GROUND WATER RESOURCES OF INDIA

CENTRAL GROUND WATER BOARD
MINISTRY OF WATER RESOURCES
GOVERNMENT OF INDIA
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FOREWORD

Ground water has played and will continue to play a key role in meeting the water needs of various use-sectors in India. This key role is a result of the ease and simplicity with which it can be extracted. Technology developments in pump manufacture and in deep well drilling have given a further boost to ground water resource development. Unfortunately, the same advantages have also led to over-exploitation in some areas. Ground water extraction has become a common place phenomenon with individuals putting their own structures for use without a thought to scientific considerations. This has led to a paradoxical situation of non-sustainable and sub-optimal development of a scarce natural resource. For planned optimal development of any resource, its quantity and quality assessment in space and time is a prime pre-requisite. This report is a scientific attempt towards achieving that end.

The exercise is based on the recommendations of the " Ground Water Estimation Committee - 1984 " but has certain additional features to bring out the realistic picture of ground water resource availability in different areas. The report gives a separate estimate of ground water resources due to natural recharge from rainfall and also the additional recharge due to canal irrigation systems.

The report is a combined effort of the Central Ground Water Board and the State Ground Water Organisations. Their efforts are praise-worthy. An expert group consisting of representatives from Central Water Commission, National Institute of Hydrology, National Water Development Agency, National Bank for Agriculture and Rural Development, Central Ground Water Board and the State Government Organisations has contributed in a good measure to refine the ground water estimates worked out by the Working Group constituted in each State. The report reflects the suggestions and modifications made by the expert group.

The report clearly brings out the regional imbalances in the availability and the extent of development of ground water in different states of the country. The aspect needs serious consideration in future planning of ground water development in India. The report is only a starting point and should be treated as a base for further refinement and update which are so essential in dealing with any dynamic resource.

The refinement in assessment of the ground water resource and its update should be a continuous process. The National Water Policy also recommends its periodic assessment. The Central Ground Water Board, in consultation with the State Ground Water Organisations, should periodically undertake such up-dating.

I would like to place on record my deep appreciation of the work done by Dr. R.K. Prasad, in bringing out this Report, which attempts to give a comprehensive and realistic picture of ground water resource availability in the country.

MSReddy

(M.S. Reddy)
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New Delhi, June , 1995.

PREFACE

As per the National Water Policy, development of ground water resources is to be limited to utilisation of the renewable part of the naturally occurring ground water available in sub-surface domain. The present development policy, obviously forbids utilisation of the secular reserve to prevent ground water mining. Precise assessment of replenishable ground water resources and its development in terms of area which can be irrigated in the framework of land availability, cropping pattern, etc. is, therefore, key to our plans to develop ground water resources for various uses. The complexities of processess governing occurrence and movement of ground water make the problem of ground water assessment somewhat difficult, as not only vast volume of data is required to be collected but also many disciplines of science have to be involved in a co-ordinated manner for space time location of ground water in quantity and quality. The gravity of the situation can, however, be gauged through one of the conclusions drawn in the International Advanced Research Workshops on "Estimation of Natural Recharge of Ground Water" in 1987 at Antalay, Turkey. It says " no single comprehensive estimation technique can yet be identified from the spectrum of methods available, all are reported to give suspect results ". But in view of the rapidly expanding urban, industrial and agricultural water requirements, assessment of ground water resources with best possible accuracy is of fundamental importance for planning the resource use on scientific and economic considerations.

In India, the efforts in this direction were initiated immediately in post-independence era and the approach and methodologies utilised since then have undergone gradual changes based on the refinement of our understanding in the field of ground water. The methodology, recommended by " Ground Water Resource Estimation Committee " in 1984 is in a true sense the logical scientific approach for assessment of country's ground water resources in volumetric terms. The resources so assessed volumetrically have by and large been accepted. The real problem, however, arose when the volumetric resources were converted in terms of area which can ultimately be irrigated. The figures originally computed gave rise to differences and controversies. Keeping this in view, the Central Ground Water Board made a realistic effort for resolving these issues in coordination with Central Water Commission, National Water Development Agency, National Institute of Hydrology, National Bank for Agriculture and Rural Development and State Ground Water Organisations, under the overall guidance of Ministry of Water Resources. After an in-depth discussion and analysis, the figures reflected in this Report have been firmed up. The aspects like land availability, water requirement for prevalent cropping pattern, ground water development strategy, etc. were accounted for which have now resulted in realistic figures. There is, however, always a scope for improvement in methodology and revision of information contained herein on quantum of ground water resource and the resultant irrigation potential. This in fact will be a continuous process as ground water is a dynamic resource and science is in continuous search for better understanding. Based on the developments in science and situation, the Board in consultation with State and other Organisations would continue to update these figures in future as per the covenants of the National Water Policy.

The National Report on " Ground Water Resources of India " is a culmination of the untiring efforts of the officers of the Board and State Ground Water Organisations. Their contributions alongwith the expertise from specialist organisations have made this task easier and fruitful. However, I would like to make special mention of Sh. Santosh Kumar Sharma, Scientist 'D' of Central Ground Water Board who has been associated with the aspect of ground water resource assessment for last one decade and has contributed substantially in bringing out this report. The contributions made by Sh.N.Kittu, Sh.S.C. Sharma, Sh. S.Das and Dr. S.P. Sinha Ray, Directors have also been significant.

I am sure, this document would be quite useful as a base for ground water resource development planning in the country in general and in the canal commands in particular as necessary effort will be seriously made, to make use of the considerable ground water in conjunction with the surface water, to meet the needs of tail enders and also prevent water logging and soil deterioration in head reaches. It would be highly appreciated if suggestions on the various aspects of ground water covered herein are sent to Central Ground Water Board, which would be quite useful in reviewing this document in future.

Faridabad, June, 1995

(R.K. PRASAD)
CHAIRMAN
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GROUND WATER RESOURCES OF INDIA

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GROUND WATER RESOURCES OF INDIA

1.0 INTRODUCTION

Ground water is an important source of irrigation and caters to more than 45% of the total irrigation in the country. The contribution of ground water irrigation to achieve self-sufficiency in food grains production in the past three decades is phenomenal. In the coming years the ground water utilization is likely to increase manifold for expansion of irrigated agriculture and to achieve National targets of food production. Although the ground water is annually replenishable resource, its availability is non-uniform in space and time. Hence, precise estimation of ground water resource and irrigation potential is a pre-requisite for planning its development.

A complexity of factors - hydrogeological, hydrological and climatological, control the ground water occurrence and movement. The precise assessment of recharge and discharge is rather difficult, as no techniques are currently available for their direct measurements. Hence, the methods employed for ground water resource estimation are all indirect. Ground water being a dynamic and replenishable resource, is generally estimated based on the component of annual recharge, which could be subjected to development by means of suitable ground water structures.

For quantification of ground water resources proper understanding of the behaviour and characteristics of the water bearing rock formation known as Aquifer is essential. An aquifer has two main functions - (i) to transit water (conduit function) and (ii) to store it (storage function). The Ground water resources in unconfined aquifers can be classified as Static and Dynamic. The static resources can be defined as the amount of ground water available in the permeable portion of the aquifer below the zone of water level fluctuation. The dynamic resources can be defined as the amount of ground water available in the zone of water level fluctuation. The replenishable ground water resource is essentially a dynamic resource which is replenished annually or periodically by precipitation, irrigation return flow, canal seepage, tank seepage, influent seepage, etc.

The methodologies adopted for computing ground water resources, are generally based on the hydrological budget techniques. The hydrologic equation for ground water regime is a specialized form of water balance equation that requires quantification of the items of inflow to and outflow from a ground water reservoir, as well as of changes in storage there in. A few of these are directly measurable, some may be determined by differences between measured volumes or rates of flow of surface water and some require indirect methods of estimation. These items are elaborated as below :-

I. Items of supply to ground water reservoir

1. Precipitation infiltration to the water table.

2. Natural recharge from stream, lakes and ponds.

3. Ground water inflow into the area under consideration.

4. Recharge from irrigation, reservoirs, and other schemes especially designed for artificial recharge.

II. **Items of disposal from ground water reservoir**

1. Evaporation from capillary fringe in areas of shallow water table, and transpiration by phreatophytes and other plants/vegetation.

2. Natural discharge by seepage and spring flow to streams, lakes and ponds.

3. Ground water outflow.

4. Artificial discharge by pumping or flowing wells or drains.

Over the years the ground water assessment techniques have evolved from progressive understanding of ground water occurrence and movement, recharge and discharge processes. In order to appreciate the techniques it will be worthwhile to have a brief review of the ground water assessments undertaken in the past.

1.1 HISTORICAL BACKGROUND

The assessment of water resources of the country dates back to 1949, Dr. A.N. Khosla (1949) estimated the total average annual run-off of all the river systems in India as 167.4 m.ha.m., based on empirical formula which included both the surface and ground waters. Since then attempts have been made from time to time by various Working Groups/Committees/Task Force, constituted by Government of India to estimate the ground water resources of the country based on status of available data and in response to developmental needs. But, due to paucity of scientific data and incomplete understanding of the parameters involved in recharge and discharge processes, all these estimations were tentative and at best approximation.

The National Commission on Agriculture (1976), in its report assessed the total ground water resource of the country as 67 m.ha.m., excluding soil moisture. The usable ground water resource was assessed as 35 m.ha.m., of which 26 m.ha.m. was considered as available for irrigation. These estimates by the Commission were made for the country as a whole, taking into account the total precipitation, its distribution to surface water, immediate evaporation loss from the soil, and sub-soil percolation. The ground water recharge was worked out from the total quantity of water that percolated into the soil.

The report of the National Commission on Agriculture (1976), worked out the ultimate irrigation potential from ground water as 40 million hectares based on utilisable ground water resource of 26 m.ha.m. and an average requirement of 0.65 hectare metre of ground water to irrigate a cropped hectare, in contrast to 0.90 hectare metre of surface water, as conveyance losses are higher in the latter case.

This was the first exercise for conversion of the volume of ground water to the area to be irrigated. The water requirement of crops was based on the average depth of gross irrigation application at the source per crop hectare. The component of water applied for irrigation, which recycles back to ground water reservoir was not accounted for.

The first attempt to estimate the ground water resources on scientific basis was made in 1979. A High Level Committee, known as Ground Water Over Exploitation Committee was constituted by Agriculture Refinance and Development Corporation (ARDC). The committee was headed by the Chairman, CGWB and included as its members representatives from the State Ground Water Organizations and Financial Institutions. This Committee recommended definite norms, for ground water resources computations. Based on these norms the State Governments and the Central Ground Water Board computed the gross ground water recharge as 46.79 m.ha.m. and the net recharge (70% of the gross) as 32.49 m.ha.m. This committee had however recommended that the methodology be revised with increasing availability of data to make it more scientific. The computed ground water resources were not translated to irrigation potentials in terms of area.

Relying on the experience, gathered during the implementation of ARDC III and IV projects, and based on the knowledge of the behaviour of ground water regime in the highly developed blocks, and on detailed analysis in the Central Ground Water Board, it was later decided that the guidelines of the Over Exploitation Committee should be modified as under :-

i) The correction factor for normalization of rainfall in the water table fluctuation approach be modified to make it conceptually more correct.

ii) For all the states, where Central Ground Water Board carried out the ground water resource evaluation by water table fluctuation approach, the concept of 100% utilization of recharge as available in November had been adopted as a realistic approach for ground water resource evaluation. It was felt that the water table fluctuation from pre-monsoon to November accounts for the irrecoverable losses, which were not to be again accounted for. The November water level represents a stabilized post-monsoon ground water situation.

Subsequently the necessity was felt for constitution of a committee to go into various aspects of the problems of the ground water development, faced during the implementation of ARDC III & IV credit projects, and make suitable recommendations. Accordingly, the Government of India constituted another committee under the Chairmanship of Chairman, Central Ground Water Board. This committee examined in depth a large volume of hydrogeological and related data generated by the Central Ground Water Board through nation-wide surveys, exploration and 12 water balance projects, completed till then, and area oriented studies, carried out by the State Ground Water Organizations. The Ground Water Estimation Committee came up with a revised methodology for assessment of ground water potential and evolved new norms, described in the succeeding chapters.

These norms of Ground Water Estimation Committee 1984, are currently utilized by the Central Ground Water Board and State Ground Water Departments to compute the ground water resources.

The State Governments were advised to constitute Working Groups for assessment of ground water potentials. The Secretaries-Incharge of Ground Water Department, in the States were requested to reassess the ground water potential, keeping in view the norms and guidelines laid down by the Ground Water Estimation Committee 1984. The group included the head of the Ground Water Organization in the State, Director of the State

Agriculture Department and representative from Agriculture Universities and National Bank for Agriculture and Rural Development. The Director, CGWB was the convener of this group, as the representative of Government of India. These groups were headed by the Irrigation Secretaries Incharge of Ground Water Development. Based on the recommendations of these Working Groups constituted in different States, the annual replenishable ground water resources of the country works out to be 45.33 m.ha.m. Keeping a provision of 15% (6.98 m.ha.m.) for drinking, industrial and other uses the utilisable ground water resource for irrigation was computed 38.34 m.ha.m. per year. The ultimate irrigation potential in terms of area based on the state-wise assessment was estimated as 80.38 m.ha.

The ultimate irrigation potential from ground water was computed based on utilisable ground water resources for each State and Union Territory, and taking into account the cropping pattern and crop water requirements. The blockwise/districtwise figures of irrigation requirement for the prevalent crops were worked out by the Agriculture Departments/ Agriculture University of the concerned states for arriving at the ultimate irrigation potential from ground water. The figures of irrigation requirement were different for different states as per the prevalent cropping patterns, which were utilized to work out ultimate irrigation potential from ground water. As such the approach in this case was different from that adopted by National Commission on Agriculture (1976), wherein a uniform gross irrigation requirement of 0.65 m/ha was assumed for all the states. In this assessment, the irrigation requirement varies from 0.36 m/ha in Uttar Pradesh to 1.20 m/ha in Assam. Even in individual states, a range of values of irrigation requirement was considered viz. 0.36 to 0.937 m for Tamilnadu, 0.4 to 0.75 m for Maharashtra, etc.

The ground water resources and irrigation potential from ground water, as assessed by the Working Groups in different states, were forwarded by the State Governments to the CGWB and Ministry of Water Resources. The matter was discussed in the Ministry of Water Resources in detail, and the Secretary (WR) stressed the need for computation of ground water resource estimates in command and non-command areas, and consideration of crop water requirement for working out irrigation potential from ground water. Accordingly, Joint Secretary (Admn.) Ministry of Water Resources, Government of India wrote to the Secretaries Incharge of Ground Water Development of all the States and Union Territories to reactivate or reconstitute the Working Groups formed earlier, for refinement of ground water resource potential. In the meantime, Minor Irrigation Census conducted all over the country during 1986-87, firmed up the realistic figures of ground water structures and irrigation potentials from ground water, both created and utilized. Intensification of ground water monitoring through strengthening of Hydrograph Network Stations both by Central Ground Water Board and the State Organizations also generated voluminous data for computation of dynamic resources. The refinement of ground water resources and irrigation potentials in the country has been possible because of this improved data base. The present report embodies the details of revised ground water resource estimates and irrigation potential from ground water, as undertaken by the Working Groups constituted in different States.

2.0 HYDROGEOLOGICAL SITUATION

India is a vast country having diversified geological climatological and topographic

set-up, giving rise to divergent ground water situations in different parts of the country. The prevalent rock formations, ranging in age from Archaean to Recent, which control occurrence and movement of ground water, are widely varied in composition and structure. Similarly, not too insignificant, are the variations of land forms, from the rugged mountainous terrains of the Himalayas, Eastern and Western Ghats to the flat alluvial plains of the river valleys and coastal tracts, and the aeolian deserts of Rajasthan. The rainfall pattern, too, show similar region-wise variations. The topography and rainfall virtually control runoff and ground water recharge. The Aquifer Map of India depicts the salient features of the hydrogeological environment and aquifer potentials (Plate - A).

The high relief areas of the northern and north-eastern regions occupied by the Himalayan ranges, the hilly tracts of Rajasthan and peninsular regions with steep topographic slope, and characteristic geological set-up offer high run-off and little scope for rain water infiltration. The ground water potential in these terrains are limited to intermontane valleys.

The large alluvial tract in the Sindhu - Ganga - Brahmaputra plains extending over a distance of 2,000 kms. from Punjab in the west to Assam in the east, constitutes one of the largest and most potential ground water reservoir in the world. The aquifer systems are extensive, thick, hydraulically interconnected and moderate to high yielding. To the north of this tract all along the Himalayan foot hills, occur the linear belt of Bhabar piedmont deposits, and the Tarai belt down slope with characteristic auto flowing conditions.

Almost the entire Peninsular India, is occupied by a variety of hard and fissured formations, including crystalline, trappean basalt and consolidated sedimentaries (including carbonate rocks), with patches of semi consolidated sediments in narrow intracratonic basins. Rugged topography, compact and fissured nature of the rock formations, combine to give rise to discontinuous aquifers, with limited to moderate yield potentials. The near surface weathered mantle, forms the all important ground water reservoir, and the source for circulation of ground water through the underlying fracture systems. In the hard rock terrain, deep weathered pediments, low-lying valleys and abandoned river channels, generally contain adequate thickness of porous material, to sustain ground water development under favourable hydrometeorological conditions. Generally, the potential water saturated fracture systems occur down to 100 m depth, and in cases yield even upto 30 Litres per Second (lps). The friable semi consolidated sandstones also form moderate yielding aquifers, and auto flowing zones in these formations are not uncommon.

The coastal and deltaic tracts in the country form a narrow linear strip around the peninsula. The eastern coastal and deltaic tract and the estuarine areas of Gujarat are receptacles of thick alluvial sediments. Though highly productive aquifers occur in these tracts salinity hazards impose quality constraints for ground water development. In this terrain ground water withdrawal requires to be regulated so as not to exceed annual recharge and not to disturb hydrochemical balance leading to sea water ingress.

The quality of ground water in both hard rock and alluvial terrains is by and large fresh and suitable for all uses. The specific conductance is generally less than 1000 us/cm at 25 C. But in coastal areas, estuarine tracts of Gujarat, Rann of Kutch and arid tracts of Rajasthan, the degree of mineralization in ground water is rather high and salinity hazards are not uncommon.

The salinity hazards in ground water are also noticed in the inland areas of Punjab, Haryana, Uttar Pradesh, Rajasthan and Gujarat, generally confined to arid and semi-arid tracts.

The varied modes of ground water occurrence in the country may be broadly summarized as :-

a) Porous formations comprising unconsolidated and semi consolidated sediments. Aquifers interconnected, often extensive, both continuous and discontinuous; moderate to very high yield potentials.

b) Consolidated and fissured formations. Aquifers discontinuous; limited yield potentials.

The distribution and potential of the major hydrogeological units are presented in Table - 1.

Ground Water Development

In India, ground water development is generally restricted to the shallow zone within 50 m depth and is mostly financed through institutional sources and private efforts. The development of the deeper zone (50 to 300 mbgl) is usually in the public sector for community irrigation. The shallow ground water structures include dug wells, dug-cum-borewells, shallow tubewells, filter points etc. The deeper structures include heavy duty tubewells and borewells.

The ground water development has been intensive in the alluvial areas of Indo-Ganga-Yamuna plains of Punjab, Haryana, Uttar Pradesh, and in parts of hard rock terrains in Southern States. In localized pockets in these areas, decline of water levels upto 4 m or more has been noticed.

In contrast the return flow of irrigation in many canal command areas in the country/coupled with meagre use of ground water has resulted in additional ground water recharge and consequent rise of water table.

TABLE - 1

DISTRIBUTION OF HYDROGEOLOGICAL UNITS IN THE COUNTRY AND THEIR POTENTIAL.

Geologic Age		Rock Formation	States/Hydrogeological Characters
CONSOLIDATED FORMATIONS :			
Jurassic Upper Cretaceous to Eocene	Rajmahal Traps, Deccan Traps.	Basalts, Dolerites Diorites and other acidic derivatives of Basaltic magma.	Occur in West Bengal, Bihar, Madhya Pradesh, Gujarat Maharashtra, Andhra Pradesh, Karnataka. Hydrogeological characteristics almost same as above. Fractured and Vesicular basaltic layers and inter-trappean sedimentaries are productive. Yield upto 5 lps, Storativity : 1 to 4% . Hydraulic conductivity 5 to 15 m/day. Unconfined shallow aquifers and leaky-confined/con-fined deeper aquifers.
Pre-Cambrian	Cuddapahas Delhi & Equivalent Systems.	a) Consolidated Sandstones Shales, Conglomerates. b) Limestones, Dolomites c) Quartzites, Marbles d) Intrusive Granites & Malani Volcanics.	Occur in all States. These formations are devoid of primary porosity. Weathering & denudation, structural weak planes and fractures impart porosity and permeability in the rock mass. Solution cavities (caverns) in carbonate rocks at places, give rise to large ground water storage/ circulation. The ground water circulation is generally limited within 100 m depth. Storativity value of unconfined aquifer is generally low (0.2% to 3%). Hydraulic conductivity varies widely depending on fracture incidence (2 to 10m/day). Leaky-confined / confined aquifers may be present in layered formations. Granites and granite-gneisses are the most productive aquifers. Yield range 2 to 10 lps and more.
Archaean	Archaean Complex	a) Granites, Gneisses, Charnokites & Khondalites	
	Dharwars, Aravallis & Equivalent formations.	b) Schists, Slates, Phyllites Granulites. c) Banded Haematite Quartz-ites (Iron ore series)	
SEMI-CONSOLIDATED FORMATIONS			
Tertiary		a) Nummulitic Shales and Limestones b) Carbonaceous Shales	The Hydrogeological potential of these formations is relevant only in the valley areas. Lower Siwaliks and their

		c) Sandstones d) Shales e) Conglomerates f) Ferrugineous Sandstones g) Calcareous Sandstones h) Pebble Beds and Boulder-Conglomerate i) Sands j) Clays	equivalents in Himachal Pradesh, Jammu & Kashmir, Assam, Punjab, Haryana, Uttar Pradesh, Sikkim generally do not form potential aquifers. The Upper Siwaliks have moderate ground water potential in suitable topographic locations. Tertiary sandstones of Rajasthan, Gujarat, Kutch, Kerala, Orissa, Tamil Nadu, Andhra Pradesh, West Bengal and North Eastern States have moderate to moderately good yield potentials upto 28 lps. Possess moderate primary porosity and hydraulic conductivity.
Upper Carboniferous to Jurassic	Gondwanas	a) Boulder-Pebble Beds b) Sandstones c) Shales d) Coal Seams	Occur in Bihar, Maharashtra, Andhra Pradesh, Orissa, Madhya Pradesh, Gujarat, Rajasthan and Tamil Nadu. These formations do not have wide regional distribution, Possess moderate primary porosity and hydraulic conductivity. Karstified limestones are good water yielders. Friable sandstones in Barakars and Kamthis (Lower Gondwana) and their equivalent formations possess moderately good potential. Yield upto 14 lps.
	Jurrasic of Kutch and Rajasthan Baghbeds Lametas and Equivalents.	a) Sandstones b) Calcareous Sandstone c) Shales d) Quartzites e) Limestones.	
UNCONSOLIDATED FORMATIONS :			
Pleistocene to Recent	a) Fluvio-Glacial deposits	a) Mixed Boulders, Cobbles, Sands and Silts.	The morainic deposits occupy valleys and gorges in interior Himalayas. Karewas (Kashmir Valley) are lacustrine deposits displaying cyclic layers of clayey, silty and coarser deposits with intervening boulder beds. Locally significant hydrogeological potential.
	b) Glacio-Lacustrine deposits.	b) Conglomerates, Sands Gravels, Carbanaceous shales and Blue Clays.	
	c) Piedmont and Himalayan Foot Hill deposits.	c) Boulders, Cobbles, Pebble Beds, Gravels, Sands, Silt and Clays.	The Bhabhar piedmont belt contains many productive boulder - cobble-gravel-sand aquifers. The water table is deep. Forms recharge zone for deeper aquifers of alluvial plains in south. Taral belt is down-slope continuation of Bhabhar aquifers. The

		deeper confined aquifers display flowing artesian conditions. Shallow water table yields upto 28 lps.
d) Alluvial Plains(Older & Newer Alluvium)	d) Clays & Silts, Gravels and Sands of different mix. Lenses of Peat & Organic matter, Carbonate and Siliceous Concretions (Kankar).	Occur widespread in the Indo-Ganga - Brahmaputra alluvial plains. Form the most potential ground water reservoirs with a thick sequence of sandy aquifers down to great depths. The unconfined sand aquifers sometimes extend down to moderate depth (125 m). Deeper aquifers are leaky-confined/confined. The older alluvium is relatively compact. The unconfined aquifers generally show high Storativity (5 to 25%) and high Transmissivity (500 to 3,000 m^2/day). The deeper confined aquifers generally occuring below 200 to 300 m depth have low Storativity (0.005 to 0.0005) and Transmissivity (300 to 1000 m^2/day). Highly productive aquifers yield upto 67 lps. and above. The potentials of peninsular rivers alluvium are rather moderate with yield upto 14 lps. But the alluvial valley fill deposits of Narmada, Tapi, Purna basins, 100 m thick, sustain yield upto 28 lps. The quality of ground water at deeper level is inferior. (Storativity 4×10^{-6} to 1.6×10^{-2}) and Transmissivity 100 to 1,000 m ^{2}/day). Thick alluvial sequences in deltas of major rivers on the eastern coast and in Gujarat estuarine tracts. Hydrogeological potential limited by salinity hazards.
e) Aeolian deposits. (Sandstones)	e) Very fine to fine Sand and Silt.	The aeolian deposits occuring in West Rajasthan, Gujarat, Haryana, Delhi, Punjab have moderate to high yield potentials; are well sorted and permeable; lie in arid region; natural recharge is poor and water table is deep.

