for crop irrigation. Underprivileged design and carrying out of irrigation systems and their following maladministration decrease the 'efficiency' of most irrigation, that is the quantity of the useful water that is essentially used in crop production.

A research, "River for Jaffna cultivating productive water from salt water lagoons in northern Sri Lanaka- what the water balance of Elephant pass lagoon demonstrates" by S.Kuganesan and S.S.Sivakumar, has "results of the monthly simulation of lake showed that nearly 2 MCM/month was available for release throughout year. When there was spill from upstream reservoirs, 4 MCM/month was available and in addition excess of 6 MCM/month could be drawn from December to April", these should be an evidence for the underprivileged design.

A research article, "assessment of groundwater resources in Jaffna limestone aquifer", exhibits the average abstraction of the water for agricultural, domestic with home garden, domestic with public wells to be 71.2%, 16.9% and 8.5% respectively. However, in the research area the abstraction has exceeded even 100% of the annual recharge. Continuing overdraft exceeding in the safe yield may subsequently lead to progressive decline in groundwater table in the Jaffna.

This a serious problem of the groundwater and give a chance to intrusion of sea water to groundwater. Future more, huge amount of water losses occurs over and done with canal leakage, infiltration and runoff of water applied in excess and through evaporation from irrigated fields.

According to a research, "Groundwater and its susceptibility to degradation: A global assessment of the problem and options for management" by Natural Environment Research Council, UK, of the total amount applied to the fields, as little as 30% to 40% may actually be used by the growing crops. The remain greeneries the fields as surface runoff, percolates below the crop root zone towards the water table or evaporates directly into the atmosphere. Some of the big trees have high evaporation in forest. The evaporation of tree should be included as a negative relationship to the water table depth up to 4 m and the evaporation from tall trees is a significant factor of the groundwater. When water evaporates, the containing salts are deposited in the ground, cumulative the salts in the soil in through proportion to the salt content of the useful water and the depth of water used. The addition of the next irrigation water temporarily dilutes the soil water, but evapotranspiration concentrates it further. More or less of the additional irrigation water percolates below the soil, dissolving salts from the subsoil on its way down towards the groundwater table.

Soil water is usually 2 to 3 times more concentrated than the applied irrigation water, and often 5 to 10 times. One objective of farmers in operating irrigation is to prevent levels of soil water mineralization from accomplishment improper levels in relative to the specific crops existence grown of their lifetime. This is realized by using irrigation water in additional of crop requirements to percolate the salts from the soil. However, this simply transfers the salinity problem from the soil zone down to the underlying groundwater, and the resulting excess infiltration causes the water table to rise lower than the irrigated land.

In the rainy season of Ariyalay area, salt water come through lagoon and spread over the surface, the subsequent waterlogging that one gives to further salinity degradation, moreover because the groundwater was at present comparatively saline, as in the lowest part of the river, or because the increasing groundwater dissolves more salts from the aquifer, from the subsoil and from the soil itself. Finally, if the water table rises to within a meter or so of the land surface, direct evaporation from the aquifer will decrease the rate of rise but also further increase salinity.

The greatly increased penetration when irrigation is initially applied may leach out salts already present in arid soils and subsoils. The chemical and physical developments paying to salinization are occasionally complex, the core of the difficult is obviously the rough guide of excess irrigation water without adequate drainage measures. Salinization will be more rapidly and extra noticeable if the irrigation water is of poor initial quality, for example where groundwater of marginal quality, maybe at present affected by the mechanisms outlined above, is used or where waste water is reused to irrigate crops.

Groundwater development, many of the benefits of providing access to safe drinking water and improved agricultural production, its possible unpleasant side effects, such as the use of shallow wells dry up, pumping or water supply costs and the deterioration of the water quality can increase. The essence of any significant environmental impact by reducing the need to cause the flow of spring discharge or a stream. It is important to clearly distinguish between the negative side effects of the benefits from the exploitation.

However, a negative side effect may be the lowering of a shallow water table, which causes village drinking water supplies and shallow irrigation wells belonging to poorer farmers to dry up. And the future, over-exploitation of the reservoir may be a vague, controversial and somewhat emotive term, however, it grows more and more important as competition for a limited resource, especially in the Jaffna region, is likely to become. Because water is a dynamic resource, it is more complicated. Various components of the water balance during a drought or in response to rainfall patterns, time vary naturally.