3.0 METHODOLOGY FOR ASSESSMENT OF VOLUMETRIC GROUND WATER RESOURCES AS PER GROUND WATER ESTIMATION COMMITTEE 1984

During the last decade, extensive and intensive scientific studies through multi-disciplinary ground water projects were undertaken by the Central Ground Water Board (CGWB) and State Ground Water Organisations to evaluate the ground water resources available for development. These studies yielded valuable data from the varied hydrogeological situations of India and concerted efforts were made to rationalise the recharge estimation methodology all over the country. In the year 1982, Government of India constituted "Ground Water Estimation Committee" (GEC) with the members drawn from various organizations engaged in hydrogeological studies and ground water development. In 1984 this committee, after reviewing the data collected by Central and State Agencies, Research Organisations, Universities, etc. recommended the methods for ground water recharge estimation.

(a) Ground Water Level Fluctuation and Specific Yield Method

The water table fluctuation and specific yield approach has been recommended for recharge estimation.

Generally a well hydrograph follows a definite trend like stream hydrograph with a peak followed by a recession limb. The recession limb in a post-recharge period is characterized by two distinct slopes-one a steep one (from August to October/November) and other a gentler one (from October/November to June). The steeper limb signifies the quick dissipation of a major part of recharge during the later part of recharge period itself. This recession of water table is sluggish in alluvial areas compared to hard rock areas wherein a substantial recession occurs within one or one and half month after the peak water level is achieved. Due to less demand and adequate soil moisture in later half of recharge period and under prevailing agricultural practice in India, the fast receding limb of hydrograph is not considered for computation of utilisable recharge. The utilisable recharge is estimated based on pre-monsoon (April-May) to post-monsoon (November) water level fluctuation for the areas receiving South-West Monsoon. Similarly for the areas receiving North-East Monsoon water level fluctuations of pre-monsoon (November) and post-monsoon (March) have been taken into consideration.

The monitoring of water level network stations needs to be adequate in space and time and analysis of data carried out keeping in view the hydrogeological situation. The inconsistencies in observations which may arise due to varied hydrogeological factors should be smoothened out.

Since 1984 the Hydrograph Network Stations in the country for ground water monitoring have been strengthened by Central Ground Water Board and State Governments. Currently more than 15,500 Hydrograph Network Stations are established by CGWB and more than 30,000 Observation Wells by State Ground Water Organisations for periodical monitoring by ground water levels. The latest refinement of ground water resource estimation is based on ground water level fluctuation data generated from CGWB and State Observation Network Stations.

The specific yield values of the geological formations in the zone of water table fluctuation as computed from pumping tests were utilized in this recharge estimation. As a guide following values computed in different studies are recommended :-

Table - 2

(i)	Sandy alluvial area	12 to 18 percent
(ii)	Valley fills	10 to 14 percent
(iii)	Silty/Clayey alluvial area	5 to 12 percent
(iv)	Granites	2 to 4 percent
(v)	Basalts	1 to 3 percent
(vi)	Laterite	2 to 4 percent
(vii)	Weathered Phyllites, Shales, Schist and associated rocks.	1 to 3 percent
(viii)	Sandstone	1 to 8 percent
(ix)	Limestone	3 percent
(x)	Highly Karstified Limestones	7 percent

Normalization of Rainfall Recharge

The water table fluctuation in an aquifer corresponds to the rainfall of the year of observation. The rainfall recharge estimated should be corrected to the long term normal rainfall for the areas as given by India Meteorological Department.-

For calculating the annual recharge during monsoon the formula indicated below may be adopted.

Monsoon Recharge =

$$(\Delta S + DW - Rs - Rigw - Ris) \times \frac{\text{Normal Monsoon RF}}{\text{Annual Monsoon RF}} + Rs + Ris$$

Where,
ΔS = Change in ground water storage volume during pre and post monsoon period (April/May to November), (million cubic metre or mcm) obtained as below :-

Area (Sq.Km.) X Water Level fluctuation (m) X Specific yield

The areas not suitable for recharge like high hilly and saline area should be excluded.

DW = Gross ground water draft during monsoon (million cubic metre)

Rs = Recharge from canal seepage during monsoon (mcm).

Rigw = Recharge from recycled water from ground water irrigation during monsoon (mcm).

Ris = Recharge from recycled water from surface water irrigation during monsoon (mcm)

RF = Rainfall (metre).

To eliminate the effects of drought or surplus rainfall years, the recharge during monsoon is estimated as above for a period of 3 to 5 years and an average figure is taken for long term recharge. Recharge from winter rainfall may also be estimated on the same lines.

(b) Rainfall Infiltration Method

In areas where ground water level monitoring is not adequate in space and time, rainfall infiltration may be adopted. The norms for rainfall infiltration contributing to ground water recharge are evolved, based on the studies undertaken in various water balance projects in India. The norms for recharge from rainfall under various hydrogeological situations are recommended in Table - 3.

The normal rainfall figures are taken from India Meteorological Department which is main agency for collection and presentation of rainfall data. The ranges of rainfall infiltration factor are recommended as a guideline and need to be adopted based on their applicability to prevalent hydrogeological situation.

Besides natural ground water recharge estimation, recharge due to seepage from canals, return seepage from irrigated fields, seepage from tanks and lakes, potential recharge in water logged and flood prone areas are computed based on following recommended norms :-

Table - 3

Rainfall infiltration factor in Different Hydrogeological Situations

S.No.	Hydrogeological Situation	Rainfall Infiltration Factor
1.	Alluvial Areas	
	a. Sandy Areas	20 to 25 percent of normal rainfall
	b. Areas with higher clay content	10 to 20 percent of normal rainfall
2.	Semi-Consolidated Sandstones	
	(Friable and highly porous)	10 to 15 percent of normal rainfall
3.	Hard rock areas	
	a. Granitic Terrain	
	(i) Weathered and Fractured	10 to 15 percent of normal rainfall
	(ii) Un-Weathered	5 to 10 percent of normal rainfall
	b. Basaltic Terrain	
	(i) Vesicular and Jointed Basalt	10 to 15 percent of normal rainfall
	(ii) Weathered Basalt	4 to 10 percent of normal rainfall
	c. Phyllites, Limestones, Sandstones, Quartzites, Shales, etc.	3 to 10 percent of normal rainfall.

Recharge due to Seepage from Unlined Canals

The following norms may be adopted in most of the areas except where realistic values have been arrived at, from project studies :-

(i) For unlined canals in normal type of soil with some clay content along with sand :-

15 to 20 ham/day/10^6 sq.m. of wetted area of canal

(ii) For unlined canals in sandy soils :-

25 to 30 ham/day/10^6 sq.m. of wetted area

(iii) For lined canals the seepage losses may be taken as 20 percent of the above values.

Return Seepage from Irrigation Fields

(i) Irrigation by surface water sources

(a) 35% of water delivered at the outlet for application in the field. The variation in percentage of seepage may be guided by studies undertaken in the area or in a similar area.

(b) 40% of water delivered at outlets for paddy irrigation only

(ii) Irrigation by ground water sources

(a) 30% of the water delivered at outlet. For paddy irrigation 35% as return seepage of the water delivered may be taken. Since, net ground water draft figures are taken, the recharge from ground water irrigation is not accounted separately.

In all the above cases, return seepage figures include losses in the field channel also and these should not be accounted for separately.

Seepage from Tanks

The seepage from the tanks may be taken as 44 to 60 cm per year over the total water spread. The seepage from percolation tanks is higher and may be taken as 50% of its gross storage. In case of seepage from ponds and lakes, the norms as applied to tanks may be taken.

Annual Ground Water Recharge

The annual replenishable ground water recharge includes the following components;

Total annual recharge = Recharge during monsoon + Non-monsoon rainfall recharge + Seepage from Canals + Return flow from irrigation + Inflow from influent rivers etc. + Recharge from submerged lands, lakes, etc.

Besides, the present methodology recommends computation of potential recharge in shallow water table areas/waterlogged areas and in flood prone areas.

Potential Resource in Water Logged Area and Shallow Water Table Zones

Potential Ground Water Resource =

(5-B) X (A) X (Specific Yield)

where,

B = Depth to water table below ground surface in pre-monsoon period in shallow aquifers (m)

A = Area of shallow water table zone (m^2)

The planning of minor irrigation works in the areas indicated above should be done in such a way that there are no long term adverse effects on water table. The behaviour of water table in the adjoining area which is not waterlogged should be taken as a guide for development purposes.

Potential Recharge in Flood Prone Areas

The potential recharge from flood plains may be estimated on the same norms as for ponds and lakes, i.e. 44 to 60 cm per year over the water spread area for period equal to the retention period.

Total Ground Water Resources

The total ground water resources for water table aquifers is taken as annual ground water recharge plus potential recharge in shallow water table zone.

The total ground water resource, thus computed would be available for utilization for irrigation, domestic and industrial uses. The base flow in rivers is a regenerated ground water resource and is some times committed for lift irrigation schemes, and other surface irrigation works. It is, therefore, recommended that 15% of total ground water resources be kept for drinking and industrial purposes, for committed base flow and to account for the unrecoverable losses. The remaining 85% can be utilized for irrigation purposes. But wherever the committed base flows, domestic and industrial uses are more than 15% the utilisable resources for irrigation may be considered accordingly.

Ground Water Draft

The ground water draft is the quantity of ground water withdrawn from the ground water reservoirs. The total quantity withdrawn is termed as gross draft. The annual ground water draft of a structure is computed by multiplying its average discharge and annual working hours. The number of working hours can be calculated by the hourly consumption of electrical or diesel energy. The ground water draft is also calculated by the irrigation water requirement of crops in the command area of the structure. The Minor Irrigation Census 1986-87 has brought out the existing ground water structures and these are taken as base figures to work out ground water draft and to project future ground water development. For working out ground water balance, 70% of gross extraction is taken which is known as Net Ground Water Draft. The 30% is presumed to go as return seepage to ground water regime.

Categorization of Areas Based on Level of Ground Water Development

The level of ground water development in an area is to be taken as the ratio of net yearly draft to total utilisable ground water resources for irrigation. It can be expressed as :-

Level of Ground Water Development

$$= \frac{\text{Net Yearly Draft}}{\text{Utilisable Resource for Irrigation}} \times 100$$

For the purpose of clearance of schemes by Financial Institutions, categorization of areas based on level of ground water development at year 5 has been recommended as follows :

Category of Areas		Stage of Ground Water Development (%) at Year 5.
(a)	White	< 65%
(b)	Grey	> 65 but <85%
(c)	Dark	> 85 but <100%
(d)	Over-exploited	> 100%.

In dark areas, micro-level surveys are required to evaluate the ground water resources more precisely for taking up further ground water development. As per National Water Policy, ground water development is limited to annual replenishable ground water resource, hence ground water exploitation is not permitted in over-exploited areas. The ground water levels are the ultimate indicator of the extent of ground water development taking place in an area. Hence, the behaviour of ground water level should be a deciding factor to indicate the possibilities of future ground water development. It is therefore, necessary that no further ground water development is recommended in the areas where, long term decline in ground water levels are witnessed, though the ground water resource assessment may be indicating surplus availability of ground water.

4.0 IRRIGATION POTENTIAL FROM GROUND WATER SOURCES

In normal irrigation practices the term net irrigation water requirement and gross irrigation water requirements are generally used. The net irrigation water requirement is the amount of water, exclusive of effective precipitation required for crop production. In other words, it is the amount of irrigation water that must be stored in the root zone to meet the consumptive use requirement of crops. The gross irrigation water requirement includes the net requirement and also losses incurred in distributing and applying water and in operating the system.

Computation of Irrigation Potential

For working out the area, which can be irrigated from the existing ground water resources (utilisable ground water resources), the relationship between net irrigation requirement and quantity of water to be pumped out from a ground water structure to meet this requirement (gross irrigation requirement) needs to be understood clearly. While the former is the basic requirement of crop for its proper growth and yield during the crop period, and is generally consumed fully, the latter is the gross requirement or the quantity of the water pumped out from the source or the quantity of water applied to the field. This amount includes the application losses based on the irrigation efficiency described earlier.

The relationship is expressed as :

$$Qf = \frac{Qr}{Ec}$$

Where,

Qf = Discharge to be pumped from well or amount of water.

Qr = Discharge required to meet crop water requirement.

Ec = Overall Irrigation efficiency.

The overall irrigation efficiency in ground water irrigation system is higher, because of the source being adjacent to command, and farm conduit and main conveyance losses being much less. The irrigation efficiency in ground water system is generally taken as 70%.

As such, the computation of feasible potential or potential created from ground water on area basis can be computed by dividing the utilisable ground water resources by the gross irrigation requirement of crops grown in an unit area, hereafter referred to as weighted average delta. In the current exercise the ultimate irrigation potentials in the country, have been computed, based on weighted average delta as determined by State Agricultural Departments and Agricultural Universities.

In the present exercise the ultimate irrigation potentials have been computed, assuming high efficiency of ground water irrigation system and ignoring the recycling of ground irrigation component. But, in this case field application losses being minimal, the values of weighted average delta would be rather low approaching the net irrigation requirement values.

5.0 STATEWISE GROUND WATER RESOURCES AND IRRIGATION POTENTIAL

In accordance with the recommendations of the Ground Water Estimation Committee, 1984, the Working Groups constituted by the State Governments, assessed the ground water resource and irrigation potential of different States. The ground water estimation is for fresh water only and saline areas have been excluded from these assessments. It may be seen, that in keeping with the hydrogeological variations in the country, the ground water development potentials, too, vary widely in different States/ Regions. Though rainfall has been the principal source for ground water recharge, the recharge from canal seepage and return flow of irrigation has also been significant in some States. The contribution from canal irrigation system to the annual ground water recharge in the States of Andhra Pradesh, Punjab, Haryana, and Jammu & Kashmir ranges from 43.25% to 49.26%, in the States of Tamil Nadu and Uttar Pradesh 28% and in other States it is meagre. To arrive at figures of the ultimate irrigation potentials in terms of area, consumptive use under the prevalent cropping patterns, and the irrigation requirements in the States, falling in different agro-climatic zones and constraints of land availability have been taken into consideration. The total ground water resources and resultant

irrigation potentials from natural ground water recharge and from ground water recharge due to existing canal irrigation system have been separated, with a view to appreciate the contribution due to canal irrigation system. The potential created from ground water is similarly due to the contribution from natural ground water recharge as well as contribution from canal irrigation system. The irrigation potential created from ground water has also been similarly bifurcated on pro-rata basis.

The Statewise/District wise ground water resource and irrigation potentials are summed up and presented in Annexures - I, II & III. The annexures reflect stage of development both in term of volumetric ground water resource and irrigation potential. The assessed ultimate irrigation potential computed as 71.17 m.ha. has been reduced to 90% level and termed "Utilisable Irrigation Potential for Development". This has been done in view of the following:

a) To ensure sustainable development, the level of ground water extraction has to be kept at a level reasonably lower than the absolute maximum.

b) To maintain river ecology, minimum flows have to be ensured by limiting extraction of ground water which contributes to the lean season flow in the river.

c) 90% level of extraction is considered reasonable from the above consideration.

ANDHRA PRADESH

The substantial quantity of ground water is available in canal and tank ayacut areas and in deeper aquifers in selected sedimentary formations in West Godavari, East Godavari, Warangal and Khammam Districts. In Ayacut areas, conjunctive utilisation of surface and ground water is needed. Besides, the small land holdings do not support bankable ground water development scheme. Due to heterogeneous nature of hard rock formations, which cover the major part of the State, detailed surveys supported by Remote Sensing and Geophysical Surveys are needed for successful site locations. The ground water development is feasible through dug, dug-cum-bore and bore wells in hard rock formations and through deep tubewells and filter points in sedimentaries and coastal aquifers.

BIHAR

The non-availability of adequate power supply for ground water pumpage and small land holdings not capable of supporting bankable scheme are the main constraints for speedy ground water development in the State. Hard rock formations occupying Chota Nagpur area and parts of South Bihar can support low yielding wells and the well sites are to be located only after detailed surveys. The ground water can be developed by shallow and deep tubewells in Gangetic alluvial areas, whereas dug and borewells are feasible in hard rock terrain.

GOA

Dug wells and bored wells are feasible in hard rock areas. Filter points can be constructed in beach sands. The small land holdings, limited land availability along with the topographical set up are the main constraints for ground water development.

GUJARAT

The ground water development has proceeded with a faster pace in major parts of the State resulting in excessive development in many parts. Progressive decline of water level and quality deterioration in coastal areas have resulted in limited availability of suitable ground water for development. The need, therefore, is for regulated ground water development and adoption of ground water management strategies like; artificial recharge utilising surplus monsoon runoff, conjunctive use of surface and ground water in surface water irrigation commands, etc. Deep tubewells are main ground water structures feasible in alluvial areas of Central Gujarat. Dug wells and borewells are the main ground water structures in Saurashtra Peninsula and other hard rock areas. In coastal Saurashtra, the ground water development is to be undertaken cautiously due to salinity ingress.

HARYANA

The development of ground water resources is quite high in areas underlain by fresh ground water, resulting in ground water level decline. The southern and south-western parts do not permit large scale ground water development due to inland ground water salinity in the aquifer. Shallow and deep tubewells are the main ground water structures in alluvial terrain. The hard rock areas can be developed through dug wells and borewells.

HIMACHAL PRADESH

The topographical set up, limited land availability and inaccessibility for drilling rigs to reach the areas are some of the factors acting as constraint for ground development. The cost of construction of tubewell utilizing Percussion rigs is high and time consuming and also beyond the reach of individual farmer. This is also a constraint for speedy ground water development. The level of ground water development in general is of a very low order. The ground water development is limited to valley areas through tubewells.

JAMMU & KASHMIR

Topographical set up, inaccessibility of the area for man and drilling machinery and adverse climatic conditions are the main constraints for speedy ground water development. In general, ground water development is at a low key. The ground water development is generally from tubewells.

KARNATAKA

The heterogeneity of hard rock formation and discontinuous nature of aquifers require proper location of wells for their success. Remote Sensing techniques along with Geophysical Surveys are needed for success of a well. Small land holdings do not permit a bankable ground water development scheme for institutional financing. Proper siting, along with suitable spacing is needed for regulated ground water development to avoid local over-development of ground water resource. Dug wells, dug-cum-bore wells and borewells are the main ground water structures feasible in the State.

KERALA

The ground water development for irrigation has commenced recently in the State. The main constraints for speedy ground water development are high rainfall, substantial surface water availability, limited land for ground water development and small and fragmented land holdings. The community well scheme is recommended for speedy development of ground water. In alluvial areas, the tubewells are the main ground water development structures, whereas dug well and bore wells are feasible in hard rock areas.

MADHYA PRADESH

Ground water development in hard rock areas can be taken up through construction of dug wells and bore wells. The location of successful site for ground water structure requires the Hydrogeological Surveys coupled with Remote Sensing Techniques and Geophysical Surveys. The small land holding, non-availability of adequate power supply are some of the constraints for speedy ground water development.

MAHARASHTRA

Dug wells, dug cum bore and bore wells are feasible in hard rock areas. In Tapi and Puma alluvium tubewells can be constructed. In hard rock areas the location for successful well has to be based on detailed Hydrogeological Survey supported by Remote Sensing and Geophysical Techniques.

ORISSA

Poor infrastructural facilities, fragmented and small land holdings, coupled with traditional cropping pattern make individual investments non-viable. Unreliable power supply, non-availability of Diesel/Kerosene in remote areas, poor after sales service are some of the major constraints for speedy development of ground water. The hard rock terrain has not yet been explored completely to indicate the occurrence of aquifers to be tapped through boring. The site location in hard rock terrain requires Remote Sensing and Geophysical Techniques for a successful well. Investments for ground water structures through group or cooperative effort are also not in practice which can accelerate ground water development. The ground water

development in hard rock terrain is feasible through dug and bore wells. In coastal alluvial tract and in inland alluvial area deep tubewells and filter points can be constructed.

PUNJAB

The ground water resource has already been developed beyond utilisable development limit in most of the Districts leaving hardly any scope for future ground water development. In the Kandi tract the nature of hydrogeological conditions require high cost for tubewell construction with suitable percussion drilling rigs. The ground water development can take place in fringe areas occupied by Kandi tract.

The total available ground water resource for irrigation is 1.6789 m.ha.m., the net annual draft is 1.5758 m.ha.m. The utilisable irrigation potential is 2.92 m.ha. from ground water resources based on the weighted average delta of 0.52 m. The potential created from ground water as on 1993, is 5.1170 m.ha., exceeding the utilisable irrigation potential. This additional potential has been developed by over-exploiting the ground water resources.

RAJASTHAN

Ground water development in hard rock areas is through dug, dug-cum-bore and borewells. Shallow tubewells are feasible in valley fill areas. In western part deep tubewells are feasible. Deeper water levels and ground water quality problem along with non-availability of adequate power for pumping the ground water, are some of the constraints for ground water development.

TAMIL NADU

In hard rock area the dug wells and borewells are common structures for ground water development. In alluvial areas deep tubewells are feasible. The ground water development in most of the parts of State is high resulting in lowering of water level in many areas. Regulated development of ground water is required specially in hard rock areas. In the coastal areas, a cautious approach has to be adopted for ground water development due to salinity hazards.

UTTAR PRADESH

The irrigation potential created from ground water as on 1991, is 13.11 m.ha., considering norms of 5 ha. for shallow tubewells and 100 ha. for deep tubewell. The norms have since been revised as 3.87 ha. for shallow tubewell and 50 ha. for deep tubewell (MI Census 1987). So far, the irrigation potential utilized based on ground water draft (1991) is 9.78 m.ha. This takes into account irrigation application of 0.20 and 0.63 m which is also supplemented from surface water irrigation. Due to overlap of irrigation commands of surface water and ground water, it is not possible to project the actual contribution from ground water alone. The potential created from ground water as on 1993, and as per data provided by State Government is 14.00 m.ha. The ground water development is feasible through shallow

tubewells and deep tubewells in alluvial areas of Gangetic plains. Dug, Dug-cum-bore and bore wells are feasible in hard rock areas of Bundelkhand Region. The ground water development in Western Uttar Pradesh has taken place at comparatively faster pace resulting in lowering of water levels in few localized areas. In Eastern Uttar Pradesh, the ground water development is much less. The main constraints for speedy ground water development in Eastern Uttar Pradesh are non-availability of supporting bankable scheme, inadequate electric power supply, high cost of diesel and small land holdings. Complex hydrogeological situation in hard rock areas of Southern Uttar Pradesh require detailed Hydrogeological Surveys supported by Remote Sensing and Geophysical Techniques for location of successful wells.