Groundwater levels dropped as a signal on exploitation, but simply an indication that the system is not in balance by themselves. Hydrogeological there is no objective measure or definition of over exploitation. Although overexploitation has usefully been defined as a failure to achieve maximum economic returns to the resource. Water uses a variety of factors including the relative value of economic considerations, and moral factors must take into account issues of social equality and environmental protection.

Intrusion of water, with different of suspension of chemical particles, can also alter the physical properties of aquifer. For example, changes in porosity and permeability can result from the consolidation processes of sediment in the rock through water-rock interaction. As well as a research, "water problems in the Jaffna" by Dr.V.Navaratnarajah, sketchy present impact of hardness and salinity due to contribute of chemical particles calcium, magnesium bicarbonates and sulphates in the Jaffna limestone aquifer. Such processes can irreparably damage the fabric and the hydraulic properties of the aquifer. Changes induced in the hydrochemistry of groundwater due to water-rock interaction may also have adverse health impacts.

The probability of serious adverse side effects or excessive extraction of groundwater intense varies quite widely with the ground water environment. Serious saline intrusion is limited to relatively few water management settings, but it should be noted that these are not necessarily coastal that can occur old brackish water or saline aquifers in the continental deep.

Land subsidence important part is largely restricted to coastal and alluvial formations containing significant thicknesses of clay and silt interbedded unconsolidated lagoon or lacustrine. However, a much greater variety of aquifers are susceptible to induction recharge contaminated if they experience excessive extraction in urban areas. The potential severity of such side effects can be estimated in general.

3 Suggestion for Managing Some Problems of Ground Water

Most people in the Jaffna rely on groundwater for drinking, agriculture and other domestic activities. Pollution and its impact on people's lives has caused. Rapid and actual essential of new arrangements to solve the critical states of the people who are affected by water pollution problems. Solutions of these pollutions can divided in two categories, first is short term run solution which provides an immediate solution, another one is long term run which provides a permanent solution. Future more underground bed or layer performance groundwater wells and springs serve the important in the hydrological cycle of water supply available for current and future use and continuous water release function.

The discharged water storage and aquifer has two main functions. First, it can benefit the environment by maintaining and sustaining river flows, springs and wetlands naturally. Second, it can provide a valuable water supply to meet the growing demand for water for drinking and domestic use, crop irrigation and industry.

The reconciliation of these different functions is important for those interested in sustainable use of water resources task. However, Jaffna lies in an arid area so both first and second roles are more appropriate to improve water resources in each season Maha season from October to December and Yala season from January to September.

In the Jaffna, a part of the annual year from January to August, when rainfall is scarce, groundwater may be the only source of freshwater available and is, as a consequence, often heavily. However, now a day in the Jaffna where there is significant rainfall, conflicting demands on groundwater can lead to shortages exploited.

4 Short Term Run

Human beings or living being are not alive without drinking water. So immediate solution is very important to the affected area for their subsequently living. In this time drinking water should be supply to the affected area. Some areas at Vadamarachi, Valikamam, and coastal area in the Jaffna faces a problem of getting drinking water. In this area, need to supply drinking water through the pipe lines to manage the critical situations or supply water through filling common tanks in the area.

Future more, Valikamam area has consume more water than other affected area because of more cultivated lands. Their need more water for cultivating activities. In the situation, the government or public administrator should supply another line for agricultural activities from the river or some waste water with less treatment. Some industries' wastage and hospital wastage are able to treat for agricultural purpose without pollute the soil or ground water table. In this treatment should be the nutrient that wanted to agricultural activities as well as may reduce the use of chemical fertilizers. Yet to come, construct the water treatment plant for desalinization of the sea water and may use the byproduct of the treatment as a raw material for the preparation of salt. In this process may equalize or protect increasing the salt concentration of the sea. But the short term running solution isn't keep for long year because this is a rapid solution for the problems. If it is keep that may produce the adverse effect which going to forward creating unmanageable serious problems.

5 Long Term Run

Most of the researches focus solutions which be the long term running solutions. Intrusion of salt is an important one into the waters near the coast or in other water bodies. Salt The mobility of such saline waters depends upon the hydraulic gradients which are of course locally disturbed by groundwater abstraction, the permeability of the aquifer and the presence or absence of hydraulic barriers. Before moving to examine the relevant time period, a salt of an assessment is important to over exploitation. A displacement of after few years' overexploitation indicating a high probability, but bet-

ter long-term management strategies can be adopted.