WEST BENGAL

Shallow and Deep tubewells are feasible in alluvial areas of the State. In hard rock areas dug, dug-cum-bore and bore wells can be constructed. The ground water development has been substantially accelerated after the World Bank Assistance for ground water based projects. The main constraints in ground water development in northern part of the State are small land holding, high rainfall and difficult terrain. IN foothill areas the tubewell construction is costly and time consuming and is beyond the capacity of individual farmer.

NORTH EASTERN STATES

Assam

Heavy monsoon, abundant surface water and limited land availability for agriculture, are some of the main constraints for development of ground water in spite of presence of potential ground water aquifer. Fragmented and small land holdings prohibit the beneficiaries not only to raise their own finances but to avail institutional finance for construction well and pump set installation. Lack of adequate and timely availability of electricity and insufficient maintenance and repair facility, act as constraints to utilise the potential already created through construction of wells by individuals and minor irrigation corporation. Construction of dug wells which were the initial steps in ground water development in other States have not at all picked up due to lack of awareness regarding the benefits of well irrigation and multiple cropping. Shallow and deep tubewells are generally feasible in major parts of the State.

Tripura

In the North-Eastern Sector the ground water development is comparatively higher in the State of Tripura. The main reasons for the ground water development are influence of proximity to highly populated and developed undivided Bengal, adequate availability of power, finance and maintenance expertise and crop water requirement for Kharif and Rabi crops. The ground water development is however, limited to the broad valleys which contain the potential aquifers. Shallow tubewells and auto flow wells are feasible based on the hydrogeological situation in the valley portions.

Arunachal Pradesh and Meghalaya

Heavy rainfall, non-accessible areas to transport drilling rigs and the machineries, small land holding and availability of natural springs capable of meeting drinking water requirement, are some of the factors non-conducive to ground water development in these States. Construction of tubewells in bouldery formation in Arunachal Pradesh which yield substantial quantity of ground water are beyond the capacity of individual farmers due to high cost.

Areas with Intensive Ground Water Development

The ground water development in different parts of the country is not uniform. Based on the hydrogeological, agricultural and Socio-economic situations, the ground water development in some parts is quite intensive resulting in over-exploitation. The reports of Working Group for different States have brought out the over-exploited and dark blocks [Annexure - IV (a) & (b)].The stage of ground water development and categorisation of blocks/taluks/watersheds/mandals is based on the ground water resource assessment in terms of volume and as per recommendations of Ground Water Estimation Committee-1984.

6.0 NATIONAL SCENARIO OF GROUND WATER RESOURCE AND IRRIGATION POTENTIAL.

The total rechargeable ground water resources in the country are computed as 43.19 m.ha.m. The available ground water resource for irrigation is 36.08 m.ha.m., of which the utilisable quantity is 32.47 m.ha.m. (Annexure - III).

The utilisable irrigation potential of the country has been estimated as 64.05 m.ha., based on crop water requirement and availability of cultivable land. The statewise irrigation potential created as on 1993, is presented in Table - 4 and Plate - B. The ground water resources have been bifurcated based on the contribution from natural recharge due to rainfall and augmentation from canal irrigation system. Accordingly, of the total utilisable irrigation potential of 64.05 m.ha., the potential from natural rainfall recharge is 50.82 m.ha. and augmentation from canal irrigation system is 13.23 m.ha. The irrigation potential created in country till 1993 is estimated as 35.38 m.ha. The stage of ground water development works out to be 55.23%. This is however, at variance with the stage of development, as about 32%, worked out on volumetric basis. This is due to the fact that the area which can be theoretically irrigated from the available ground water resources has to be reduced based on availability of land for irrigation and considering the absence of suitable measures to control and regulate ground water development and to account for the possible refinements which would be required in the present methodology of ground water resource assessment. The utilisable irrigation potential and potential created as on 1993, is given in Table-4.

Table - 4

UTILISABLE IRRIGATION POTENTIAL AND IRRIGATION POTENTIAL CREATED FROM GROUND WATER

As on 1993

Sr. No.	States	Utilisable Irrigation Potential			Irrigation Potential Created			Balance	Level of Ground Water Development
		Due to Natural Recharge From Rainfall (m.ha)	Due to Augmentation From Canal Irrigation System (m.ha)	Total From Ground Water Resource (m.ha)	From Natural Ground Water (m.ha)	Due to Augmentation From Canal Irrigation System (m.ha)	Total (m.ha)	(m.ha)	(%)
1	2	3	4	5	6	7	8	9	10
1	Andhra Pradesh	2.9127	1.0474	3.9601	1.4188	0.5102	1.9290	2.0311	48.71
2	Arunachal Pradesh	0.0180	0.0000	0.0180	0.0021	----	0.0021	0.0159	11.67
3	Assam	0.8709	0.0291	0.9000	0.1742	0.0058	0.1800	0.7200	20.00
4	Bihar	4.2552	0.6924	4.9476	1.2278	0.1998	1.4276	3.5200	28.85
5	Goa	0.0247	0.0046	0.0293	0.0014	0.0003	0.0017	0.0276	5.80
6	Gujarat	2.2201	0.5358	2.7559	1.4828	0.3578	1.8406	0.9153	66.79
7	Haryana	0.7792	0.6824	1.4616	0.8465	0.7414	1.5879	0.0000	108.64
8	Himachal Pradesh	0.0538	0.0147	0.0685	0.0120	0.0033	0.0153	0.0532	22.36
9	Jammu & Kashmir	0.3680	0.3400	0.7080	0.0067	0.0062	0.0120	0.6951	1.81
10	Karnataka	2.2255	0.3473	2.5738	0.6303	0.0981	0.7284	1.8444	28.31
11	Kerala	0.7294	0.1498	0.8792	0.1304	0.0268	0.1572	0.7220	17.88
12	Madhya Pradesh	8.6619	1.0706	9.7325	1.6681	0.2062	1.8743	7.8582	19.26
13	Maharashtra	3.2585	0.3935	3.6520	1.1511	0.1390	1.2901	2.3619	35.32
14	Manipur	0.3690	0.0000	0.3690	0.0004	----	0.0004	0.3686	0.11
15	Meghalaya	0.0635	0.0000	0.0635	0.0092	----	0.0092	0.0543	14.50
16	Mizoram		Not Assessed						
17	Nagaland	Not Assessed							
18	Orissa	3.4683	0.7343	4.2026	0.3244	0.0687	0.3931	3.8095	9.35
19	Punjab	1.4801	1.4370	2.9171	2.5964	2.5206	5.1170	0.0000	175.41
20	Rajasthan	1.5085	0.2694	1.7779	1.2771	0.2281	1.5052	0.2727	84.67
21	Sikkim	Not Assessed							
22	Tamil Nadu	2.0316	0.8005	2.8321	1.4082	0.5549	1.9631	0.8680	69.32
23	Tripura	0.0690	0.0116	0.0806	0.0170	0.0029	0.0199	0.0607	24.70
24	Uttar Pradesh	12.5505	4.2485	16.7990	10.4451	3.5549	14.0000	2.7990	83.34
25	West Bengal	2.9008	0.4171	3.3179	1.1543	0.1660	1.3203	1.9976	39.79
	TOTAL STATES	**50.8192**	**13.2260**	**64.0452**	**25.9843**	**9.3910**	**35.3753**	**30.9951**	**55.23**

UNION TERRITORIES

1	Dadar & N.Haveli	0.0043	0.0008	0.0051	0.0007	0.0001	0.0008	0.0043	15.48
	TOTAL UTs	**0.0043**	**0.0008**	**0.0051**	**0.0007**	**0.0001**	**0.0008**	**0.0043**	**15.48**
	GRAND TOTAL	**50.8235**	**13.2268**	**64.0503**	**25.9850**	**9.3911**	**35.3761**	**30.9994**	**55.23**

ANNEXURES

(I To IV)

ANNEXURE - I(a)

STATE-WISE GROUND WATER RESOURCES AND IRRIGATION POTENTIAL DUE TO NATURAL RECHARGE FROM RAINFALL

ANNEXURE-I(a)

GROUND WATER RESOURCE AND IRRIGATION POTENTIAL DUE TO NATURAL RECHARGE IN INDIA

Sr. No.	States	Total Replenishablor Ground Water Resource from Normal Natural Recharge (m.ha.m/Yr)	Provision Domestic Industrial & Other Uses (m.ha.m/Yr)	Available Ground Water Resource for Irrigation i Net Terms (m.ha.m/Yr)	Utilisable Ground Water Resource for Irrigation Net Terms (m.ha.m/Yr)	Gross Draft from Natural Recharge Estimated on Prorata Basis (m.ha.m/Yr)	Net Draft from Natural Recharge (m.ha.m/Yr)	Balance Ground Water Resource for Future Use in Net Terms (m.ha.m/Yr)	Level of Ground Water Develop-ment (%)	Weighted Average Delta (m)	Utilisable Irrigation Potential for Development From Natural Recharge (m.ha)
1	2	3	4	5	6	7	8	9	10	11	12
1	Andhra Pradesh	2.00277	0.30042	1.70235	1.53212	0.62204	0.43543	1.26692	25.58	0.047-1.472	2.91268
2	Arunachal Pradesh	0.14385	0.02158	0.12227	0.11005	--	--	0.12227	--	--	0.01800
3	Assam	2.42315	0.36347	2.05968	1.85371	0.12989	0.09092	1.96876	4.41	1.283	0.87091
4	Bihar	2.83086	0.42463	2.40623	2.16561	0.63807	0.44665	1.95958	18.56	0.40-0.65	4.25524
5	Goa	0.01841	0.00276	0.01565	0.01409	0.00186	0.00130	0.01435	8.30	0.570	0.02471
6	Gujarat	1.63771	0.24566	1.39205	1.25284	0.82999	0.58100	0.81105	41.74	0.45-0.714	2.22010
7	Haryana	0.47272	0.07091	0.40181	0.36164	0.53136	0.37196	0.02965	92.57	0.385-0.6	0.77922
8	Himachal Pradesh	0.02877	0.00575	0.02302	0.02072	0.00659	0.00461	0.01841	20.03	0.385	0.05383
9	Jammu & Kashmir	0.24254	0.03639	0.20615	0.18554	0.00285	0.00200	0.20415	0.97	0.385-0.6	0.36795
10	Karnataka	1.41792	0.21269	1.20523	1.08471	0.55258	0.38679	0.81844	32.09	0.18-0.74	2.22548
11	Kerala	0.66346	0.11100	0.55246	0.49721	0.12113	0.08479	0.46767	15.35	0.53-0.83	0.72944
12	Madhya Pradesh	4.52908	0.67938	3.84970	3.46474	0.91689	0.64183	3.20787	16.67	0.400	8.66189
13	Maharashtra	3.33998	1.09344	2.24654	2.02189	0.94257	0.65980	1.58674	29.37	0.43-1.28	3.25851
14	Manipur	0.31540	0.04730	0.26810	0.24129	Neg.	Neg.	0.26810	Neg.	0.650	0.36900
15	Meghalaya	0.05397	0.00810	0.04587	0.04128	0.00260	0.00182	0.04405	Neg.	0.650	0.06351
16	Mizoram					Not Assessed					
17	Nagaland	0.07240	0.01090	0.06150	0.05535	Neg.	Neg.	0.06150	Neg.	--	---
18	Orissa	1.64859	0.24728	1.40131	1.26117	0.16686	0.11681	1.28450	8.34	0.34-0.44	3.46825
19	Punjab	0.94656	0.09463	0.85193	0.76674	1.14143	0.79900	0.05293	93.79	0.518	1.48019
20	Rajasthan	1.09845	0.17354	0.92491	0.83242	0.72359	0.50651	0.41840	54.76	0.457-0.6	1.50846
21	Sikkim					Not Assessed					
22	Tamil Nadu	1.69099	0.28365	1.60734	1.44660	1.41211	0.98848	0.61886	61.50	0.37-0.93	2.03158
23	Tripura	0.05679	0.00852	0.04827	0.04344	0.02293	0.01605	0.03222	33.25	0.630	0.06896
24	Uttar Pradesh	6.34330	0.95153	5.39177	4.85264	2.85353	1.99746	3.39431	37.05	0.2 - 0.5	12.55049
25	West Bengal	2.02992	0.30451	1.72541	1.55287	0.59996	0.41997	1.30544	24.34	0.33-0.75	2.90079
	TOTAL STATES	34.20759	5.69804	28.50955	25.65867	12.21879	8.55308	19.95647	30.00	--	50.81916
	UNION TERRITORIES										
1	Andaman & Nicobar					Not Assessed					
2	Chandigarh	0.002966	--	--	--	0.00351	0.002454	0.000512	--	--	---
3	Dadra & N.Haveli	0.003576	0.000536	0.003040	0.00274	0.00055	0.000387	0.002653	12.73	0.640	0.00427
4	Daman & Diu	0.001300	0.000200	0.001100	0.00099	0.00129	0.000900	0.000200	81.82	--	---
5	NCT Delhi	0.02389	0.01549	--	--	0.01245	0.008720	--	--	--	---
6	Lakshadweep	0.000243	--	--	--	0.00022	0.000155	0.000088	63.79	--	---
7	Pondicherry	0.002877	0.000432	0.002445	0.00220	0.00085	0.000595	0.001850	24.34	--	---
	TOTAL UTs	0.034852	0.016658	0.006585	0.00593	0.01687	0.013211	0.005303	--	--	0.00427
	GRAND TOTAL	34.242442	5.714898	28.516135	25.66460	12.23766	8.56629	19.961773	30.04	--	50.82343

NOTE

1. Col. 5 = Ground Water Resource from Normal Natural Recharge - Provision for Domestic, Industrial & Other Uses (Col. 3 - Col. 4).

2. Col. 6 = 90% of Column 5.

2. Col. 7 = Gross draft is the total withdrawal from Ground Water Resource for Irrigation.

3. Col. 8 = 70% of Gross draft (bulk of the losses return back to the Ground Water Reservoir)

4. Col. 9 = Col. 5 - Col. 8 in net terms.

5. Col. 10 = Level of Ground Water Development (Col. 8 / Col. 5) X 100.

6. Col. 12** = Utilisable Ground Water Resource for Irrigation / Weighted Average Delta (Col.6 / Col.11).
(This is 90% of Ultimate Irrigation Potential which was computed as per available ground water resource for irrigation and limiting it as per the land availability.)

Note:- ** Utilisable irrigation potential has been kept as 90 % of the ultimate irrigation potential which is reasonable, in view of the following:-

1. To ensure sustainable development, the level of extraction has to be kept at a level reasonably lower than the ultimate availability.

2. To maintain river ecology, minimum flows have to be ensured by limiting extraction of ground water, which contributes to the lean season flows in the rivers.

ANNEXURE - I(b)

DISTRICT-WISE GROUND WATER RESOURCES AND IRRIGATION POTENTIAL DUE TO NATURAL RECHARGE FROM RAINFALL

ANNEXURE-I(b)

GROUND WATER RESOURCE AND IRRIGATION POTENTIAL DUE TO NATURAL RECHARGE

ANDHRA PRADESH

Sr. No.	Districts	Total Replenishable Ground Water Resource from Normal Natural Recharge (m.ha.m/Yr)	Provision for Domestic, Industrial & Other Uses (m.ha.m/Yr)	Available Ground Water Resource for Irrigation in Net Terms (m.ha.m/Yr)	Utilisable Ground Water Resource for Irrigation in Net Terms (m.ha.m/Yr)	Gross Draft from Natural Recharge Estimated on Prorata Basis (1993) (m.ha.m/Yr)	Net Draft from Natural Recharge (1993) (m.ha.m/Yr)	Balance Ground Water Resource for Future Use (m.ha.m/Yr)	Level of Ground Water Develop-ment (%)	Weighted Average Delta (m)	Utilisable Irrigation Potential for Development From Natural Recharge (m.ha)
1	2	3	4	5	6	7	8	9	10	11	12
1	Srikakulam	0.05448	0.00817	0.04631	0.04168	0.01187	0.00831	0.03800	17.94	0.0475-1.472	0.03553
2	Vijayanagaram	0.06370	0.00956	0.05414	0.04873	0.01017	0.00712	0.04702	13.15	0.097-1.472	0.05659
3	Visakhapatnam	0.06332	0.00950	0.05382	0.04844	0.01211	0.00848	0.04534	15.76	0.097-0.872	0.05621
4	East Godavari	0.06670	0.01000	0.05670	0.05103	0.01074	0.00752	0.04918	13.26	0.147-1.472	0.10141
5	West Godavari	0.06286	0.00943	0.05343	0.04809	0.01810	0.01267	0.04076	23.71	0.147-1.472	0.10227
6	Krishna	0.03746	0.00562	0.03184	0.02866	0.00721	0.00505	0.02679	15.86	0.147-1.472	0.08884
7	Guntur	0.07548	0.01132	0.06416	0.05774	0.00600	0.00420	0.05996	6.55	0.662-0.87	0.07737
8	Prakasam	0.09784	0.01468	0.08316	0.07484	0.01613	0.01129	0.07187	13.58	0.047-0.872	0.16539
9	Nellore	0.20031	0.03005	0.17026	0.15323	0.07907	0.05535	0.11491	32.51	0.072-1.47	0.19227
10	Kurnool	0.07471	0.01121	0.06350	0.05715	0.01591	0.01114	0.05236	17.54	0.097-0.872	0.12974
11	Anantapur	0.09164	0.01375	0.07789	0.07010	0.04100	0.02870	Q0.04919	36.85	0.047-0.872	0.13114
12	Cuddapah	0.08889	0.01333	0.07556	0.06800	0.03781	0.02647	0.04909	35.03	0.147-1.472	0.15507
13	Chittoor	0.13192	0.01979	0.11213	0.10091	0.05404	0.03783	0.07430	33.74	0.147-1.472	0.18452
14	Rangareddy	0.06098	0.00915	0.05183	0.04665	0.02699	0.01889	0.03294	36.45	0.147-1.472	0.10152
15	Hyderabad										
16	Nizamabad	0.06791	0.01019	0.05772	0.05195	0.02907	0.02035	0.03737	35.26	0.072-1.472	0.11143
17	Medak	0.09935	0.01490	0.08445	0.07601	0.03710	0.02597	0.05848	30.75	0.147-1.472	0.15975
18	Mehaboobnagar	0.11065	0.01660	0.09405	0.08465	0.04474	0.03132	0.06273	33.30	0.097-0.872	0.18973
19	Nalgonda	0.09814	0.01472	0.08342	0.07508	0.03243	0.02270	0.06072	27.21	0.147-0.872	0.17555
20	Warangal	0.12187	0.01828	0.10359	0.09323	0.05014	0.03510	0.06849	33.88	0.097-0.872	0.21170
21	Khammam	0.12014	0.01802	0.10212	0.09191	0.01466	0.01026	0.09186	10.05	0.097-0.872	0.16450
22	Karimnagar	0.09658	0.01449	0.08209	0.07388	0.04783	0.03348	0.04861	40.78	0.147-1.472	0.18084
23	Adilabad	0.11784	0.01768	0.10016	0.09014	0.01890	0.01323	0.08693	13.21	0.097-0.872	0.14132
	TOTAL	2.00277	0.30042	1.70235	1.53212	0.62204	0.43543	1.26692	25.58		2.91268

Note: Utilisable Irrigation potential is limited to the land availability.

GROUND WATER RESOURCE AND IRRIGATION POTENTIAL DUE TO NATURAL RECHARGE

ARUNACHAL PRADESH

Sr. No.	Districts	Total Replenishable Ground Water Resource from Normal Natural Recharge (m.ha.m/Yr)	Provision for Domestic, Industrial & Other Uses (m.ha.m/Yr)	Available Ground Water Resource for Irrigation in Net Terms (m.ha.m/Yr)	Utilisable Ground Water Resource for Irrigation in Net Terms (m.ha.m/Yr)	Gross Draft from Natural Recharge Estimated on Prorata Basis (1992) (m.ha.m/Yr)	Net Draft from Natural Recharge (1992) (m.ha.m/Yr)	Balance Ground Water Resource for Future Use (m.ha.m/Yr)	Level of Ground Water Develop-ment (%)	Weighted Average Delta (m)	Utilisable Irrigation Potential for Development From Natural Recharge (m.ha)
1	2	3	4	5	6	7	8	9	10	11	12
1	Lohit	0.06435	0.00965	0.05470	0.04923	–	–	0.05470	–	–	---
2	Siang	0.07800	0.01170	0.06630	0.05967	–	–	0.06630	–	–	---
3	Tirap	0.00150	0.00023	0.00127	0.00115	–	–	0.00127	–	–	---
	TOTAL	**0.14385**	**0.02158**	**0.12227**	**0.11005**	**–**	**–**	**0.12227**	**–**	**–**	**0.01800**

GROUND WATER RESOURCE AND IRRIGATION POTENTIAL DUE TO NATURAL RECHARGE

ASSAM

Sr. No.	Districts	Total Replenishable Ground Water Resource from Normal Natural Recharge (m.ha.m/Yr)	Provision for Domestic, Industrial & Other Uses (m.ha.m/Yr)	Available Ground Water Resource for Irrigation in Net Terms (m.ha.m/Yr)	Utilisable Ground Water Resource for Irrigation in Net Terms (m.ha.m/Yr)	Gross Draft from Natural Recharge Estimated on Prorata Basis (1992) (m.ha.m/Yr)	Net Draft from Natural Recharge (1992) (m.ha.m/Yr)	Balance Ground Water Resource for Future Use (m.ha.m/Yr)	Level of Ground Water Develop-ment (%)	Weighted Average Delta (m)	Utilisable Irrigation Potential for Development From Natural Recharge (m.ha)
1	2	3	4	5	6	7	8	9	10	11	12
1	Berpeta	0.11034	0.01655	0.09379	0.08441	0.00761	0.00533	0.08846	5.68	1.283	0.03966
2	Bongaigaon	0.10728	0.01609	0.09119	0.08207	0.00634	0.00444	0.08675	4.87	1.283	0.03856
3	Goalpara										
4	Cachar	0.08145	0.01222	0.06923	0.06231	0.00014	0.00010	0.06913	0.14	1.283	0.02927
5	Darsang	0.13730	0.02060	0.11670	0.10503	0.01013	0.00709	0.10961	6.08	1.283	0.04935
6	Dhemaji										
7	Lakhimpur	0.28157	0.04224	0.23933	0.21540	0.01069	0.00748	0.23185	3.13	1.283	0.10120
8	Dibrugarh										
9	Tinsukia	0.34440	0.05166	0.29274	0.26347	0.01229	0.00860	0.28414	2.94	1.283	0.12378
10	Dhubri	0.12863	0.01929	0.10934	0.09841	0.00900	0.00630	0.10304	5.76	1.283	0.04623
11	Golaghat										
12	Jorhat	0.32127	0.04819	0.27308	0.24577	0.01084	0.00759	0.26549	2.78	1.283	0.11547
13	Hailakandi										
14	Karimganj	0.02279	0.00342	0.01937	0.01743	0.00093	0.00065	0.01872	3.36	1.283	0.00819
15	Kamrup										
16	Nalbari	0.18216	0.02732	0.15484	0.13936	0.01507	0.01055	0.14429	6.81	1.283	0.06547
17	Karbi-Anglong	0.05712	0.00857	0.04855	0.04370	0.00006	0.00004	0.04851	0.08	1.283	0.02053
18	Kokrajhar	0.15646	0.02347	0.13299	0.11969	0.00499	0.00349	0.12950	2.62	1.283	0.05623
19	Morigaon	0.11215	0.01682	0.09533	0.08580	0.02154	0.01508	0.08025	15.82	1.283	0.04031
20	Nagaon										
21	N.C.Hills	0.06002	0.00900	0.05102	0.04592	0.00003	0.00002	0.05100	0.04	1.283	0.02157
22	Sibsagar	0.16345	0.02452	0.13893	0.12504	0.00493	0.00345	0.13548	2.48	1.283	0.05875
23	Sonitpur	0.15676	0.02351	0.13325	0.11993	0.01530	0.01071	0.12254	8.04	1.283	0.05634
	TOTAL	2.42315	0.36347	2.05968	1.85371	0.12989	0.09092	1.96876	4.41		0.87091

Note : Delta is very high
Utilisable Irrigation Potential is limited to the area available.