For case in point, the research, "Water problems in the Jaffna peninsula" by Dr.V.Navaratnarajah, are presented clearly and specifically address solution for instruction of salt water as a result of indiscriminating extraction of ground water. For example, the author, gives the solution for the problem to "rehabilitate the Jaffna Lagoon Scheme and the tanks in the peninsula suggested that this can be done at an estimated cost which return due to increase agriculture or increased fodder from grass grown in adjoining lands and the improved health of the population that would result from the consumption of the increased production of milk products was estimated a year, suggesting that that the cost would be returned in two years", which statement exhibits the planning of economic level of the author. The large amount of tanks and ponds are interconnected between them to serve the high amount of rain water to recharge the ground water, now a day, most of the ponds and reservoirs are wiped out due to increase the population of people and their indiscriminating activities.

The authors set and specify the value and addressing the results of the study, these result have no supported document or not proven. And also General problems are consistent with results. Possible uncontrolled or mediating factors, such as fertilizers use, are discussed as limitations of the study. The authors recommend future research based on their statistical as well as practical findings. Beside this, they argue the need to continue their longitudinal study to better understand irrigation development of civilization, development of geological testing, and analyzing the funds affecting the achievement of Jaffna people. Moreover, the research, "River for Jaffna cultivating productive water from salt water lagoons in northern Sri Lanaka- what the water balance of Elephant pass lagoon demonstrates" by S.Kuganesan and S.S.Sivakumar, clearly demonstrates benefits with empirical data about of the solution also .

In addition, the research, "Water problems in the Jaffna peninsula" by Dr.V.Navaratnarajah, indicates the solution of increasing level of nitrate soil and water. Not only, the quality of water, reasonable system of pipe line of waste water disposal in the towns or urban areas is set up in the populated areas but also the highly agricultural areas use the chemical fertilizers, increased the amount of nitrate-nitrogen in soil that combination with water, produced the toxicity. So these problem could reduce proper waste water disposal and the bio fertilizers such as bio mass which means leaves and trees and cattle waste products, maintain the quality of water at the low level of nitrate-nitrogen.

A research, Assessment of groundwater resources in Jaffna limestone aquifer" by Mrs.Thushyanthy Mikunthan and Mrs.Christina Shanthi De Silva, exhibits the remedying activities where how control extraction from groundwater the badly behaved of insufficient ground water problems. By contrast, in a less sensitive aquifer, a slow progressive decline offers opportunities to fully assess the problem and identify options to control or mitigate the worst effects, in the area of the city there is time with tests to try and gauge the effectiveness of different systems economic incentives or disincentive to discourage overuse or to redirect abstraction, government or public administrators of the areas may take managing to strengthen laws and institutions in order to enforce strict controls on groundwater extraction.

6 Conclusion

In our way, perhaps more importantly, when the application of controls on abstraction are not effective, there is time for many water abstractors continue until it has recouped its activities of investment and be redistributed to other areas of economic activity. Moreover, the rapid growth of cities is accompanied by greatly increased demand for water. While cities and towns gradually extend their dependence for all or part of their supply to well fields in adjacent rural and urban areas, future demand may increasingly force them to look further and further afield. Due to the significant factor that population exacerbates the demand of ground water in continuous year, these techniques are not enough to sustain the water use in upcoming periods, we need to find the new technique to store the water with minimum amount of loss. For instance, in the rainy season more water mixes with sea through some rivers and open the gates of the reservoirs or ponds.

This situation may handle in proper way such as excess water may use for recharge some reservoirs or ponds due to interconnected the ponds or reservoirs as well as recharge the aquifer in direct methods or indirect methods after checking the geotechnical characterization of Jaffna area. Future more, presently no suitable government programs managing the quality of waters in water bodies. However, the Central Environmental Authority (CEA) is authorized to manage industry sewages and specify water quality managing situations cooperative with Environmental Impact Assessment (EIA) regulations for major development projects. In Sri Lanka, common water bodies are managed by Research organizations, National water Supply and Drainage Board, Central Environmental Authority, Irrigation Department and Private parties. These organizations must maintain coordination between them in water quality managing cases, or government need to prepare a law for control the main pollution sources such as domestic sewage, industrial activities, agricultural activities, indiscriminate extraction of

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