GROUND WATER RESOURCE AND IRRIGATION POTENTIAL DUE TO NATURAL RECHARGE

BIHAR

Sr. No.	Districts	Total Replenishable Ground Water Resource from Normal Natural Recharge (m.ha.m/Yr)	Provision for Domestic, Industrial & Other Uses (m.ha.m/Yr)	Available Ground Water Resource for Irrigation in Net Terms (m.ha.m/Yr)	Utilisable Ground Water Resource for Irrigation in Net Terms (m.ha.m/Yr)	Gross Draft from Natural Recharge estimated on Prorata Basis (1991) (m.ha.m/Yr)	Net Draft from Natural Recharge (1991) (m.ha.m/Yr)	Balance Ground Water Resource for Future Use (m.ha.m/Yr)	Level of Ground Water Develop-ment (%)	Weighted Average Delta (m)	Utilisable Irrigation Potential for Development From Natural Recharge (m.ha)
1	2	3	4	5	6	7	8	9	10	11	12
1	Siwan	0.03632	0.00545	0.03087	0.02778	0.01546	0.01082	0.02005	35.05	0.65	0.04274
2	Saran	0.05762	0.00864	0.04898	0.04408	0.01694	0.01186	0.03712	24.21	0.65	0.06782
3	Gopalganj	0.02976	0.00446	0.02530	0.02277	0.00856	0.00599	0.01931	23.68	0.65	0.03502
4	W.Champaran	0.10413	0.01562	0.08851	0.07966	0.01380	0.00966	0.07885	10.91	0.65	0.12255
5	E.Champaran	0.06587	0.00988	0.05599	0.05039	0.02097	0.01468	0.04131	26.22	0.65	0.07753
6	Vaishali	0.05508	0.00826	0.04682	0.04214	0.02541	0.01779	0.02903	38.00	0.65	0.06483
7	Muzaffarpur	0.08077	0.01212	0.06865	0.06178	0.03703	0.02592	0.04273	37.76	0.65	0.09506
8	Sitamarhi	0.06676	0.01001	0.05675	0.05108	0.02989	0.02092	0.03583	36.86	0.65	0.07857
9	Samastipur	0.07863	0.01179	0.06684	0.06016	0.03561	0.02493	0.04191	37.30	0.65	0.09254
10	Dharbhanga	0.06879	0.01032	0.05847	0.05262	0.01709	0.01196	0.04651	20.45	0.65	0.08096
11	Madhubani	0.08984	0.01348	0.07636	0.06872	0.01744	0.01221	0.06415	15.99	0.65	0.10573
12	Begusarai	0.06223	0.00933	0.05290	0.04761	0.03117	0.02182	0.03108	41.25	0.65	0.07324
13	Khagaria	0.04552	0.00683	0.03869	0.03482	0.01479	0.01035	0.02834	26.75	0.65	0.05357
14	Purnia	0.12045	0.01807	0.10238	0.09214	0.01847	0.01293	0.08945	12.63	0.65	0.14176
15	Saharsa	0.06638	0.00996	0.05642	0.05078	0.02460	0.01722	0.03920	30.52	0.65	0.07812
16	Madhepura	0.04831	0.00725	0.04106	0.03696	0.01821	0.01275	0.02831	31.05	0.65	0.05686
17	Katihar	0.08883	0.01332	0.07551	0.06796	0.03024	0.02117	0.05434	28.04	0.65	0.10455
18	Araria	0.12922	0.01938	0.10984	0.09886	0.02021	0.01415	0.09569	12.88	0.65	0.15208
19	Kishanganj	0.08334	0.01250	0.07084	0.06376	0.00896	0.00627	0.06457	8.85	0.65	0.09809
20	Jahanabad	0.03678	0.00552	0.03126	0.02813	0.01623	0.01136	0.01990	36.34	0.65	0.04329

Cont..

1	2	3	4	5	6	7	8	9	10	11	12
21	Bhojpur	0.08915	0.01337	0.07578	0.06820	0.02170	0.01519	0.06059	20.05	0.65	0.10492
22	Rohtas	0.15863	0.02379	0.13484	0.12136	0.02860	0.02002	0.11482	14.85	0.40	0.30338
23	Aurangabad	0.05142	0.00771	0.04371	0.03934	0.00749	0.00524	0.03847	11.99	0.40	0.09834
24	Gaya	0.11035	0.01655	0.09380	0.08442	0.02993	0.02095	0.07285	22.33	0.40	0.21105
25	Patna	0.07159	0.01074	0.06085	0.05477	0.03571	0.02500	0.03585	41.08	0.65	0.08426
26	Nalanda	0.06263	0.00939	0.05324	0.04792	0.01616	0.01131	0.04193	21.24	0.40	0.11979
27	Nawada	0.04372	0.00656	0.03716	0.03344	0.01547	0.01083	0.02633	29.14	0.40	0.08362
28	Munger	0.11485	0.01723	0.09762	0.08786	0.02241	0.01569	0.08193	16.07	0.40	0.21965
29	Bhagalpur	0.16900	0.02535	0.14365	0.12929	0.02220	0.01554	0.12811	10.82	0.40	0.32321
30	Sahebganj	0.02846	0.00427	0.02419	0.02177	0.00401	0.00281	0.02138	11.62	0.40	0.05444
31	Palamu	0.07675	0.01151	0.06524	0.05872	0.00129	0.00090	0.06434	1.38	0.40	0.14679
32	Ranchi	0.05264	0.00790	0.04474	0.04027	0.00126	0.00088	0.04386	1.97	0.40	0.10067
33	Lohardagga	0.01286	0.00193	0.01093	0.00984	0.00113	0.00079	0.01014	7.23	0.40	0.02459
34	Gumla	0.06938	0.01041	0.05897	0.05307	0.00149	0.00104	0.05793	1.76	0.40	0.13268
35	E.Singhbhum	0.02842	0.00426	0.02416	0.02174	0.00231	0.00162	0.02254	6.71	0.40	0.05436
36	W.Singhbhum	0.05610	0.00841	0.04769	0.04292	0.00014	0.00010	0.04759	0.21	0.40	0.10730
37	Hazaribagh	0.07236	0.01085	0.06151	0.05536	0.00127	0.00089	0.06062	1.45	0.40	0.13839
38	Giridih	0.05607	0.00841	0.04766	0.04289	0.00083	0.00058	0.04708	1.22	0.40	0.10723
39	Deoghar	0.01634	0.00245	0.01389	0.01250	0.00157	0.00110	0.01279	7.92	0.40	0.03125
40	Godda	0.01308	0.00196	0.01112	0.01001	0.00084	0.00059	0.01053	5.31	0.40	0.02502
41	Dhanbad	0.02121	0.00318	0.01803	0.01623	0.00040	0.00028	0.01775	1.55	0.40	0.04056
42	Dumka	0.04122	0.00618	0.03504	0.03154	0.00077	0.00054	0.03450	1.54	0.40	0.07883
	TOTAL	**2.83086**	**0.42463**	**2.40623**	**2.16561**	**0.63807**	**0.44665**	**1.95958**	**18.56**		**4.25524**

GROUND WATER RESOURCE AND IRRIGATION POTENTIAL DUE TO NATURAL RECHARGE

GOA

Sr. No.	Districts	Total Replenishable Ground Water Resource from Normal Natural Recharge (m.ha.m/Yr)	Provision for Domestic, Industrial & Other Uses (m.ha.m/Yr)	Available Ground Water Resource for Irrigation in Net Terms (m.ha.m/Yr)	Utilisable Ground Water Resource for Irrigation in Net Terms (m.ha.m/Yr)	Gross Draft from Natural Recharge Estimated on Prorata Basis (1992) (m.ha.m/Yr)	Net Draft from Natural Recharge (1992) (m.ha.m/Yr)	Balance Ground Water Resource for Future Use (m.ha.m/Yr)	Level of Ground Water Develop-ment (%)	Weighted Average Delta (m)	Utilisable Irrigation Potential for Development From Natural Recharge (m.ha)
1	2	3	4	5	6	7	8	9	10	11	12
1	North Goa	0.01082	0.00162	0.00920	0.00828	0.00102	0.00072	0.00848	7.80	0.57	0.01453
2	South Goa	0.00759	0.00114	0.00645	0.00581	0.00083	0.00058	0.00587	9.02	0.57	0.01018
	TOTAL	**0.01841**	**0.00276**	**0.01565**	**0.01409**	**0.00185**	**0.00130**	**0.01435**	**8.30**		**0.02471**

GROUND WATER RESOURCE AND IRRIGATION POTENTIAL DUE TO NATURAL RECHARGE

GUJARAT

Sr. No.	Districts	Total Replenishable Ground Water Resource from Normal Natural Recharge (m.ha.m/Yr)	Provision for Domestic, Industrial & Other Uses (m.ha.m/Yr)	Available Ground Water Resource for Irrigation in Net Terms (m.ha.m/Yr)	Utilisable Ground Water Resource for Irrigation in Net Terms (m.ha.m/Yr)	Gross Draft from Natural Recharge Estimated on Prorata Basis (1991) (m.ha.m/Yr)	Net Draft from Natural Recharge (1991) (m.ha.m/Yr)	Balance Ground Water Resource for Future Use (m.ha.m/Yr)	Level of Ground Water Develop-ment (%)	Weighted Average Delta (m)	Utilisable Irrigation Potential for Development From Natural Recharge (m.ha)
1	2	3	4	5	6	7	8	9	10	11	12
1	Ahmadabad	0.09683	0.01452	0.08231	0.07408	0.07350	0.05145	0.03086	62.51	0.510	0.14525
2	Amreli	0.07764	0.01165	0.06599	0.05939	0.04346	0.03042	0.03557	46.10	0.450	0.13198
3	Banaskantha	0.12878	0.01932	0.10946	0.09851	0.09947	0.06963	0.03983	63.61	0.520	0.18944
4	Baroda	0.11417	0.01713	0.09704	0.08734	0.05449	0.03814	0.05890	39.30	0.706	0.12371
5	Bhavnagar	0.11191	0.01679	0.09512	0.08561	0.04141	0.02899	0.06613	30.48	0.523	0.16369
6	Bharuch	0.08342	0.01251	0.07091	0.06382	0.02267	0.01587	0.05504	22.38	0.714	0.08938
7	Dang	0.01441	0.00216	0.01225	0.01102	0.00004	0.00003	0.01222	0.24	0.510	0.02161
8	Gandhinagar	0.01228	0.00184	0.01044	0.00940	0.01009	0.00706	0.00338	67.62	0.580	0.01621
9	Jamnagar	0.08715	0.01307	0.07408	0.06667	0.03516	0.02461	0.04947	33.22	0.489	0.13634
10	Junagadh	0.12034	0.01805	0.10229	0.09206	0.07491	0.05244	0.04985	51.27	0.510	0.18051
11	Kheda	0.08320	0.01248	0.07072	0.06365	0.03664	0.02565	0.04507	36.27	0.601	0.10591
12	Kutch	0.06645	0.00997	0.05648	0.05083	0.02869	0.02008	0.03640	35.55	0.616	0.08252
13	Mehsana	0.05598	0.00840	0.04758	0.04282	0.08437	0.05906	-0.01148	124.13	0.650	0.06588
14	Panchmahals	0.10332	0.01550	0.08782	0.07904	0.03451	0.02416	0.06366	27.51	0.564	0.14014
15	Rajkot	0.11174	0.01676	0.09498	0.08548	0.05000	0.03500	0.05998	36.85	0.616	0.13877
16	Sabarkantha	0.11050	0.01658	0.09392	0.08453	0.06623	0.04635	0.04756	49.36	0.580	0.14574
17	Surat	0.10037	0.01506	0.08531	0.07678	0.01733	0.01213	0.07318	14.22	0.564	0.13613
18	Surendranagar	0.07381	0.01107	0.06274	0.05647	0.03251	0.02276	0.03998	36.28	0.626	0.09021
19	Valsad	0.08541	0.01281	0.07260	0.06534	0.02451	0.01716	0.05544	23.64	0.560	0.11668
	TOTAL	**1.63771**	**0.24566**	**1.39205**	**1.25284**	**0.82999**	**0.58100**	**0.81105**	**41.74**		**2.22010**

GROUND WATER RESOURCE AND IRRIGATION POTENTIAL DUE TO NATURAL RECHARGE

HARYANA

Sr. No.	Districts	Total Replenishable Ground Water Resource from Normal Natural Recharge (m.ha.m/Yr)	Provision for Domestic, Industrial & Other Uses (m.ha.m/Yr)	Available Ground Water Resource for Irrigation in Net Terms (m.ha.m/Yr)	Utilisable Ground Water Resource for Irrigation in Net Terms (m.ha.m/Yr)	Gross Draft from Natural Recharge Estimated on Prorata Basis (1992) (m.ha.m/Yr)	Net Draft from Natural Recharge (1992) (m.ha.m/Yr)	Balance Ground Water Resource for Future Use (m.ha.m/Yr)	Level of Ground Water Develop-ment (%)	Weighted Average Delta (m)	Utilisable Irrigation Potential for Development From Natural Recharge (m.ha)
1	2	3	4	5	6	7	8	9	10	11	12
1	Ambala	0.05018	0.00753	0.04265	0.03839	0.04180	0.02926	0.01339	68.60	0.600	0.06398
2	Bhiwani	0.02427	0.00364	0.02063	0.01857	0.01067	0.00747	0.01316	36.21	0.385	0.04823
3	Faridabad	0.02297	0.00345	0.01952	0.01757	0.02029	0.01420	0.00532	72.75	0.385	0.04563
4	Gurgaon	0.02246	0.00337	0.01909	0.01718	0.02543	0.01780	0.00129	93.24	0.385	0.04463
5	Hisar	0.03440	0.00516	0.02924	0.02632	0.01321	0.00925	0.01999	31.63	0.385	0.06835
6	Jind	0.01795	0.00269	0.01526	0.01373	0.01670	0.01169	0.00357	76.61	0.385	0.03567
7	Kaithal	0.04107	0.00616	0.03491	0.03142	0.06940	0.04858	-0.01367	139.16	0.600	0.05237
8	Kurukshetra	0.02556	0.00383	0.02173	0.01956	0.06309	0.04416	-0.02243	203.22	0.600	0.03260
9	Mahendragarh	0.01324	0.00199	0.01125	0.01013	0.02689	0.01882	-0.00757	167.29	0.385	0.02630
10	Panipath	0.02627	0.00394	0.02233	0.02010	0.04641	0.03249	-0.01016	145.50	0.600	0.03350
11	Rewari	0.01756	0.00263	0.01493	0.01344	0.02843	0.01990	-0.00497	133.29	0.385	0.03490
12	Rohtak	0.04614	0.00692	0.03922	0.03530	0.02046	0.01432	0.02490	36.51	0.385	0.09168
13	Sirsa	0.02034	0.00305	0.01729	0.01556	0.01046	0.00732	0.00997	42.34	0.385	0.04042
14	Sonipat	0.02852	0.00428	0.02424	0.02182	0.01997	0.01398	0.01026	57.67	0.385	0.05666
15	Yamunanagar	0.04163	0.00624	0.03539	0.03185	0.04381	0.03067	0.00472	86.66	0.600	0.05309
16	Kamal	0.04016	0.00602	0.03414	0.03073	0.07436	0.05205	-0.01791	152.46	0.600	0.05121
	TOTAL	**0.47272**	**0.07091**	**0.40181**	**0.36164**	**0.53136**	**0.37196**	**0.02985**	**92.57**		**0.77912**

GROUND WATER RESOURCE AND IRRIGATION POTENTIAL DUE TO NATURAL RECHARGE

HIMACHAL PRADESH

Sr. No.	Districts	Total Replenishable Ground Water Resource from Normal Natural Recharge (m.ha.m/Yr)	Provision for Domestic, Industrial & Other Uses (m.ha.m/Yr)	Available Ground Water Resource for Irrigation in Net Terms (m.ha.m/Yr)	Utilisable Ground Water Resource for Irrigation in Net Terms (m.ha.m/Yr)	Gross Draft from Natural Recharge Estimated on Prorata Basis (1992) (m.ha.m/Yr)	Net Draft from Natural Recharge (1992) (m.ha.m/Yr)	Balance Ground Water Resource for Future Use (m.ha.m/Yr)	Level of Ground Water Develop-ment (%)	Weighted Average Delta (m)	Utilisable Irrigation Potential for Development From Natural Recharge (m.ha)
1	2	3	4	5	6	7	8	9	10	11	12
1	Una Valley (Una distt.)	0.00856	0.00171	0.00685	0.00617	0.00343	0.00240	0.00445	35.04	0.385	0.01603
2	Ponta Valley (Sirmour distt.)	0.00642	0.00128	0.00514	0.00463	0.00029	0.00020	0.00494	3.89	0.385	0.01203
3	Nalagarh Valley (Solan distt.)	0.00460	0.00092	0.00369	0.00331	0.00066	0.00046	0.00322	12.50	0.385	0.00860
4	Nurpur Valley (Kangra distt.)	0.00686	0.00137	0.00548	0.00494	0.00174	0.00122	0.00427	22.22	0.385	0.01283
5	Behl Valley (Mandi distt.)	0.00233	0.00047	0.00186	0.00167	0.00047	0.00033	0.00153	17.74	0.385	0.00434
	TOTAL	**0.02877**	**0.00575**	**0.02302**	**0.02072**	**0.00659**	**0.00461**	**0.01841**	**20.03**		**0.05383**

GROUND WATER RESOURCE AND IRRIGATION POTENTIAL DUE TO NATURAL RECHARGE

JAMMU & KASHMIR

Sr. No.	Districts	Total Replenishable Ground Water Resource from Normal Natural Recharge (m.ha.m/Yr)	Provision for Domestic, Industrial & Other Uses (m.ha.m/Yr)	Available Ground Water Resource for Irrigation in Net Terms (m.ha.m/Yr)	Utilisable Ground Water Resource for Irrigation in Net Terms (m.ha.m/Yr)	Gross Draft from Natural Recharge Estimated on Prorata Basis (1993) (m.ha.m/Yr)	Net Draft from Natural Recharge (1993) (m.ha.m/Yr)	Balance Ground Water Resource for Future Use (m.ha.m/Yr)	Level of Ground Water Develop-ment (%)	Weighted Average Delta (m)	Utilisable Irrigation Potential for Development From Natural Recharge (m.ha)
1	2	3	4	5	6	7	8	9	10	11	12
1	Kathua	0.02637	0.00396	0.02241	0.02017	0.00009	0.00006	0.02235	0.27	0.385	0.05240
2	Jammu	0.05606	0.00841	0.04765	0.04289	0.00261	0.00183	0.04582	3.84	0.385	0.11140
3	Srinagar	0.01661	0.00249	0.01412	0.01271	0.00001	0.00001	0.01411	0.07	0.600	0.02118
4	Ananatnag	0.11104	0.01666	0.09439	0.08494	0.00001	0.00001	0.09437	0.01	0.600	0.14158
5	Baramula	0.03246	0.00487	0.02758	0.02483	0.00013	0.00009	0.02750	0.33	0.600	0.04139
	TOTAL	**0.24254**	**0.03639**	**0.20615**	**0.18554**	**0.00285**	**0.00200**	**0.20415**	**0.97**		**0.36795**

GROUND WATER RESOURCE AND IRRIGATION POTENTIAL DUE TO NATURAL RECHARGE

KARNATAKA

Sr. No.	Districts	Total Replenishable Ground Water Resource from Normal Natural Recharge (m.ha.m/Yr)	Provision for Domestic, Industrial & Other Uses (m.ha.m/Yr)	Available Ground Water Resource for Irrigation in Net Terms (m.ha.m/Yr)	Utilisable Ground Water Resource for Irrigation in Net Terms (m.ha.m/Yr)	Gross Draft from Natural Recharge Estimated on Prorata Basis (1992) (m.ha.m/Yr)	Net Draft from Natural Recharge (1992) (m.ha.m/Yr)	Balance Ground Water Resource for Future Use (m.ha.m/Yr)	Level of Ground Water Develop-ment (%)	Weighted Average Delta (m)	Utilisable Irrigation Potential for Development From Natural Recharge (m.ha)
1	2	3	4	5	6	7	8	9	10	11	12
1	Bangalore	0.07089	0.01063	0.06026	0.05423	0.06300	0.04410	0.01616	73.08	0.421	0.12869
2	Belgaum	0.10276	0.01541	0.08735	0.07862	0.05434	0.03804	0.04931	43.55	0.18-0.48	0.19080
3	Bellary	0.03873	0.00581	0.03292	0.02963	0.01144	0.00801	0.02491	24.33	0.400	0.07407
4	Bidar	0.05282	0.00792	0.04490	0.04041	0.01457	0.01020	0.03470	22.72	0.740	0.05461
5	Bijapur	0.10757	0.01614	0.09143	0.08229	0.05682	0.03978	0.05165	43.51	0.400	0.20167
6	Chitradurga	0.05976	0.00896	0.05080	0.04572	0.03160	0.02212	0.02868	43.54	0.393	0.11645
7	Chickmagalur	0.05086	0.00763	0.04323	0.03891	0.00381	0.00267	0.04056	6.17	0.18-0.57	0.09000
8	Dakshina Kannada	0.12195	0.01829	0.10366	0.09329	0.06117	0.04282	0.06084	41.30	0.630	0.07650
9	Dharwad	0.09800	0.01470	0.08330	0.07497	0.02386	0.01670	0.06660	20.05	0.18-0.48	0.17010
10	Gulbarga	0.09812	0.01472	0.08340	0.07506	0.01629	0.01140	0.07200	13.67	0.57-0.74	0.12600
11	Hassan	0.04514	0.00677	0.03837	0.03453	0.00610	0.00420	0.03417	10.95	0.18-0.57	0.07290
12	Kodagu(Coorg)	0.01652	0.00248	0.01404	0.01264	0.00157	0.00110	0.01294	7.83	0.180	0.03572
13	Kolar	0.07494	0.01124	0.06370	0.05733	0.06276	0.04393	0.01977	68.96	0.416	0.13765
14	Mandya	0.04236	0.00635	0.03601	0.03241	0.00597	0.00418	0.03183	11.61	0.463	0.06992
15	Mysore	0.07257	0.01089	0.06168	0.05551	0.02014	0.01410	0.04758	22.86	0.46-0.57	0.11340
16	Raichur	0.07140	0.01071	0.06069	0.05462	0.01266	0.00886	0.05183	14.60	0.40-0.57	0.12150
17	Shimoga	0.13323	0.01998	0.11325	0.10192	0.03314	0.02320	0.09005	20.49	0.18-0.57	0.19980
18	Tumkur	0.08305	0.01246	0.07059	0.06353	0.05804	0.04063	0.02996	57.56	0.39-0.46	0.15570
19	Uttara Kannada	0.07725	0.01159	0.06566	0.05909	0.01536	0.01075	0.05491	16.37	0.18-0.63	0.09000
	TOTAL	**1.41792**	**0.21269**	**1.20523**	**1.08471**	**0.55256**	**0.38679**	**0.81844**	**32.09**		**2.22548**

Note: The Utilisable Irrigation Potential is limited to the area available.

GROUND WATER RESOURCE AND IRRIGATION POTENTIAL DUE TO NATURAL RECHARGE

KERALA

Sr. No.	Districts	Total Replenishable Ground Water Resource from Normal Natural Recharge (m.ha.m/Yr)	Provision for Domestic, Industrial & Other Uses (m.ha.m/Yr)	Available Ground Water Resource for Irrigation in Net Terms (m.ha.m/Yr)	Utilisable Ground Water Resource for Irrigation in Net Terms (m.ha.m/Yr)	Gross Draft from Natural Recharge Estimated on Prorata Basis (1992) (m.ha.m/Yr)	Net Draft from Natural Recharge (1992) (m.ha.m/Yr)	Balance Ground Water Resource for Future Use (m.ha.m/Yr)	Level of Ground Water Develop-ment (%)	Weighted Average Delta (m)	Utilisable Irrigation Potential for Development From Natural Recharge (m.ha)
1	2	3	4	5	6	7	8	9	10	11	12
1	Thiruvananthapuram	0.02771	0.00831	0.01940	0.01746	0.00677	0.00474	0.01466	24.43	0.73	0.02391
2	Quilon	0.04257	0.00851	0.03406	0.03065	0.00927	0.00649	0.02757	19.05	0.71	0.04317
3	Pathanamthitta	0.03401	0.00510	0.02891	0.02602	0.00421	0.00295	0.02596	10.20	0.72	0.03614
4	Alleppey	0.03914	0.00587	0.03327	0.02994	0.00440	0.00308	0.03019	9.26	0.65	0.04607
5	Kottayam	0.04061	0.00609	0.03452	0.03107	0.00499	0.00349	0.03103	10.11	0.69	0.04503
6	Iddukki	0.04515	0.00677	0.03838	0.03454	0.00270	0.00189	0.03649	4.92	0.83	0.04162
7	Ernakulam	0.05659	0.00849	0.04810	0.04329	0.01444	0.01011	0.03799	21.02	0.65	0.06660
8	Trichur	0.06594	0.00989	0.05605	0.05045	0.01733	0.01213	0.04392	21.64	0.66	0.07643
9	Palghat	0.05859	0.00879	0.04980	0.04482	0.00743	0.00520	0.04460	10.44	0.53	0.08457
10	Malappuram	0.06089	0.01218	0.04871	0.04384	0.01273	0.00891	0.03980	18.29	0.71	0.06175
11	Calicut	0.04324	0.00865	0.03459	0.03113	0.00633	0.00443	0.03016	12.81	0.75	0.04151
12	Wyanad	0.04122	0.00618	0.03504	0.03154	0.00247	0.00173	0.03331	4.94	0.54	0.05839
13	Cannanore	0.06735	0.01010	0.05725	0.05152	0.01190	0.00833	0.04892	14.55	0.78	0.06605
14	Kasaragod	0.04045	0.00607	0.03438	0.03094	0.01616	0.01131	0.02307	32.90	0.81	0.03820
	TOTAL	0.66346	0.11100	0.55246	0.49719	0.12113	0.08479	0.46767	15.35		0.72944

GROUND WATER RESOURCE AND IRRIGATION POTENTIAL DUE TO NATURAL RECHARGE

MADHYA PRADESH

Sr. No.	Districts	Total Replenishable Ground Water Resource from Normal Natural Recharge (m.ha.m/Yr)	Provision for Domestic, Industrial & Other Uses (m.ha.m/Yr)	Available Ground Water Resource for Irrigation in Net Terms (m.ha.m/Yr)	Utilisable Ground Water Resource for Irrigation in Net Terms (m.ha.m/Yr)	Gross Draft from Natural Recharge Estimated on Prorata Basis (1990) (m.ha.m/Yr)	Net Draft from Natural Recharge (1990) (m.ha.m/Yr)	Balance Ground Water Resource for Future Use (m.ha.m/Yr)	Level of Ground Water Develop-ment (%)	Weighted Average Delta (m)	Utilisable Irrigation Potential for Development From Natural Recharge (m.ha)
1	2	3	4	5	6	7	8	9	10	11	12
1	Balaghat	0.08882	0.01332	0.07550	0.06795	0.01325	0.00927	0.06623	12.28	0.40	0.16987
2	Bastar	0.51563	0.07734	0.43829	0.39446	0.00662	0.00463	0.43366	1.06	0.40	0.98614
3	Betul	0.09339	0.01401	0.07938	0.07144	0.03241	0.02269	0.05669	28.58	0.40	0.17861
4	Bhind	0.05760	0.00864	0.04896	0.04406	0.01403	0.00982	0.03914	20.06	0.40	0.11016
5	Bhopal	0.02582	0.00387	0.02195	0.01975	0.01507	0.01055	0.01140	48.06	0.40	0.04938
6	Bilaspur	0.21449	0.03217	0.18232	0.16408	0.02504	0.01753	0.16479	9.62	0.40	0.41021
7	Chhatarpur	0.09731	0.01460	0.08271	0.07444	0.03515	0.02460	0.05811	29.75	0.40	0.18611
8	Chindwara	0.10765	0.01615	0.09150	0.08235	0.03417	0.02392	0.06758	26.14	0.40	0.20588
9	Damoh	0.04425	0.00664	0.03761	0.03385	0.00794	0.00556	0.03205	14.79	0.40	0.08462
10	Datia	0.01571	0.00236	0.01335	0.01202	0.00354	0.00248	0.01087	18.55	0.40	0.03005
11	Dewas	0.08549	0.01282	0.07267	0.06540	0.03519	0.02463	0.04804	33.90	0.40	0.16350
12	Dhar	0.11717	0.01758	0.09959	0.08964	0.04318	0.03023	0.06936	30.35	0.40	0.22409
13	Durg	0.09218	0.01383	0.07835	0.07052	0.01451	0.01016	0.06819	12.97	0.40	0.17629
14	Guna	0.08756	0.01313	0.07443	0.06698	0.01548	0.01084	0.06358	14.56	0.40	0.16746
15	Gwalior	0.06124	0.00919	0.05205	0.04685	0.01141	0.00799	0.04406	15.34	0.40	0.11712
16	Hoshangabad	0.18771	0.02816	0.15955	0.14360	0.02919	0.02043	0.13912	12.81	0.40	0.35900
17	Indore	0.04762	0.00714	0.04048	0.03643	0.03142	0.02199	0.01849	54.33	0.40	0.09107
18	Jabalpur	0.08937	0.01341	0.07596	0.06837	0.02527	0.01769	0.05827	23.29	0.40	0.17092
19	Jhabua	0.04665	0.00700	0.03965	0.03568	0.00608	0.00426	0.03539	10.74	0.40	0.08922
20	Khandwa	0.08403	0.01260	0.07143	0.06428	0.03248	0.02274	0.04869	31.83	0.40	0.16071
21	Khargone	0.11577	0.01737	0.09840	0.08856	0.04370	0.03059	0.06781	31.09	0.40	0.22141
22	Mandla	0.08706	0.01306	0.07400	0.06660	0.00229	0.00160	0.07240	2.16	0.40	0.16650
23	Mandsaur	0.10148	0.01522	0.08626	0.07763	0.04651	0.03256	0.05370	37.75	0.40	0.19408
24	Morena	0.18399	0.02760	0.15639	0.14075	0.02474	0.01731	0.13908	11.07	0.40	0.35188
25	Narsinghapur	0.10006	0.01501	0.08505	0.07655	0.02525	0.01768	0.06737	20.78	0.40	0.19136

1	2	3	4	5	6	7	8	9	10	11	12
26	Panna	0.03488	0.00523	0.02965	0.02668	0.00708	0.00496	0.02469	16.71	0.40	0.06671
27	Raigarh	0.10515	0.01577	0.08938	0.08044	0.00633	0.00443	0.08495	4.96	0.40	0.20110
28	Raipur	0.24581	0.03887	0.20894	0.18804	0.01918	0.01343	0.19551	6.43	0.40	0.47011
29	Raisen	0.08585	0.01288	0.07297	0.06568	0.01516	0.01061	0.06236	14.54	0.40	0.16419
30	Rajgarh	0.06026	0.00904	0.05122	0.04610	0.03160	0.02212	0.02910	43.19	0.40	0.11525
31	Rajnandgaon	0.10679	0.01602	0.09077	0.08169	0.00451	0.00316	0.08761	3.48	0.40	0.20424
32	Ratlam	0.05185	0.00778	0.04407	0.03967	0.02837	0.01986	0.02421	45.06	0.40	0.09916
33	Rewa	0.04650	0.00697	0.03953	0.03557	0.00980	0.00686	0.03267	17.35	0.40	0.08893
34	Sagar	0.08140	0.01221	0.06919	0.06227	0.02180	0.01526	0.05393	22.05	0.40	0.15568
35	Sarguja	0.18454	0.02768	0.15686	0.14117	0.01067	0.00747	0.14939	4.76	0.40	0.35293
36	Satna	0.08791	0.01319	0.07472	0.06725	0.01472	0.01031	0.06441	13.79	0.40	0.16813
37	Sehore	0.05786	0.00868	0.04918	0.04426	0.02072	0.01450	0.03468	29.49	0.40	0.11066
38	Seoni	0.08780	0.01317	0.07463	0.06717	0.01485	0.01040	0.06423	13.93	0.40	0.16792
39	Shahdol	0.12294	0.01844	0.10450	0.09405	0.00464	0.00325	0.10125	3.11	0.40	0.23512
40	Shajapur	0.03980	0.00597	0.03383	0.03045	0.02198	0.01538	0.01845	45.47	0.40	0.07612
41	Shivpuri	0.07944	0.01192	0.06752	0.06077	0.02240	0.01568	0.05184	23.22	0.40	0.15193
42	Sidhi	0.11554	0.01733	0.09821	0.08839	0.02426	0.01698	0.08123	17.29	0.40	0.22097
43	Tikamgarh	0.06639	0.00996	0.05643	0.05079	0.03449	0.02414	0.03229	42.78	0.40	0.12697
44	Ujjain	0.05318	0.00798	0.04520	0.04068	0.02358	0.01650	0.02870	36.51	0.40	0.10171
45	Vidisha	0.06715	0.01007	0.05708	0.05137	0.00683	0.00478	0.05230	8.37	0.40	0.12842
	TOTAL	4.52908	0.67938	3.84970	3.46474	0.91689	0.64183	3.20787	16.67		8.66189

GROUND WATER RESOURCE AND IRRIGATION POTENTIAL DUE TO NATURAL RECHARGE

MAHARASHTRA

Sr. No.	Districts	Total Replenishable Ground Water Resource from Normal Natural Recharge (m.ha.m/Yr)	Provision for Domestic, Industrial & Other Uses (m.ha.m/Yr)	Available Ground Water Resource for Irrigation in Net Terms (m.ha.m/Yr)	Utilisable Ground Water Resource for Irrigation in Net Terms (m.ha.m/Yr)	Gross Draft from Natural Recharge Estimated on Prorata Basis (1988) (m.ha.m/Yr)	Net Draft from Natural Recharge (1988) (m.ha.m/Yr)	Balance Ground Water Resource for Future Use (m.ha.m/Yr)	Level of Ground Water Develop-ment (%)	Weighted Average Delta (m)	Utilisable Irrigation Potential for Development From Natural Recharge (m.ha)
1	2	3	4	5	6	7	8	9	10	11	12
1	Thane	0.03888	0.01273	0.02615	0.02354	0.00562	0.00393	0.02222	15.03	0.43	0.05473
2	Raigad	0.05727	0.01875	0.03852	0.03467	0.00496	0.00347	0.03505	9.01	0.66	0.05253
3	Ratnagiri	0.06086	0.01992	0.04094	0.03685	0.00441	0.00309	0.03786	7.55	0.81	0.04548
4	Sindhudurga	0.03564	0.01167	0.02397	0.02158	0.00442	0.00309	0.02088	12.89	0.58	0.03720
5	Nasik	0.13480	0.04413	0.09067	0.08160	0.06583	0.04608	0.04459	50.82	1.04	0.07847
6	Jalgaon	0.11586	0.03793	0.07793	0.07013	0.06223	0.04356	0.03437	55.90	0.68	0.10314
7	Dhule	0.12238	0.04006	0.08232	0.07409	0.04939	0.03457	0.04775	42.00	0.94	0.07881
8	Ahmednagar	0.11115	0.03639	0.07476	0.06728	0.07179	0.05025	0.02451	67.22	1.28	0.05257
9	Pune	0.14282	0.04676	0.09606	0.08645	0.05517	0.03862	0.05744	40.20	0.68	0.12714
10	Solapur	0.15825	0.05181	0.10644	0.09580	0.06260	0.04382	0.06262	41.16	0.62	0.15452
11	Kolhapur	0.11595	0.03796	0.07799	0.07019	0.03637	0.02546	0.05253	32.65	0.56	0.12534
12	Sangli	0.11031	0.03611	0.07420	0.06678	0.05216	0.03651	0.03768	49.21	0.52	0.12841
13	Satara	0.11029	0.03611	0.07418	0.06676	0.04984	0.03489	0.03930	47.03	1.07	0.06240
14	Aurangabad	0.10523	0.03445	0.07078	0.06370	0.04434	0.03104	0.03974	43.85	0.45	0.14156
15	Jalna	0.11505	0.03767	0.07738	0.06964	0.02304	0.01613	0.06125	20.84	0.53	0.13141
16	Parbhani	0.19903	0.06516	0.13387	0.12049	0.03642	0.02549	0.10838	19.04	0.56	0.21515
17	Beed	0.14534	0.04758	0.09776	0.08798	0.02679	0.01875	0.07901	19.18	0.67	0.13132
18	Nanded	0.17831	0.05838	0.11993	0.10794	0.02676	0.01873	0.10120	15.62	0.96	0.11244
19	Usmanabad	0.11260	0.03686	0.07574	0.06816	0.03426	0.02398	0.05176	31.66	0.47	0.14503
20	Latur	0.10124	0.03314	0.06810	0.06129	0.02198	0.01539	0.05271	22.60	0.47	0.13040
21	Amravati	0.12839	0.04203	0.08636	0.07772	0.03913	0.02739	0.05897	31.72	0.67	0.11600
22	Yeotmal	0.13905	0.04552	0.09353	0.08417	0.01739	0.01217	0.08136	13.01	0.72	0.11691
23	Buldana	0.12915	0.04228	0.08687	0.07818	0.03400	0.02380	0.06307	27.40	0.36	0.21717
24	Akola	0.16367	0.05358	0.11009	0.09908	0.02273	0.01591	0.09418	14.45	0.70	0.14154
25	Nagpur	0.16499	0.05401	0.11098	0.09988	0.03699	0.02589	0.08509	23.33	0.80	0.12485
26	Bhandara	0.08861	0.02901	0.05960	0.05364	0.01556	0.01089	0.04871	18.27	0.45	0.11921
27	Wardha	0.08150	0.02668	0.05482	0.04934	0.02256	0.01579	0.03903	28.80	0.45	0.10964
28	Chandrapur	0.12517	0.04098	0.08419	0.07577	0.00842	0.00589	0.07830	7.00	0.54	0.14032
29	Gadchiroli	0.04819	0.01578	0.03241	0.02917	0.00746	0.00522	0.02719	16.11	0.45	0.06482
	TOTAL	3.33998	1.09344	2.24654	2.02189	0.94257	0.65980	1.58674	29.37		3.25851

GROUND WATER RESOURCE AND IRRIGATION POTENTIAL DUE TO NATURAL RECHARGE

MEGHALAYA

Sr. No.	Districts	Total Replenishable Ground Water Resource from Normal Natural Recharge (m.ha.m/Yr)	Provision for Domestic, Industrial & Other Uses (m.ha.m/Yr)	Available Ground Water Resource for Irrigation in Net Terms (m.ha.m/Yr)	Utilisable Ground Water Resource for Irrigation in Net Terms (m.ha.m/Yr)	Gross Draft from Natural Recharge Estimated on Prorata Basis (1993) (m.ha.m/Yr)	Net Draft from Natural Recharge (1993) (m.ha.m/Yr)	Balance Ground Water Resource for Future Use (m.ha.m/Yr)	Level of Ground Water Develop-ment (%)	Weighted Average Delta (m)	Utilisable Irrigation Potential for Development From Natural Recharge (m.ha)
1	2	3	4	5	6	7	8	9	10	11	12
1	West Khasi Hills	0.00824	0.00124	0.00700	0.00630	Neg.	Neg.	0.00700	Neg.	0.65	0.00969
2	East Khasi Hills & Ri-Bhoi	0.00730	0.00110	0.00620	0.00558	Neg.	Neg.	0.00620	Neg.	0.65	0.00859
3	East Garo Hills	0.00652	0.00098	0.00554	0.00499	Neg.	Neg.	0.00554	Neg.	0.65	0.00767
4	West Garo Hills	0.01062	0.00159	0.00903	0.00812	Neg.	Neg.	0.00903	Neg.	0.65	0.01250
5	South Garo Hills	0.02129	0.00319	0.01810	0.01629	0.00260	0.00182	0.01628	Neg.	0.65	0.02506
	TOTAL	**0.05397**	**0.00810**	**0.04587**	**0.04128**	**0.00260**	**0.00182**	**0.04405**	**Neg.**		**0.06351**

GROUND WATER RESOURCE AND IRRIGATION POTENTIAL DUE TO NATURAL RECHARGE

ORISSA

Sr. No.	Districts	Total Replenishable Ground Water Resource from Normal Natural Recharge (m.ha.m/Yr)	Provision for Domestic, Industrial & Other Uses (m.ha.m/Yr)	Available Ground Water Resource for Irrigation in Net Terms (m.ha.m/Yr)	Utilisable Ground Water Resource for Irrigation in Net Terms (m.ha.m/Yr)	Gross Draft from Natural Recharge Estimated on Prorata Basis (1992) (m.ha.m/Yr)	Net Draft from Natural Recharge (1992) (m.ha.m/Yr)	Balance Ground Water Resource for Future Use (m.ha.m/Yr)	Level of Ground Water Develop-ment (%)	Weighted Average Delta (m)	Utilisable Irrigation Potential for Development From Natural Recharge (m.ha)
1	2	3	4	5	6	7	8	9	10	11	12
1	Angul	0.07060	0.01059	0.06001	0.05401	0.00629	0.00440	0.05561	7.33	0.340	0.15886
2	Balasore	0.09033	0.01355	0.07678	0.06910	0.03649	0.02554	0.05124	33.26	0.440	0.15706
3	Bargarh	0.06984	0.01048	0.05936	0.05342	0.00254	0.00178	0.05758	3.00	0.340	0.15713
4	Bhadrak	0.04100	0.00615	0.03485	0.03137	0.00722	0.00505	0.02980	14.49	0.440	0.07128
5	Bolangir	0.06159	0.00924	0.05235	0.04712	0.00728	0.00509	0.04726	9.72	0.340	0.13858
6	Cuttack	0.05162	0.00774	0.04388	0.03949	0.00501	0.00351	0.04037	8.00	0.390	0.10126
7	Dhenkanal	0.04710	0.00707	0.04003	0.03603	0.00329	0.00230	0.03773	5.75	0.340	0.10598
8	Gajpati	0.01766	0.00266	0.01501	0.01351	0.00288	0.00202	0.01299	13.46	0.360	0.03753
9	Ganjam	0.07909	0.01187	0.06723	0.06050	0.01432	0.01003	0.05720	14.92	0.370	0.16352
10	Jagatsinghpur	0.04755	0.00713	0.04042	0.03637	0.00595	0.00416	0.03626	10.29	0.440	0.08267
11	Jajpur	0.05527	0.00829	0.04698	0.04228	0.00978	0.00684	0.04014	14.56	0.430	0.09832
12	Kalahandi	0.05108	0.00766	0.04342	0.03908	0.00555	0.00389	0.03953	8.96	0.340	0.11494
13	Keonjhar	0.09624	0.01444	0.08180	0.07363	0.00679	0.00475	0.07705	5.81	0.350	0.21036
14	Kundrapara	0.00312	0.00047	0.00265	0.00239	0.00095	0.00066	0.00199	24.91	0.440	0.00543
15	Khurda	0.05563	0.00834	0.04729	0.04255	0.00401	0.00281	0.04448	5.94	0.350	0.12159
16	Koraput	0.08132	0.01220	0.06912	0.06221	0.00183	0.00128	0.06784	1.85	0.340	0.18297
17	Malkangiri	0.05608	0.00841	0.04767	0.04290	0.00048	0.00034	0.04733	0.71	0.340	0.12618
18	Mayurbhanj	0.12112	0.01817	0.10295	0.09266	0.00825	0.00577	0.09718	5.60	0.390	0.23759
19	Nawarangpur	0.02196	0.00329	0.01867	0.01680	0.00379	0.00265	0.01602	14.19	0.340	0.04941
20	Nawarangpur	0.05166	0.00775	0.04391	0.03952	0.00281	0.00197	0.04194	4.49	0.340	0.11624
21	Nayagarh	0.03646	0.00547	0.03099	0.02789	0.00399	0.00280	0.02819	9.04	0.350	0.07968
22	Phulbani	0.11813	0.01772	0.10041	0.09037	0.00574	0.00402	0.09639	4.00	0.340	0.26579
23	Puri	0.03378	0.00507	0.02871	0.02584	0.00382	0.00268	0.02603	9.33	0.430	0.06009
24	Rayagada	0.06411	0.00962	0.05449	0.04904	0.00391	0.00274	0.05175	5.03	0.420	0.11677
25	Sambalpur	0.11054	0.01658	0.09396	0.08457	0.00677	0.00474	0.08922	5.04	0.340	0.24872
26	Sonepur	0.03042	0.00456	0.02586	0.02327	0.00098	0.00069	0.02517	2.67	0.340	0.06843
27	Sundargarh	0.08529	0.01279	0.07250	0.06525	0.00614	0.00430	0.06820	5.93	0.340	0.19190
	TOTAL	1.64859	0.24728	1.40131	1.26117	0.16686	0.11681	1.28450	8.34		3.46827

GROUND WATER RESOURCE AND IRRIGATION POTENTIAL DUE TO NATURAL RECHARGE

PUNJAB

Sr. No.	Districts	Total Replenishable Ground Water Resource from Normal Natural Recharge (m.ha.m/Yr)	Provision for Domestic, Industrial & Other Uses (m.ha.m/Yr)	Available Ground Water Resource for Irrigation in Net Terms (m.ha.m/Yr)	Utilisable Ground Water Resource for Irrigation in Net Terms (m.ha.m/Yr)	Gross Draft from Natural Recharge Estimated on Prorata Basis (1992) (m.ha.m/Yr)	Net Draft from Natural Recharge (1992) (m.ha.m/Yr)	Balance Ground Water Resource for Future Use (m.ha.m/Yr)	Level of Ground Water Develop-ment (%)	Weighted Average Delta (m)	Utilisable Irrigation Potential for Development From Natural Recharge (m.ha)
1	2	3	4	5	6	7	8	9	10	11	12
1	Amritsar	0.08165	0.00816	0.07349	0.06614	0.11183	0.07828	-0.00479	106.52	0.518	0.12767
2	Jalandhar	0.04653	0.00465	0.04188	0.03769	0.10626	0.07438	-0.03250	177.60	0.518	0.07276
3	Kapurthala	0.03303	0.00330	0.02973	0.02676	0.11014	0.07710	-0.04737	259.33	0.518	0.05165
4	Ludhiana	0.08989	0.00899	0.08090	0.07281	0.14234	0.09964	-0.01874	123.16	0.518	0.14057
5	Rupnagar	0.04702	0.00470	0.04232	0.03809	0.03006	0.02104	0.02128	49.72	0.518	0.07352
6	Patiala	0.07648	0.00765	0.06883	0.06195	0.13547	0.09483	-0.02600	137.77	0.518	0.11960
7	Hoshiarpur	0.08123	0.00812	0.07311	0.06580	0.04840	0.03388	0.03923	46.34	0.518	0.12702
8	Bhatinda	0.08335	0.00833	0.07502	0.06752	0.04621	0.03235	0.04267	43.12	0.518	0.13033
9	Ferozepur	0.11182	0.01118	0.10064	0.09058	0.09250	0.06475	0.03589	64.34	0.518	0.17485
10	Faridkot	0.13593	0.01359	0.12234	0.11011	0.11354	0.07948	0.04286	64.97	0.518	0.21255
11	Sangrur	0.06292	0.00629	0.05663	0.05097	0.12116	0.08481	-0.02818	149.76	0.518	0.09838
12	Gurdaspur	0.09671	0.00967	0.08704	0.07834	0.08351	0.05846	0.02858	67.16	0.518	0.15122
	TOTAL	**0.94656**	**0.09463**	**0.85193**	**0.76674**	**1.14143**	**0.79900**	**0.05293**	**93.79**		**1.48019**

GROUND WATER RESOURCE AND IRRIGATION POTENTIAL DUE TO NATURAL RECHARGE

RAJASTHAN

Sr. No.	Districts	Total Replenishable Ground Water Resource from Normal Natural Recharge (m.ha.m/Yr)	Provision for Domestic, Industrial & Other Uses (m.ha.m/Yr)	Available Ground Water Resource for Irrigation in Net Terms (m.ha.m/Yr)	Utilisable Ground Water Resource for Irrigation in Net Terms (m.ha.m/Yr)	Gross Draft from Natural Recharge Estimated on Prorata Basis (1990) (m.ha.m/Yr)	Net Draft from Natural Recharge (1990) (m.ha.m/Yr)	Balance Ground Water Resource for Future Use (m.ha.m/Yr)	Level of Ground Water Develop-ment (%)	Weighted Average Delta (m)	Utilisable Irrigation Potential for Development From Natural Recharge (m.ha)
1	2	3	4	5	6	7	8	9	10	11	12
1	Ajmer	0.02682	0.00415	0.02267	0.02040	0.02357	0.01650	0.00617	72.78	0.557	0.03661
2	Alwar	0.06946	0.01042	0.05904	0.05314	0.08914	0.06240	-0.00336	105.69	0.557	0.09538
3	Banswara	0.02977	0.00446	0.02531	0.02278	0.00481	0.00337	0.02194	13.31	0.557	0.04087
4	Barmer	0.03075	0.00557	0.02518	0.02266	0.00930	0.00651	0.01867	25.85	0.600	0.03776
5	Bharatpur	0.04168	0.00625	0.03543	0.03189	0.03650	0.02555	0.00988	72.11	0.557	0.05723
6	Bhilwara	0.05107	0.00766	0.04341	0.03907	0.02801	0.01961	0.02380	45.17	0.557	0.07012
7	Bikaner	0.01250	0.00203	0.01047	0.00942	0.00000	0.00000	0.01047	0.00	0.600	0.01570
8	Bundi	0.02920	0.00438	0.02482	0.02234	0.00487	0.00341	0.02141	13.74	0.457	0.04887
9	Chittorgarh	0.05921	0.00888	0.05033	0.04530	0.04139	0.02897	0.02136	57.56	0.557	0.06129
10	Churu	0.01526	0.00306	0.01220	0.01098	0.00054	0.00038	0.01182	3.11	0.600	0.01831
11	Dholpur	0.02012	0.00302	0.01710	0.01539	0.01894	0.01326	0.00384	77.54	0.600	0.02566
12	Dungarpur	0.01658	0.00249	0.01409	0.01268	0.00543	0.00380	0.01029	26.97	0.557	0.02277
13	Jaipur	0.09565	0.01690	0.07875	0.07088	0.10419	0.07293	0.00582	92.61	0.600	0.11812
14	Jaisalmer	0.01019	0.00155	0.00864	0.00778	0.00007	0.00005	0.00859	0.58	0.600	0.01295
15	Jalore	0.02947	0.00461	0.02486	0.02237	0.05057	0.03540	-0.01054	142.40	0.600	0.03729
16	Jhalawar	0.03790	0.00568	0.03222	0.02900	0.02956	0.02069	0.01153	64.21	0.457	0.06342
17	Jhunjhunu	0.02157	0.00432	0.01725	0.01552	0.02181	0.01527	0.00198	88.52	0.600	0.02588
18	Jodhpur	0.03182	0.00682	0.02500	0.02250	0.02831	0.01982	0.00518	79.28	0.600	0.03750
19	Kota	0.08680	0.01306	0.07374	0.06637	0.01024	0.00717	0.06657	9.72	0.457	0.14517
20	Nagaur	0.05783	0.00940	0.04843	0.04359	0.02369	0.01658	0.03185	34.23	0.557	0.07823
21	Pali	0.04296	0.00644	0.03652	0.03287	0.02554	0.01788	0.01864	48.96	0.557	0.05899
22	Sawai Madhopur	0.06134	0.00924	0.05210	0.04689	0.04343	0.03040	0.02170	58.35	0.557	0.08417
23	Sikar	0.03360	0.00509	0.02851	0.02566	0.03386	0.02370	0.00481	83.13	0.600	0.04278
24	Sirohi	0.02224	0.00334	0.01890	0.01701	0.01684	0.01179	0.00711	62.38	0.557	0.03053
25	Tonk	0.04102	0.00617	0.03485	0.03137	0.02159	0.01511	0.01974	43.36	0.557	0.05630
26	Udaipur	0.09069	0.01360	0.07709	0.06938	0.03851	0.02696	0.05013	34.97	0.557	0.12453
27	Sri Ganganagar	0.03294	0.00494	0.02800	0.02520	0.01286	0.00900	0.01900	32.14	0.600	0.04200
	TOTAL	1.09845	0.17354	0.92491	0.83242	0.72359	0.50651	0.41840	54.76		1.50846

GROUND WATER RESOURCE AND IRRIGATION POTENTIAL DUE TO NATURAL RECHARGE

TAMIL NADU

Sr. No.	Districts	Total Replenishable Ground Water Resource from Normal Natural Recharge (m.ha.m/Yr)	Provision for Domestic, Industrial & Other Uses (m.ha.m/Yr)	Available Ground Water Resource for Irrigation in Net Terms (m.ha.m/Yr)	Utilisable Ground Water Resource for Irrigation in Net Terms (m.ha.m/Yr)	Gross Draft from Natural Recharge Estimated on Prorata Basis (1992) (m.ha.m/Yr)	Net Draft from Natural Recharge (1992) (m.ha.m/Yr)	Balance Ground Water Resource for Future Use (m.ha.m/Yr)	Level of Ground Water Develop-ment (%)	Weighted Average Delta (m)	Utilisable Irrigation Potential for Development From Natural Recharge (m.ha)
1	2	3	4	5	6	7	8	9	10	11	12
1	Chengai-MGR	0.12146	0.01822	0.10324	0.09292	0.09006	0.06304	0.04020	61.06	0.758	0.12257
2	N.Arcot Ambedkar	0.10856	0.01628	0.09228	0.08305	0.09702	0.06791	0.02437	73.59	0.871	0.09535
3	Thiruvannamalai-Sambuvaryar	0.15522	0.02328	0.13194	0.11874	0.10204	0.07143	0.06051	54.14	0.832	0.14270
4	South Arcot	0.29756	0.04463	0.25293	0.22763	0.26290	0.18403	0.06890	72.76	0.709	0.32097
5	Dharmapuri	0.10063	0.01509	0.08554	0.07698	0.08072	0.05651	0.02903	66.06	0.719	0.10702
6	Salem	0.10982	0.01647	0.09335	0.08401	0.11157	0.07810	0.01525	83.66	0.599	0.14023
7	Coimbatore	0.06912	0.01037	0.05875	0.05288	0.07290	0.05103	0.00772	86.86	0.467	0.11335
8	Periyar	0.10997	0.01649	0.09348	0.08412	0.11525	0.08068	0.01280	86.31	0.561	0.14993
9	Thiruchirappalli	0.17371	0.02606	0.14765	0.13289	0.10967	0.07677	0.07088	31.99	0.731	0.18184
10	Thanjavur	0.16316	0.02447	0.13869	0.12482	0.08298	0.05809	0.08060	41.88	0.900	0.13863
11	Nagapattinam-Quid-e-Milleth	0.04305	0.00646	0.03659	0.03293	0.05210	0.03647	0.00012	99.67	0.789	0.04173
12	Madurai	0.08571	0.01286	0.07285	0.06557	0.05541	0.03879	0.03406	53.25	0.662	0.09909
13	Dindigul Anna	0.07677	0.01152	0.06525	0.05873	0.05665	0.03965	0.02560	60.77	0.652	0.09013
14	Pudukkottai	0.06608	0.00991	0.05617	0.05055	0.01879	0.01315	0.04302	23.41	0.934	0.05411
15	Nilgiris	0.00580	0.00087	0.00493	0.00444	0.00023	0.00016	0.00477	3.25	0.371	0.01197
16	Ramanathapuram	0.01138	0.00171	0.00967	0.00870	0.00101	0.00071	0.00896	7.34	0.731	0.01191
17	P.M.Ramalingam Thevar	0.03064	0.00480	0.02604	0.02344	0.00467	0.00327	0.02277	12.55	0.785	0.02985
18	Kamarajar	0.06278	0.00942	0.05336	0.04803	0.03648	0.02553	0.02783	47.84	0.769	0.06243
19	Thirunelvali-Katt.	0.07420	0.01113	0.06307	0.05676	0.04867	0.03407	0.02900	54.02	0.633	0.08968
20	V.O.Chidambaranar	0.01971	0.00296	0.01675	0.01508	0.01251	0.00875	0.00800	52.24	0.662	0.02276
21	Kanyakumari	0.00566	0.00085	0.00481	0.00433	0.00048	0.00034	0.00447	7.07	0.817	0.00531
	TOTAL	1.89099	0.28365	1.60734	1.44660	1.41211	0.98848	0.61886	61.50		2.03156

GROUND WATER RESOURCE AND IRRIGATION POTENTIAL DUE TO NATURAL RECHARGE

TRIPURA

Sr. No.	Districts	Total Replenishable Ground Water Resource from Normal Natural Recharge (m.ha.m/Yr)	Provision for Domestic, Industrial & Other Uses (m.ha.m/Yr)	Available Ground Water Resource for Irrigation in Net Terms (m.ha.m/Yr)	Utilisable Ground Water Resource for Irrigation in Net Terms (m.ha.m/Yr)	Gross Draft from Natural Recharge Estimated on Prorata Basis (1992) (m.ha.m/Yr)	Net Draft from Natural Recharge (1992) (m.ha.m/Yr)	Balance Ground Water Resource for Future Use (m.ha.m/Yr)	Level of Ground Water Develop-ment (%)	Weighted Average Delta (m)	Utilisable Irrigation Potential for Development From Natural Recharge (m.ha)
1	2	3	4	5	6	7	8	9	10	11	12
1	North Tripura	0.01645	0.00247	0.01398	0.01258	0.00345	0.00241	0.01157	17.24	0.63	0.01997
2	South Tripura	0.01845	0.00277	0.01568	0.01411	0.00625	0.00438	0.01130	27.93	0.63	0.02240
3	West Tripura	0.02189	0.00328	0.01861	0.01675	0.01323	0.00926	0.00935	49.76	0.63	0.02659
	TOTAL	**0.05679**	**0.00852**	**0.04827**	**0.04344**	**0.02293**	**0.01605**	**0.03222**	**33.25**		**0.06896**

GROUND WATER RESOURCE AND IRRIGATION POTENTIAL DUE TO NATURAL RECHARGE

UTTAR PRADESH

Sr. No.	Districts	Total Replenishable Ground Water Resource from Normal Natural Recharge (m.ha.m/Yr)	Provision for Domestic, Industrial & Other Uses (m.ha.m/Yr)	Available Ground Water Resource for Irrigation in Net Terms (m.ha.m/Yr)	Utilisable Ground Water Resource for Irrigation in Net Terms (m.ha.m/Yr)	Gross Draft from Natural Recharge Estimated on Prorata Basis (1991) (m.ha.m/Yr)	Net Draft from Natural Recharge (1991) (m.ha.m/Yr)	Balance Ground Water Resource for Future Use (m.ha.m/Yr)	Level of Ground Water Develop-ment (%)	Weighted Average Delta (m)	Weighted Average Delta for Utilised Irr. pot./ for Balance potential (m)	Utilisable Irrigation Potential for Developmer From Natural Recharge (m.ha)
1	2	3	4	5	6	7	8	9	10	11	12	13
1	Agra	0.05741	0.00861	0.04880	0.04392	0.03863	0.02704	0.02176	55.41	0.206	0.50	0.20826
2	Aligarh	0.07331	0.01100	0.06231	0.05608	0.03960	0.02772	0.03459	44.49	0.261	0.50	0.19907
3	Allahabad	0.14263	0.02139	0.12124	0.10911	0.05473	0.03831	0.08293	31.60	0.380	0.50	0.27888
4	Azamgarh	0.09854	0.01478	0.08376	0.07538	0.05339	0.03738	0.04638	44.63	0.480	0.50	0.18356
5	Budaun	0.13498	0.02025	0.11473	0.10326	0.09597	0.06718	0.04755	58.55	0.339	0.50	0.34076
6	Bahraich	0.24738	0.03711	0.21027	0.18924	0.09016	0.05611	0.15416	26.68	0.353	0.50	0.48209
7	Ballia	0.12050	0.01807	0.10243	0.09218	0.04853	0.03397	0.06846	33.16	0.419	0.50	0.22750
8	Banda	0.08187	0.01228	0.06959	0.06263	0.01904	0.01333	0.05626	19.16	0.276	0.50	0.16339
9	Bara Banki	0.17545	0.02632	0.14913	0.13422	0.07468	0.05227	0.09686	35.05	0.433	0.50	0.32941
10	Baraelli	0.16279	0.02442	0.13837	0.12454	0.06478	0.04535	0.09302	32.77	0.482	0.50	0.28838
11	Basti	0.17287	0.02593	0.14694	0.13225	0.09166	0.06416	0.08278	43.66	0.482	0.50	0.32015
12	Bijnor	0.13166	0.01975	0.11191	0.10072	0.08744	0.06121	0.05070	54.70	0.633	0.50	0.21565
13	Bulandshar	0.08554	0.01283	0.07271	0.06544	0.06395	0.04477	0.02794	61.57	0.298	0.50	0.24344
14	Dehradun	0.05381	0.00807	0.04574	0.04117	0.00179	0.00125	0.04449	2.73	0.344	0.50	0.08475
15	Deoria	0.19321	0.02898	0.16423	0.14780	0.07527	0.05269	0.11154	32.08	0.517	0.50	0.33172
16	Etah	0.10228	0.01534	0.08694	0.07825	0.03402	0.02381	0.06313	27.39	0.312	0.50	0.21185
17	Etawah	0.06500	0.00975	0.05525	0.04972	0.02612	0.01829	0.03696	33.10	0.323	0.50	0.13941
18	Faizabad	0.14218	0.02133	0.12085	0.10877	0.07326	0.05128	0.06957	42.43	0.467	0.50	0.26641
19	Farrukhabad	0.06539	0.00981	0.05558	0.05003	0.04254	0.02978	0.02580	53.57	0.318	0.50	0.16688
20	Fatehpur	0.09569	0.01435	0.08134	0.07320	0.04350	0.03045	0.05089	37.44	0.347	0.50	0.20438
21	Firozabad	0.07107	0.01066	0.06041	0.05437	0.04829	0.03380	0.02661	55.95	0.267	0.50	0.21083
22	Ghaziabad	0.07996	0.01199	0.06797	0.06117	0.04013	0.02809	0.03988	41.33	0.400	0.50	0.16205
23	Ghazipur	0.08620	0.01293	0.07327	0.06594	0.03897	0.02728	0.04599	37.23	0.435	0.50	0.16344
24	Gonda	0.28525	0.04279	0.24246	0.21622	0.11567	0.08097	0.16149	33.40	0.383	0.50	0.56222
25	Gorakhpur	0.13335	0.02000	0.11335	0.10201	0.06993	0.04895	0.06440	43.18	0.409	0.50	0.26987
26	Hamirpur	0.07334	0.01100	0.06234	0.05611	0.01792	0.01254	0.04980	20.12	0.208	0.50	0.16721
27	Hardoi	0.18969	0.02845	0.16124	0.14511	0.06394	0.04476	0.11648	27.76	0.337	0.50	0.38027
28	Haridwar	0.09746	0.01462	0.08284	0.07456	0.03363	0.02354	0.05930	28.42	0.649	0.50	0.16187
29	Jalaun	0.06401	0.00960	0.05441	0.04897	0.00910	0.00637	0.04604	11.71	0.203	0.50	0.12681
30	Jaunpur	0.11319	0.01698	0.09621	0.08659	0.08196	0.05737	0.03884	59.63	0.412	0.50	0.24899

1	2	3	4	5	6	7	8	9	10	11	12	13
31	Jhansi	0.04971	0.00746	0.04225	0.03803	0.02582	0.01794	0.02431	42.46	0.224	0.50	0.14696
32	Kanpur City	0.02114	0.00317	0.01797	0.01617	0.00940	0.00658	0.01139	36.62	0.313	0.50	0.04752
33	Kanpur Dehat	0.08266	0.01240	0.07026	0.06324	0.02832	0.01982	0.05044	28.21	0.300	0.50	0.17575
34	Kheri	0.22190	0.03329	0.18861	0.16975	0.10759	0.07531	0.11330	39.93	0.509	0.50	0.39418
35	Lalitpur	0.04144	0.00622	0.03522	0.03170	0.02304	0.01613	0.01909	45.80	0.235	0.50	0.12280
36	Lucknow	0.05171	0.00776	0.04395	0.03956	0.02105	0.01473	0.02922	33.52	0.388	0.50	0.10139
37	Maharajganj	0.15994	0.02399	0.13595	0.12235	0.03985	0.02789	0.10806	20.51	0.506	0.50	0.26540
38	Mainpuri	0.03913	0.00587	0.03326	0.02993	0.01643	0.01080	0.02246	32.47	0.318	0.50	0.08417
39	Mathura	0.03045	0.00457	0.02588	0.02330	0.01998	0.01399	0.01189	54.06	0.290	0.50	0.06349
40	Maunath Bhanjan	0.03779	0.00567	0.03212	0.02891	0.01854	0.01298	0.01914	40.41	0.491	0.50	0.06847
41	Meerut	0.10464	0.01570	0.08894	0.08005	0.06181	0.04326	0.04568	48.64	0.536	0.50	0.18592
42	Mirzapur	0.08283	0.01242	0.07041	0.06336	0.01386	0.00970	0.06071	13.78	0.365	0.50	0.14342
43	Moradabad	0.16490	0.02474	0.14016	0.12615	0.12645	0.08852	0.05164	63.16	0.476	0.50	0.33186
44	Muzaffarnagar	0.14585	0.02188	0.12397	0.11157	0.07152	0.05006	0.07391	40.38	0.597	0.50	0.24087
45	Nainital	0.11120	0.01668	0.09452	0.08507	0.03612	0.02528	0.06924	26.75	0.507	0.50	0.18875
46	Pilibhit	0.16399	0.02460	0.13939	0.12545	0.05833	0.04083	0.09856	29.29	0.529	0.50	0.27662
47	Pratapgarh	0.09304	0.01396	0.07908	0.07118	0.03798	0.02659	0.05259	33.62	0.414	0.50	0.17702
48	Rae Bareli	0.12585	0.01888	0.10697	0.09627	0.03609	0.02526	0.08171	23.61	0.406	0.50	0.22707
49	Rampur	0.10061	0.01509	0.08552	0.07697	0.04975	0.03483	0.05069	40.73	0.489	0.50	0.18279
50	Saharanpur	0.07990	0.01199	0.06791	0.06112	0.05670	0.03969	0.02822	58.45	0.522	0.50	0.14862
51	Shahjahanpur	0.14858	0.02229	0.12629	0.11367	0.08080	0.05656	0.06973	44.79	0.445	0.50	0.28912
52	Sidharthnagar	0.11790	0.01769	0.10021	0.09020	0.04457	0.03120	0.06901	31.13	0.469	0.50	0.20984
53	Sitapur	0.13384	0.02007	0.11376	0.10239	0.05753	0.04027	0.07349	35.40	0.449	0.50	0.24761
54	Sonbhadra	0.07813	0.01172	0.06641	0.05977	0.00730	0.00511	0.06130	7.69	0.300	0.50	0.13225
55	Sultanpur	0.10527	0.01579	0.08948	0.08053	0.05252	0.03677	0.05271	41.09	0.444	0.50	020130
56	Unnao	0.11888	0.01783	0.10105	0.09094	0.06105	0.04274	0.05831	42.30	0.350	0.50	0.26181
57	Varanasi	0.13601	0.02040	0.11561	0.10405	0.06372	0.04460	0.07101	38.58	0.387	0.50	0.27599
	TOTAL	6.34330	0.95153	5.39177	4.85264	2.85353	1.99746	3.39431	37.05			12.55049

GROUND WATER RESOURCE AND IRRIGATION POTENTIAL DUE TO NATURAL RECHARGE

WEST BENGAL

Sr. No.	Districts	Total Replenishable Ground Water Resource from Normal Natural Recharge (m.ha.m/Yr)	Provision for Domestic, Industrial & Other Uses (m.ha.m/Yr)	Available Ground Water Resource for Irrigation in Net Terms (m.ha.m/Yr)	Utilisable Ground Water Resource for Irrigation in Net Terms (m.ha.m/Yr)	Gross Draft from Natural Recharge estimated on Prorata Basis (1991) (m.ha.m/Yr)	Net Draft from Natural Recharge (1991) (m.ha.m/Yr)	Balance Ground Water Resource for Future Use (m.ha.m/Yr)	Level of Ground Water Develop-ment (%)	Weighted Average Delta (m)	Utilisable Irrigation Potential for Development From Natural Recharge (m.ha)
1	2	3	4	5	6	7	8	9	10	11	12
1	Bankura	0.09638	0.01446	0.08192	0.07373	0.01700	0.01190	0.07002	14.53	0.38-0.56	0.14436
2	Bardhaman	0.23308	0.03496	0.19812	0.17831	0.06926	0.04848	0.14964	24.47	0.42-0.58	0.23967
3	Birbhum	0.09398	0.01410	0.07988	0.07189	0.01604	0.01123	0.06865	14.06	0.45-0.51	0.14697
4	Coochbehar	0.16044	0.02407	0.13637	0.12273	0.00861	0.00603	0.13034	4.42	0.47	0.25830
5	Darjeeling	0.04535	0.00680	0.03855	0.03470	0.00073	0.00051	0.03804	1.32	0.38	0.09126
6	Howrah	0.01989	0.00298	0.01691	0.01522	0.00331	0.00232	0.01459	13.72	0.68	0.02187
7	Hooghly	0.11804	0.01771	0.10033	0.09030	0.04471	0.03130	0.06903	31.20	0.56	0.16128
8	Jalpaiguri	0.31852	0.04778	0.27074	0.24367	0.00407	0.00285	0.26789	1.05	0.38	0.40887
9	Malda	0.08945	0.01342	0.07603	0.06843	0.03223	0.02256	0.05347	29.67	0.35-0.55	0.13527
10	Medinipur	0.21402	0.03210	0.18192	0.16373	0.07251	0.05076	0.13116	27.90	0.38-0.68	0.29520
11	Murshidabad	0.17577	0.02637	0.14940	0.13447	0.10506	0.07354	0.07586	49.22	0.47	0.28620
12	Nadia	0.15343	0.02302	0.13041	0.11737	0.10411	0.07288	0.05753	55.89	0.33-0.70	0.23688
13	Purulia	0.06249	0.00937	0.05312	0.04781	0.00633	0.00443	0.04869	8.34	0.38	0.12591
14	N-24 Parganas	0.11717	0.01758	0.09959	0.08963	0.07934	0.05554	0.04405	55.77	0.37-0.75	0.15345
15	Uttar & Dakshin Dinajpur	0.13191	0.01979	0.11212	0.10091	0.03663	0.02564	0.08648	22.87	0.36-0.55	0.19530
	TOTAL	2.02992	0.30451	1.72541	1.55287	0.59996	0.41997	1.30544	24.34		2.90079

GROUND WATER RESOURCE AND IRRIGATION POTENTIAL DUE TO NATURAL RECHARGE

DADRA AND NAGAR HAVELI

Sr. No.	Union Territory	Total Replenishable Ground Water Resource from Normal Natural Recharge (m.ha.m/Yr)	Provision for Domestic, Industrial & Other Uses (m.ha.m/Yr)	Available Ground Water Resource for Irrigation in Net Terms (m.ha.m/Yr)	Utilisable Ground Water Resource for Irrigation in Net Terms (m.ha.m/Yr)	Gross Draft from Natural Recharge Estimated on Prorata Basis (1990) (m.ha.m/Yr)	Net Draft from Natural Recharge (1990) (m.ha.m/Yr)	Balance Ground Water Resource for Future Use (m.ha.m/Yr)	Level of Ground Water Develop-ment (%)	Weighted Average Delta (m)	Utilisable Irrigation Potential for Development From Natural Recharge (m.ha)
1	2	3	4	5	6	7	8	9	10	11	12
1	Dadra & Nagar Haveli	0.00358	0.00054	0.00304	0.00274	0.00055	0.00039	0.00265	12.83	0.64	0.00428
	TOTAL	0.00358	0.00054	0.00304	0.00274	0.00055	0.00039	0.00265	12.83		0.00428

GROUND WATER RESOURCE DUE TO NATURAL RECHARGE

N.C.T.DELHI

Sr. No.	Blocks	Total Replenishable Ground Water Resource from Normal Natural Recharge (m.ha.m/Yr)	Committed Gross Draft from Natural Recharge Estimated on Prorata Basis (1991) (m.ha.m/Yr)	Committed Net Draft from Natural Recharge (1991) (m.ha.m/Yr)	Balance Provision for Domestic, Industrial & Other Uses (m.ha.m/Yr)
1	2	3	4	5	6
1	Najafgarh	0.00183	0.00308	0.00215	Nil.
2	Khanjawala	0.00334	0.00361	0.00253	0.00081
3	Alipur	0.00485	0.00342	0.00240	0.00245
4	Mehrauli	0.00132	0.00181	0.00127	0.00005
5	Shadhara	0.00162	0.00053	0.00037	0.00125
6	City	0.01093	--	--	0.01093
	TOTAL	**0.02389**	**0.01245**	**0.00872**	**0.01549**

ANNEXURE - II(a)

STATE-WISE GROUND WATER RESOURCES AND IRRIGATION POTENTIAL DUE TO RECHARGE AUGMENTATION FROM CANAL IRRIGATION SYSTEM

ANNEXURE-II(a)

GROUND WATER RESOURCE AND IRRIGATION POTENTIAL DUE TO RECHARGE AUGMENTATION FROM CANAL IRRIGATION SYSTEM IN INDIA

Sr. No.	States/UTs	Total Replenishable Ground Water Resource (m.ha.m/Yr)	Provision for Domestic, Industrial & Other Uses (m.ha.m/Yr)	Available Ground Water Resource for Irrigation in Net Terms (m.ha.m/Yr)	Utilisable Ground Water Resource for Irrigation in Net Terms (m.ha.m/Yr)	Gross Draft Estimated on Prorata Basis (m.ha.m/Yr)	Net Draft (m.ha.m/Yr)	Balance Ground Water Resource for Future Use in net terms (m.ha.m/Yr)	Level of Ground Water Development (%)	Weighted Average Delta (m)	Utilisable Irrigation Potential for Development (m.ha)
1	2	3	4	5	6	7	8	9	10	11	12
1	Andhra Pradesh	1.52639	0.22896	1.29743	1.16769	0.39113	0.27379	1.02364	21.10	0.047-1.472	1.04740
2	Arunachal Pradesh	--	--	--	--	--	--	--	--	--	---
3	Assam	0.04877	0.00732	0.04145	0.03731	0.00466	0.00326	0.03819	7.86	1.283	0.02909
4	Bihar	0.52127	0.07819	0.44308	0.39878	0.14301	0.10011	0.34297	22.59	0.40-0.65	0.69239
5	Goa	0.00341	0.00051	0.00290	0.00261	0.00034	0.00024	0.00266	8.30	0.570	0.00457
6	Gujarat	0.39996	0.05999	0.33997	0.30597	0.19431	0.13602	0.20395	40.01	0.45-0.714	0.53580
7	Haryana	0.38004	0.05701	0.32303	0.29072	0.33716	0.23602	0.08701	73.06	0.365-0.6	0.68248
8	Himachal Pradesh	0.00783	0.00156	0.00627	0.00563	0.00097	0.00069	0.00558	11.00	0.385	0.01467
9	Jammu & Kashmir	0.20003	0.03000	0.17003	0.15304	0.00428	0.00300	0.16703	1.77	0.365-0.6	0.34000
10	Karnataka	0.20065	0.03010	0.17055	0.15350	0.06187	0.04331	0.12724	25.40	0.18-0.74	0.34733
11	Kerala	0.12657	0.02035	0.10622	0.09560	0.02261	0.01583	0.09039	14.90	0.53-0.83	0.14981
12	Madhya Pradesh	0.55984	0.08394	0.47590	0.42824	0.10177	0.07129	0.40461	14.98	0.400	1.07060
13	Maharashtra	0.44675	0.14628	0.30047	0.27042	0.16319	0.11423	0.18624	38.02	0.43-1.28	0.39346
14	Manipur	--	--	--	--	--	--	--	--	--	---
15	Meghalaya	--	--	--	--	--	--	--	--	--	---
16	Mizoram				Not Assessed						
17	Nagaland	--	--	--	--	--	--	--	--	--	---
18	Orissa	0.35155	0.05274	0.29881	0.26893	0.03758	0.02632	0.27249	8.80	0.34-0.44	0.73433
19	Punjab	0.91894	0.09189	0.82705	0.74435	1.10966	0.77676	0.05029	93.92	0.518	1.43696
20	Rajasthan	0.17231	0.02591	0.14640	0.13176	0.05123	0.03587	0.11053	24.50	0.457-0.8	0.26937
21	Sikkim				Not Assessed						
22	Tamil Nadu	0.74813	0.11221	0.63592	0.57232	0.52472	0.36730	0.26862	57.76	0.37-0.93	0.80049
23	Tripura	0.00955	0.00143	0.00812	0.00732	0.00399	0.00280	0.00532	34.48	0.630	0.01160
24	Uttar Pradesh	2.03880	0.30590	1.73290	1.55969	0.98011	0.68608	1.04682	39.59	0.20 - 0.50	4.24847
25	West Bengal	0.27929	0.04191	0.23740	0.21366	0.07798	0.05455	0.18285	22.98	0.33-0.75	0.41715
	TOTAL STATES	8.94010	1.37610	7.56400	6.80754	4.21057	2.94747	4.61653	38.97	--	13.22597
	UNION TERRITORIES										
1	Andaman & Nicobar	--	--	--	--	--	--	--	--	--	---
2	Chandigarh	--	--	--	--	--	--	--	--	--	---
3	Dadra & N.Haveli	0.000644	0.000097	0.000547	0.00049	0.000100	0.000070	0.000477	12.79	0.64	0.000769
4	Daman & Diu	--	--	--	--	--	--	--	--	--	---
5	NCT Delhi	0.005264	0.002342	--	--	0.004399	0.003079	--	--	--	---
6	Lakshadweep	--	--	--	--	--	--	--	--	--	---
7	Pondicherry	--	--	--	--	--	--	--	--	--	---
	TOTAL UTs	0.005908	0.002439	0.000547	0.00049	0.004499	0.003149	0.000477	--	--	0.000769
	GRAND TOTAL	8.946008	1.378539	7.564547	6.80803	4.215069	2.950619	4.617007	39.01	--	13.226739

NOTE

1. Col. 5 = Ground Water Resource from Canal Irrigation System - Provision for Domestic, Industrial & Other Uses (Col. 3 - Col. 4).

2. Col. 6 = 90% of Column 5.
2. Col. 7 = Gross draft is the total withdrawal from Ground Water Resource for Irrigation.

3. Col. 8 = 70% of Gross draft (bulk of the losses return back to the Ground Water Reservoir).

4. Col. 9 = Col. 5 - Col. 8 in net terms.

5. Col. 10 = Level of Ground Water Development (Col. 8 / Col. 5) X 100.

6. Col. 12** = Utilisable Ground Water Resource for Irrigation / Weighted Average Delta (Col.6 / Col.11).
(This is 90% of Ultimate Irrigation Potential which was computed as per available ground water resource for irrigation and limiting it as per the land availability.)

Note:- ** Utilisable irrigation potential has been kept as 90 % of the ultimate irrigation potential which is reasonable, in view of the following:-

1. To ensure sustainable development, the level of extraction has to be kept at a level reasonably lower than the ultimate availability.

2. To maintain river ecology, minimum flows have to be ensured by limiting extraction of ground water, which contributes to the lean season flows in the rivers.

ANNEXURE - II(b)

DISTRICT-WISE GROUND WATER RESOURCES AND IRRIGATION POTENTIAL DUE TO RECHARGE AUGMENTATION FROM CANAL IRRIGATION SYSTEM

ANNEXURE-II(b)

GROUND WATER RESOURCE AND IRRIGATION POTENTIAL DUE TO RECHARGE AUGMENTATION FROM CANAL IRRIGATION SYSTEM

ANDHRA PRADESH

Sr. No.	Districts	Total Replenishable Ground Water Resource from Canal Irrigation System (m.ha.m/Yr)	Provision for Domestic, Industrial & Other Uses (m.ha.m/Yr)	Available Ground Water Resource for Irrigation in Net Terms (m.ha.m/Yr)	Utilisable Ground Water Resource for Irrigation in Net Terms (m.ha.m/Yr)	Gross Draft from Canal Irr. System Estimated on Prorata Basis (1993) (m.ha.m/Yr)	Net Draft from Canal Irrigation System (1993) (m.ha.m/Yr)	Balance Ground Water Resource for Future Use (m.ha.m/Yr)	Level of Ground Water Develop-ment (%)	Weighted Average Delta (m)	Utilisable Irrigation Potential for Development From Canal Irriga-tion System (m.ha)
1	2	3	4	5	6	7	8	9	10	11	12
1	Srikakulam	0.07195	0.01079	0.06116	0.05504	0.01569	0.01098	0.05018	17.95	0.0475-1.472	0.08144
2	Vijayanagaram	0.04803	0.00720	0.04083	0.03675	0.00767	0.00537	0.03546	13.15	0.097-1.472	0.05701
3	Visakhapatnam	0.05083	0.00762	0.04321	0.03889	0.00973	0.00681	0.03640	15.76	0.097-0.872	0.06520
4	East Godavari	0.14245	0.02137	0.12108	0.10897	0.02296	0.01607	0.10501	13.27	0.147-1.472	0.05504
5	West Godavari	0.17170	0.02575	0.14595	0.13136	0.04944	0.03461	0.11134	23.71	0.147-1.472	0.07140
6	Krishna	0.08602	0.01290	0.07312	0.06581	0.01656	0.01159	0.06153	15.85	0.147-1.472	0.04102
7	Guntur	0.20783	0.03117	0.17666	0.15899	0.01651	0.01156	0.16510	6.54	0.662-0.87	0.09131
8	Prakasam	0.08524	0.01279	0.07245	0.06521	0.01406	0.00984	0.06261	13.58	0.047-0.872	0.03026
9	Nellore	0.10380	0.01557	0.08823	0.07941	0.04097	0.02868	0.05955	32.51	0.072-1.47	0.03380
10	Kurnool	0.04064	0.00610	0.03454	0.03109	0.00866	0.00606	0.02848	17.54	0.097-0.872	0.02113
11	Anantapur	0.03326	0.00499	0.02827	0.02544	0.01489	0.01042	0.01785	36.86	0.047-0.872	0.06754
12	Cuddapah	0.01683	0.00252	0.01431	0.01288	0.00716	0.00501	0.00930	35.01	0.147-1.472	0.03330
13	Chittoor	0.02622	0.00393	0.02229	0.02006	0.01074	0.00752	0.01477	33.74	0.147-1.472	0.06878
14	Rangareddy	0.01093	0.00164	0.00929	0.00836	0.00484	0.00339	0.00590	36.49	0.147-1.472	0.00355
15	Hyderabad										
16	Nizamabad	0.04956	0.00743	0.04213	0.03792	0.02121	0.01485	0.02728	35.25	0.072-1.472	0.04755
17	Medak	0.02983	0.00447	0.02536	0.02282	0.01114	0.00780	0.01756	30.76	0.147-1.472	0.05331
18	Mehaboobnagar	0.03436	0.00515	0.02921	0.02629	0.01389	0.00973	0.01948	33.31	0.097-0.872	0.06230
19	Nalgonda	0.10127	0.01519	0.08608	0.07747	0.03347	0.02343	0.06265	27.22	0.147-0.872	0.03843
20	Warangal	0.04543	0.00681	0.03862	0.03476	0.01869	0.01308	0.02554	33.87	0.097-0.872	0.02881
21	Khammam	0.06833	0.01025	0.05808	0.05227	0.00834	0.00584	0.05224	10.06	0.097-0.872	0.03347
22	Karimnagar	0.08420	0.01263	0.07157	0.06441	0.04169	0.02918	0.04239	40.77	0.147-1.472	0.04212
23	Adilabad	0.01768	0.00265	0.01503	0.01353	0.00283	0.00198	0.01305	13.17	0.097-0.872	0.02062
	TOTAL	1.52639	0.22896	1.29743	1.16769	0.39113	0.27379	1.02364	21.10		1.04740

Note: Utilisable Irrigation potential is limited to the land availability in command area.

GROUND WATER RESOURCE AND IRRIGATION POTENTIAL DUE TO RECHARGE AUGMENTATION FROM CANAL IRRIGATION SYSTEM

ASSAM

Sr. No.	Districts	Total Replenishable Ground Water Resource from Canal Irrigation System (m.ha.m/Yr)	Provision for Domestic, Industrial & Other Uses (m.ha.m/Yr)	Available Ground Water Resource for Irrigation in Net Terms (m.ha.m/Yr)	Utilisable Ground Water Resource for Irrigation in Net Terms (m.ha.m/Yr)	Gross Draft from Canal Irr. System Estimated on Prorata Basis (1992) (m.ha.m/Yr)	Net Draft from Canal Irrigation System (1992) (m.ha.m/Yr)	Balance Ground Water Resource for Future Use (m.ha.m/Yr)	Level of Ground Water Develop-ment (%)	Weighted Average Delta (m)	Utilisable Irrigation Potential for Development From Canal Irriga-tion System (m.ha)
1	2	3	4	5	6	7	8	9	10	11	12
1	Berpeta	0.00576	0.00086	0.00490	0.00441	0.00040	0.00028	0.00462	5.71	1.283	0.00343
2	Bongaigaon	0.00132	0.00020	0.00112	0.00101	0.00007	0.00005	0.00107	4.46	1.283	0.00078
3	Goalpara										
4	Cachar	0.00025	0.00004	0.00021	0.00019	0.00000	0.00000	0.00021	0.00	1.283	0.00015
5	Darsang	0.00340	0.00051	0.00289	0.00260	0.00026	0.00018	0.00271	6.23	1.283	0.00203
6	Dhemaji										
7	Lakhimpur	0.00113	0.00017	0.00096	0.00086	0.00004	0.00003	0.00093	3.13	1.283	0.00067
8	Dibrugarh										
9	Tinsukia	0.00230	0.00035	0.00195	0.00176	0.00009	0.00006	0.00189	3.08	1.283	0.00137
10	Dhubri	0.00137	0.00021	0.00116	0.00104	0.00010	0.00007	0.00109	6.03	1.283	0.00082
11	Golaghat										
12	Jorhat	0.00423	0.00063	0.00360	0.00324	0.00014	0.00010	0.00350	2.78	1.283	0.00252
13	Hailakandi										
14	Karimganj	0.00031	0.00005	0.00026	0.00023	0.00001	0.00001	0.00025	3.85	1.283	0.00019
15	Kamrup										
16	Nalbari	0.00464	0.00070	0.00394	0.00355	0.00039	0.00027	0.00367	6.85	1.283	0.00277
17	Karbi-Anglong	0.00135	0.00020	0.00115	0.00104	0.00000	0.00000	0.00115	0.00	1.283	0.00080
18	Kokrajhar	0.00154	0.00023	0.00131	0.00118	0.00004	0.00003	0.00128	2.29	1.283	0.00092
19	Morigaon	0.01345	0.00202	0.01143	0.01029	0.00259	0.00181	0.00962	15.84	1.283	0.00802
20	Nagaon										
21	N.C.Hills	0.00063	0.00009	0.00054	0.00049	0.00000	0.00000	0.00054	0.00	1.283	0.00038
22	Sibsagar	0.00235	0.00035	0.00200	0.00180	0.00007	0.00005	0.00195	2.50	1.283	0.00140
23	Sonitpur	0.00474	0.00071	0.00403	0.00363	0.00046	0.00032	0.00371	7.94	1.283	0.00282
	TOTAL	0.04877	0.00732	0.04145	0.03731	0.00466	0.00326	0.03819	7.86		0.02909

Note : Delta is very high
Utilisable Irrigation Potential is limited to the area available.

GROUND WATER RESOURCE AND IRRIGATION POTENTIAL DUE TO RECHARGE AUGMENTATION FROM CANAL IRRIGATION SYSTEM

BIHAR

Sr. No.	Districts	Total Replenishable Ground Water Resource from Canal Irrigation System (m.ha.m/Yr)	Provision for Domestic, Industrial & Other Uses (m.ha.m/Yr)	Available Ground Water Resource for Irrigation in Net Terms (m.ha.m/Yr)	Utilisable Ground Water Resource for Irrigation in Net Terms (m.ha.m/Yr)	Gross Draft from Canal Irr. System estimated on Prorata Basis (1991) (m.ha.m/Yr)	Net Draft from Canal Irrigation System (1991) (m.ha.m/Yr)	Balance Ground Water Resource for Future Use (m.ha.m/Yr)	Level of Ground Water Develop-ment (%)	Weighted Average Delta (m)	Utilisable Irrigation Potential for Development From Canal Irriga-tion System (m.ha)
1	2	3	4	5	6	7	8	9	10	11	12
1	Siwan	0.02765	0.00415	0.02350	0.02115	0.01177	0.00824	0.01526	35.06	0.65	0.03254
2	Saran	0.02106	0.00316	0.01790	0.01611	0.00620	0.00434	0.01356	24.25	0.65	0.02478
3	Gopalganj	0.03892	0.00584	0.03308	0.02977	0.01120	0.00784	0.02524	23.70	0.65	0.04580
4	W.Champaran	0.09196	0.01379	0.07817	0.07035	0.01219	0.00853	0.06964	10.91	0.65	0.10823
5	E.Champaran	0.06430	0.00964	0.05466	0.04919	0.02047	0.01433	0.04033	26.22	0.65	0.07568
6	Vaishali	0.00821	0.00123	0.00698	0.00628	0.00379	0.00265	0.00433	37.97	0.65	0.00966
7	Muzaffarpur	0.01906	0.00286	0.01620	0.01458	0.00874	0.00612	0.01008	37.78	0.65	0.02243
8	Sitamarhi										
9	Samastipur										
10	Dharbhanga										
11	Madhubani	0.00320	0.00048	0.00272	0.00245	0.00063	0.00044	0.00228	16.18	0.65	0.00377
12	Begusarai	0.00126	0.00019	0.00107	0.00096	0.00063	0.00044	0.00063	41.12	0.65	0.00148
13	Khagaria										
14	Purnia										
15	Saharsa	0.04065	0.00610	0.03455	0.03109	0.01506	0.01054	0.02401	30.51	0.65	0.04783
16	Madhepura	0.00638	0.00096	0.00542	0.00488	0.00240	0.00168	0.00374	31.00	0.65	0.00751
17	Katihar										
18	Araria										
19	Kishanganj										
20	Jahanabad	0.01112	0.00167	0.00945	0.00851	0.00490	0.00343	0.00602	36.30	0.65	0.01309

Cont..

1	2	3	4	5	6	7	8	9	10	11	12
21	Bhojpur	0.05634	0.00845	0.04789	0.04310	0.01371	0.00960	0.03829	20.05	0.65	0.06631
22	Rohtas	0.05800	0.00870	0.04930	0.04437	0.01046	0.00732	0.04198	14.85	0.40	0.11093
23	Aurangabad	0.03537	0.00531	0.03006	0.02705	0.00516	0.00361	0.02645	12.01	0.40	0.06763
24	Gaya	0.00584	0.00088	0.00496	0.00446	0.00159	0.00111	0.00385	22.38	0.40	0.01115
25	Patna	0.02389	0.00358	0.02031	0.01828	0.01191	0.00834	0.01197	41.06	0.65	0.02812
26	Nalanda	0.00243	0.00036	0.00207	0.00186	0.00063	0.00044	0.00163	21.26	0.40	0.00465
27	Nawada	0.00438	0.00066	0.00372	0.00335	0.00156	0.00109	0.00263	29.30	0.40	0.00838
28	Munger										
29	Bhagalpur										
30	Sahebganj										
31	Palamu										
32	Ranchi										
33	Lohardagga										
34	Gumla										
35	E.Singhbhum										
36	W.Singhbhum										
37	Hazaribagh										
38	Giridih										
39	Deoghar										
40	Godda										
41	Dhanbad										
42	Dumka	0.00125	0.00019	0.00106	0.00106	0.00003	0.00002	0.00104	1.89	0.40	0.00238
	TOTAL	**0.52127**	**0.07819**	**0.44308**	**0.39878**	**0.14301**	**0.10011**	**0.34297**	**22.59**		**0.69239**

GROUND WATER RESOURCE AND IRRIGATION POTENTIAL DUE TO RECHARGE AUGMENTATION FROM CANAL IRRIGATION SYSTEM

GOA

Sr. No.	Districts	Total Replenishable Ground Water Resource from Canal Irrigation System (m.ha.m/Yr)	Provision for Domestic, Industrial & Other Uses (m.ha.m/Yr)	Available Ground Water Resource for Irrigation in Net Terms (m.ha.m/Yr)	Utilisable Ground Water Resource for Irrigation in Net Terms (m.ha.m/Yr)	Gross Draft from Canal Irr. System Estimated on Prorata Basis (1992) (m.ha.m/Yr)	Net Draft from Canal Irrigation System (1992) (m.ha.m/Yr)	Balance Ground Water Resource for Future Use (m.ha.m/Yr)	Level of Ground Water Develop-ment (%)	Weighted Average Delta (m)	Utilisable Irrigation Potential for Development From Canal Irriga-tion System (m.ha)
1	2	3	4	5	6	7	8	9	10	11	12
1	North Goa	0.00200	0.00030	0.00170	0.00153	0.00019	0.00013	0.00157	7.80	0.57	0.00268
2	South Goa	0.00141	0.00021	0.00120	0.00108	0.00015	0.00011	0.00109	9.02	0.57	0.00189
	TOTAL	0.00341	0.00051	0.00290	0.00261	0.00034	0.00024	0.00266	8.30		0.00457

GROUND WATER RESOURCE AND IRRIGATION POTENTIAL DUE TO RECHARGE AUGMENTATION FROM CANAL IRRIGATION SYSTEM

GUJARAT

Sr. No.	Districts	Total Replenishable Ground Water Resource from Canal Irrigation System (m.ha.m/Yr)	Provision for Domestic, Industrial & Other Uses (m.ha.m/Yr)	Available Ground Water Resource for Irrigation in Net Terms (m.ha.m/Yr)	Utilisable Ground Water Resource for Irrigation in Net Terms (m.ha.m/Yr)	Gross Draft from Canal Irr. System Estimated on Prorata Basis (1991) (m.ha.m/Yr)	Net Draft from Canal Irrigation System (1991) (m.ha.m/Yr)	Balance Ground Water Resource for Future Use (m.ha.m/Yr)	Level of Ground Water Develop-ment (%)	Weighted Average Delta (m)	Utilisable Irrigation Potential for Development From Canal Irriga-tion System (m.ha)
1	2	3	4	5	6	7	8	9	10	11	12
1	Ahmadabad	0.02859	0.00429	0.02430	0.02187	0.02170	0.01519	0.00911	62.51	0.510	0.04288
2	Amreli	0.00463	0.00069	0.00394	0.00355	0.00259	0.00181	0.00213	45.94	0.450	0.00789
3	Banaskantha	0.01624	0.00244	0.01380	0.01242	0.01254	0.00878	0.00502	63.62	0.520	0.02388
4	Baroda	0.00448	0.00067	0.00381	0.00343	0.00214	0.00150	0.00231	39.37	0.706	0.00486
5	Bhavnagar	0.02106	0.00316	0.01790	0.01611	0.00780	0.00546	0.01244	30.50	0.523	0.03080
6	Bharuch	0.00060	0.00009	0.00051	0.00046	0.00016	0.00011	0.00040	21.57	0.714	0.00064
7	Dang	0.00002	0.00000	0.00002	0.00002	0.00000	0.00000	0.00002	0.24	0.510	0.00004
8	Gandhinagar										
9	Jamnagar	0.01221	0.00183	0.01038	0.00934	0.00493	0.00345	0.00693	33.24	0.489	0.01910
10	Junagadh	0.00478	0.00072	0.00406	0.00365	0.00297	0.00208	0.00198	51.23	0.510	0.00716
11	Kheda	0.07706	0.01156	0.06550	0.05895	0.03394	0.02376	0.04174	36.27	0.601	0.09809
12	Kutch	0.01384	0.00208	0.01176	0.01058	0.00597	0.00418	0.00758	35.54	0.616	0.01718
13	Mehsana	0.03045	0.00457	0.02588	0.02329	0.04589	0.03212	-0.00624	124.11	0.650	0.03583
14	Panchmahals	0.00828	0.00124	0.00704	0.00634	0.00277	0.00194	0.00510	27.56	0.564	0.01124
15	Rajkot	0.02443	0.00366	0.02077	0.01869	0.01093	0.00765	0.01312	36.83	0.616	0.03034
16	Sabarkantha	0.01582	0.00237	0.01345	0.01211	0.00949	0.00664	0.00681	49.37	0.580	0.02088
17	Surat	0.09565	0.01435	0.08131	0.07317	0.01651	0.01156	0.06974	14.22	0.564	0.12973
18	Surendranagar	0.01291	0.00194	0.01097	0.00987	0.00569	0.00398	0.00699	36.28	0.626	0.01577
19	Valsad	0.02891	0.00434	0.02457	0.02211	0.00830	0.00581	0.01876	23.65	0.560	0.03948
	TOTAL	**0.39996**	**0.05999**	**0.33997**	**0.30597**	**0.19431**	**0.13602**	**0.20395**	**40.01**		**0.53580**

GROUND WATER RESOURCE AND IRRIGATION POTENTIAL DUE TO RECHARGE AUGMENTATION FROM CANAL IRRIGATION SYSTEM

HARYANA

Sr. No.	Districts	Total Replenishable Ground Water Resource from Canal Irrigation System (m.ha.m/Yr)	Provision for Domestic, Industrial & Other Uses (m.ha.m/Yr)	Available Ground Water Resource for Irrigation in Net Terms (m.ha.m/Yr)	Utilisable Ground Water Resource for Irrigation in Net Terms (m.ha.m/Yr)	Gross Draft from Canal Irr. System Estimated on Prorata Basis (1992) (m.ha.m/Yr)	Net Draft from Canal Irrigation System (1992) (m.ha.m/Yr)	Balance Ground Water Resource for Future Use (m.ha.m/Yr)	Level of Ground Water Develop-ment (%)	Weighted Average Delta (m)	Utilisable Irrigation Potential for Development From Canal Irriga-tion System (m.ha)
1	2	3	4	5	6	7	8	9	10	11	12
1	Ambala	0.00512	0.00077	0.00435	0.00392	0.00426	0.00298	0.00137	68.56	0.600	0.00653
2	Bhiwani	0.02366	0.00355	0.02011	0.01810	0.01041	0.00729	0.01282	36.25	0.385	0.04701
3	Faridabad	0.01337	0.00201	0.01136	0.01022	0.01181	0.00827	0.00309	72.74	0.385	0.02656
4	Gurgaon	0.02461	0.00369	0.02092	0.01883	0.02786	0.01950	0.00142	93.21	0.385	0.04890
5	Hisar	0.11100	0.01665	0.09435	0.08492	0.04264	0.02985	0.06450	31.64	0.385	0.22056
6	Jind	0.02205	0.00331	0.01874	0.01687	0.02051	0.01436	0.00438	76.62	0.385	0.04381
7	Kaithal	0.01345	0.00202	0.01143	0.01029	0.02271	0.01590	-0.00447	139.10	0.600	0.01715
8	Kurukshetra	0.00560	0.00084	0.00476	0.00428	0.01383	0.00968	-0.00492	203.36	0.600	0.00714
9	Mahendragarh	0.00316	0.00047	0.00269	0.00242	0.00641	0.00449	-0.00180	166.91	0.385	0.00629
10	Panipath	0.01381	0.00207	0.01174	0.01057	0.02440	0.01708	-0.00534	145.61	0.600	0.01761
11	Rewari	0.00170	0.00025	0.00145	0.00131	0.00276	0.00193	-0.00048	133.10	0.385	0.00339
12	Rohtak	0.01669	0.00250	0.01419	0.01277	0.00740	0.00518	0.00901	36.50	0.385	0.03317
13	Sirsa	0.03675	0.00551	0.03124	0.02812	0.01890	0.01323	0.01801	42.35	0.385	0.07303
14	Sonipat	0.02493	0.00374	0.02119	0.01907	0.01746	0.01222	0.00897	57.67	0.385	0.04954
15	Yamunanagar	0.01620	0.00243	0.01377	0.01239	0.01704	0.01193	0.00184	86.63	0.600	0.02066
16	Karnal	0.04794	0.00719	0.04075	0.03668	0.08876	0.06213	-0.02138	152.47	0.600	0.06113
	TOTAL	**0.38004**	**0.05701**	**0.32303**	**0.29072**	**0.33716**	**0.23602**	**0.08701**	**73.06**		**0.68248**

GROUND WATER RESOURCE AND IRRIGATION POTENTIAL DUE TO RECHARGE AUGMENTATION FROM CANAL IRRIGATION SYSTEM

HIMACHAL PRADESH

Sr. No.	Districts	Total Replenishable Ground Water Resource from Canal Irrigation System (m.ha.m/Yr)	Provision for Domestic, Industrial & Other Uses (m.ha.m/Yr)	Available Ground Water Resource for Irrigation in Net Terms (m.ha.m/Yr)	Utilisable Ground Water Resource for Irrigation in Net Terms (m.ha.m/Yr)	Gross Draft from Canal Irr. System Estimated on Prorata Basis (1992) (m.ha.m/Yr)	Net Draft from Canal Irrigation System (1992) (m.ha.m/Yr)	Balance Ground Water Resource for Future Use (m.ha.m/Yr)	Level of Ground Water Develop-ment (%)	Weighted Average Delta (m)	Utilisable Irrigation Potential for Development From Canal Irriga-tion System (m.ha)
1	2	3	4	5	6	7	8	9	10	11	12
1	Una Valley (Una distt.)	0.00087	0.00017	0.00070	0.00063	0.00034	0.00024	0.00046	34.29	0.385	0.00164
2	Ponta Valley (Sirmour distt.)	0.00488	0.00098	0.00390	0.00351	0.00021	0.00015	0.00375	3.85	0.385	0.00912
3	Nalagarh Valley (Solan distt.)	0.00077	0.00015	0.00062	0.00056	0.00011	0.00008	0.00054	12.90	0.385	0.00145
4	Nurpur Valley (Kangra distt.)	0.00077	0.00015	0.00062	0.00056	0.00020	0.00014	0.00048	22.58	0.385	0.00145
5	Behl Valley (Mandi distt.)	0.00054	0.00011	0.00043	0.00039	0.00011	0.00008	0.00035	18.60	0.385	0.00101
	TOTAL	0.00783	0.00166	0.00627	0.00563	0.00097	0.00069	0.00558	11.02		0.01467

GROUND WATER RESOURCE AND IRRIGATION POTENTIAL DUE TO RECHARGE AUGMENTATION FROM CANAL IRRIGATION SYSTEM

JAMMU & KASHMIR

Sr. No.	Districts	Total Replenishable Ground Water Resource from Canal Irrigation System (m.ha.m/Yr)	Provision for Domestic, Industrial & Other Uses (m.ha.m/Yr)	Available Ground Water Resource for Irrigation in Net Terms (m.ha.m/Yr)	Utilisable Ground Water Resource for Irrigation in Net Terms (m.ha.m/Yr)	Gross Draft from Canal Irr. System Estimated on Prorata Basis (1993) (m.ha.m/Yr)	Net Draft from Canal Irrigation System (1993) (m.ha.m/Yr)	Balance Ground Water Resource for Future Use (m.ha.m/Yr)	Level of Ground Water Develop-ment (%)	Weighted Average Delta (m)	Utilisable Irrigation Potential for Development From Canal Irriga-tion System (m.ha)
1	2	3	4	5	6	7	8	9	10	11	12
1	Kathua	0.03193	0.00479	0.02714	0.02443	0.00010	0.00007	0.02707	0.26	0.385	0.06344
2	Jammu	0.08740	0.01311	0.07429	0.06686	0.00407	0.00285	0.07144	3.84	0.385	0.17366
3	Srinagar	0.02343	0.00351	0.01992	0.01793	0.00001	0.00001	0.01991	0.05	0.600	0.02988
4	Ananatnag	0.03192	0.00479	0.02713	0.02442	0.00000	0.00000	0.02713	0.00	0.600	0.04069
5	Baramula	0.02535	0.00380	0.02155	0.01940	0.00010	0.00007	0.02148	0.32	0.600	0.03233
	TOTAL	**0.20003**	**0.03000**	**0.17003**	**0.15304**	**0.00428**	**0.00300**	**0.16703**	**1.77**		**0.34000**

GROUND WATER RESOURCE AND IRRIGATION POTENTIAL DUE TO RECHARGE AUGMENTATION FROM CANAL IRRIGATION SYSTEM

KARNATAKA

Sr. No.	Districts	Total Replenishable Ground Water Resource from Canal Irrigation System (m.ha.m/Yr)	Provision for Domestic, Industrial & Other Uses (m.ha.m/Yr)	Available Ground Water Resource for Irrigation in Net Terms (m.ha.m/Yr)	Utilisable Ground Water Resource for Irrigation in Net Terms (m.ha.m/Yr)	Gross Draft from Canal Irr. System Estimated on Prorata Basis (1992) (m.ha.m/Yr)	Net Draft from Canal Irrigation System (1992) (m.ha.m/Yr)	Balance Ground Water Resource for Future Use (m.ha.m/Yr)	Level of Ground Water Develop-ment (%)	Weighted Average Delta (m)	Utilisable Irrigation Potential for Development From Canal Irriga-tion System (m.ha)
1	2	3	4	5	6	7	8	9	10	11	12
1	Bangalore	0.00546	0.00082	0.00464	0.00418	0.00486	0.00340	0.00124	73.28	0.421	0.00991
2	Belgaum	0.00935	0.00140	0.00795	0.00716	0.00494	0.00346	0.00449	43.52	0.18-0.48	0.01620
3	Bellary	0.03139	0.00471	0.02668	0.02401	0.00927	0.00649	0.02019	24.33	0.400	0.06003
4	Bidar										
5	Bijapur	0.00655	0.00098	0.00557	0.00501	0.00346	0.00242	0.00315	43.45	0.400	0.01253
6	Chitradurga	0.01506	0.00226	0.01280	0.01152	0.00797	0.00558	0.00722	43.59	0.393	0.02935
7	Chickmagalur	0.00819	0.00123	0.00696	0.00626	0.00061	0.00043	0.00653	6.18	0.18-0.57	0.01440
8	Dakshina Kannada	0.00252	0.00038	0.00214	0.00193	0.00126	0.00088	0.00126	41.12	0.630	0.00180
9	Dharwad	0.00589	0.00088	0.00501	0.00451	0.00143	0.00100	0.00401	19.96	0.18-0.48	0.01080
10	Gulbarga										
11	Hassan	0.00533	0.00080	0.00453	0.00408	0.00071	0.00050	0.00403	11.04	0.18-0.57	0.00900
12	Kodagu(Coorg)	0.00007	0.00001	0.00006	0.00005	0.00000	0.00000	0.00006	0.00	0.180	0.00028
13	Kolar	0.00542	0.00081	0.00461	0.00415	0.00453	0.00317	0.00144	68.91	0.416	0.00995
14	Mandya	0.03670	0.00551	0.03119	0.02807	0.00517	0.00362	0.02757	11.61	0.463	0.06058
15	Mysore	0.00872	0.00131	0.00741	0.00667	0.00243	0.00170	0.00571	22.94	0.46-0.57	0.01440
16	Raichur	0.03577	0.00537	0.03040	0.02736	0.00634	0.00444	0.02596	14.61	0.40-0.57	0.06030
17	Shimoga	0.01665	0.00250	0.01415	0.01274	0.00414	0.00290	0.01125	20.49	0.18-0.57	0.02520
18	Tumkur	0.00648	0.00097	0.00551	0.00496	0.00453	0.00317	0.00234	57.53	0.39-0.46	0.01170
19	Uttara Kannada	0.00110	0.00017	0.00093	0.00084	0.00021	0.00015	0.00078	16.13	0.18-0.63	0.00090
	TOTAL	**0.20065**	**0.03010**	**0.17055**	**0.15350**	**0.06187**	**0.04331**	**0.12724**	**25.40**		**0.34733**

Note: The Utilisable Irrigation Potential is limited to the area available in command area.

GROUND WATER RESOURCE AND IRRIGATION POTENTIAL DUE TO RECHARGE AUGMENTATION FROM CANAL IRRIGATION SYSTEM

KERALA

Sr. No.	Districts	Total Replenishable Ground Water Resource from Canal Irrigation System (m.ha.m/Yr)	Provision for Domestic, Industrial & Other Uses (m.ha.m/Yr)	Available Ground Water Resource for Irrigation in Net Terms (m.ha.m/Yr)	Utilisable Ground Water Resource for Irrigation in Net Terms (m.ha.m/Yr)	Gross Draft from Canal Irr. System Estimated on Prorata Basis (1992) (m.ha.m/Yr)	Net Draft from Canal Irrigation System (1992) (m.ha.m/Yr)	Balance Ground Water Resource for Future Use (m.ha.m/Yr)	Level of Ground Water Develop-ment (%)	Weighted Average Delta (m)	Utilisable Irrigation Potential for Development From Canal Irriga-tion System (m.ha)
1	2	3	4	5	6	7	8	9	10	11	12
1	Thiruvananthapuram	0.00225	0.00068	0.00157	0.00141	0.00056	0.00039	0.00118	24.84	0.73	0.00194
2	Quilon	0.00392	0.00078	0.00314	0.00283	0.00086	0.00060	0.00254	19.11	0.71	0.00398
3	Pathanamthitta	0.00338	0.00051	0.00287	0.00258	0.00041	0.00029	0.00258	10.10	0.72	0.00359
4	Alleppey	0.01806	0.00271	0.01535	0.01382	0.00203	0.00142	0.01393	9.25	0.65	0.02125
5	Kottayam	0.00679	0.00102	0.00577	0.00519	0.00083	0.00058	0.00519	10.05	0.69	0.00753
6	Idduikki	0.00065	0.00010	0.00055	0.00050	0.00004	0.00003	0.00052	5.45	0.83	0.00060
7	Ernakulam	0.01847	0.00277	0.01570	0.01413	0.00471	0.00330	0.01240	21.02	0.65	0.02174
8	Trichur	0.01758	0.00264	0.01494	0.01345	0.00461	0.00323	0.01171	21.62	0.66	0.02037
9	Palghat	0.02997	0.00450	0.02547	0.02292	0.00380	0.00266.	0.02281	10.44	0.53	0.04325
10	Malappuram	0.00767	0.00153	0.00614	0.00553	0.00160	0.00112	0.00502	18.24	0.71	0.00778
11	Calicut	0.00877	0.00175	0.00702	0.00632	0.00129	0.00090	0.00612	12.82	0.75	0.00842
12	Wyanad	0.00124	0.00019	0.00105	0.00095	0.00007	0.00005	0.00100	4.76	0.54	0.00175
13	Cannanore	0.00596	0.00089	0.00507	0.00456	0.00106	0.00074	0.00433	14.60	0.78	0.00585
14	Kasaragod	0.00186	0.00028	0.00158	0.00142	0.00074	0.00052	0.00106	32.91	0.81	0.00176
	TOTAL	**0.12657**	**0.02035**	**0.10622**	**0.09560**	**0.02261**	**0.01583**	**0.09039**	**14.90**		**0.14981**

GROUND WATER RESOURCE AND IRRIGATION POTENTIAL DUE TO RECHARGE AUGMENTATION FROM CANAL IRRIGATION SYSTEM

MADHYA PRADESH

Sr. No.	Districts	Total Replenishable Ground Water Resource from Canal Irrigation System (m.ha.m/Yr)	Provision for Domestic, Industrial & Other Uses (m.ha.m/Yr)	Available Ground Water Resource for Irrigation in Net Terms (m.ha.m/Yr)	Utilisable Ground Water Resource for Irrigation in Net Terms (m.ha.m/Yr)	Gross Draft from Canal Irr. System Estimated on Prorata Basis (1990) (m.ha.m/Yr)	Net Draft from Canal Irrigation System (1990) (m.ha.m/Yr)	Balance Ground Water Resource for Future Use (m.ha.m/Yr)	Level of Ground Water Develop-ment (%)	Weighted Average Delta (m)	Utilisable Irrigation Potential for Development From Canal Irriga-tion System (m.ha)
1	2	3	4	5	6	7	8	9	10	11	12
1	Balaghat	0.02565	0.00385	0.02180	0.01962	0.00382	0.00268	0.01912	12.29	0.40	0.04905
2	Bastar	0.00411	0.00062	0.00349	0.00314	0.00005	0.00004	0.00345	1.15	0.40	0.00785
3	Betul	0.00314	0.00047	0.00267	0.00240	0.00109	0.00076	0.00191	28.46	0.40	0.00600
4	Bhind	0.02968	0.00445	0.02523	0.02271	0.00723	0.00506	0.02017	20.06	0.40	0.05678
5	Bhopal	0.00133	0.00020	0.00113	0.00102	0.00078	0.00054	0.00059	47.79	0.40	0.00255
6	Bilaspur	0.03677	0.00551	0.03126	0.02813	0.00429	0.00300	0.02826	9.60	0.40	0.07033
7	Chhatarpur	0.00418	0.00063	0.00356	0.00320	0.00151	0.00106	0.00249	29.86	0.40	0.00800
8	Chindwara	0.00347	0.00052	0.00295	0.00265	0.00110	0.00077	0.00218	26.10	0.40	0.00663
9	Damoh	0.00467	0.00070	0.00397	0.00357	0.00084	0.00059	0.00338	14.86	0.40	0.00892
10	Datia	0.01023	0.00153	0.00870	0.00783	0.00230	0.00161	0.00709	18.51	0.40	0.01958
11	Dewas	0.00210	0.00031	0.00179	0.00160	0.00086	0.00060	0.00119	33.52	0.40	0.00400
12	Dhar	0.00372	0.00056	0.00316	0.00284	0.00137	0.00096	0.00220	30.38	0.40	0.00710
13	Durg	0.01460	0.00219	0.01241	0.01117	0.00230	0.00161	0.01080	12.97	0.40	0.02793
14	Guna	0.00662	0.00099	0.00563	0.00507	0.00117	0.00082	0.00481	14.56	0.40	0.01267
15	Gwalior	0.02938	0.00441	0.02497	0.02248	0.00547	0.00383	0.02114	15.34	0.40	0.05620
16	Hoshangabad	0.05563	0.00834	0.04729	0.04255	0.00865	0.00606	0.04123	12.81	0.40	0.10637
17	Indore	0.00112	0.00017	0.00095	0.00086	0.00074	0.00052	0.00043	54.74	0.40	0.00215
18	Jabalpur	0.01135	0.00170	0.00965	0.00868	0.00321	0.00225	0.00740	23.32	0.40	0.02170
19	Jhabua	0.00724	0.00109	0.00615	0.00554	0.00094	0.00066	0.00549	10.73	0.40	0.01385
20	Khandwa	0.00601	0.00090	0.00511	0.00460	0.00232	0.00163	0.00348	31.90	0.40	0.01150
21	Khargone	0.00709	0.00106	0.00603	0.00542	0.00267	0.00187	0.00416	31.01	0.40	0.01355
22	Mandla	0.00335	0.00050	0.00285	0.00256	0.00009	0.00006	0.00279	2.11	0.40	0.00640
23	Mandsaur	0.00260	0.00039	0.00221	0.00199	0.00119	0.00084	0.00137	38.01	0.40	0.00497
24	Morena	0.08496	0.01274	0.07222	0.06499	0.01142	0.00800	0.06422	11.08	0.40	0.16248

Cont.

1	2	3	4	5	6	7	8	9	10	11	12
25	Narsinghapur	0.00215	0.00032	0.00183	0.00165	0.00054	0.00038	0.00145	20.77	0.40	0.00412
26	Panna	0.00344	0.00052	0.00292	0.00263	0.00070	0.00049	0.00243	16.78	0.40	0.00657
27	Raigarh	0.00737	0.00110	0.00627	0.00564	0.00044	0.00031	0.00596	4.94	0.40	0.01410
28	Raipur	0.05378	0.00807	0.04571	0.04114	0.00420	0.00294	0.04277	6.43	0.40	0.10285
29	Raisen	0.01744	0.00262	0.01482	0.01334	0.00308	0.00216	0.01266	14.57	0.40	0.03335
30	Rajgarh	0.00301	0.00045	0.00256	0.00230	0.00158	0.00111	0.00145	43.36	0.40	0.00576
31	Rajnandgaon	0.00922	0.00138	0.00784	0.00705	0.00039	0.00027	0.00757	3.44	0.40	0.01763
32	Ratlam	0.00208	0.00031	0.00177	0.00159	0.00114	0.00079	0.00098	44.63	0.40	0.00398
33	Rewa	0.00968	0.00145	0.00823	0.00740	0.00204	0.00143	0.00680	17.38	0.40	0.01850
34	Sagar	0.00319	0.00048	0.00271	0.00244	0.00085	0.00060	0.00211	22.14	0.40	0.00610
35	Sarguja	0.01662	0.00249	0.01413	0.01271	0.00096	0.00067	0.01346	4.74	0.40	0.03178
36	Satna	0.00371	0.00056	0.00315	0.00284	0.00062	0.00044	0.00271	13.97	0.40	0.00710
37	Sehore	0.00301	0.00045	0.00256	0.00230	0.00108	0.00076	0.00181	29.30	0.40	0.00575
38	Seoni	0.01122	0.00168	0.00954	0.00858	0.00190	0.00133	0.00821	13.94	0.40	0.02145
39	Shahdol	0.00530	0.00079	0.00451	0.00405	0.00020	0.00014	0.00437	3.10	0.40	0.01012
40	Shajapur	0.00395	0.00059	0.00336	0.00302	0.00218	0.00153	0.00183	45.54	0.40	0.00755
41	Shivpuri	0.00451	0.00068	0.00383	0.00345	0.00127	0.00089	0.00294	23.24	0.40	0.00862
42	Sidhi	0.00468	0.00070	0.00398	0.00358	0.00098	0.00069	0.00329	17.33	0.40	0.00895
43	Tikamgarh	0.01030	0.00154	0.00876	0.00788	0.00535	0.00374	0.00502	42.69	0.40	0.01970
44	Ujjain	0.01230	0.00185	0.01045	0.00941	0.00545	0.00382	0.00663	36.56	0.40	0.02352
45	Vidisha	0.01388	0.00208	0.01180	0.01062	0.00141	0.00099	0.01081	8.39	0.40	0.02655
	TOTAL	**0.55981**	**0.08394**	**0.47590**	**0.42824**	**0.10177**	**0.07125**	**0.40461**	**14.98**		**1.07060**

GROUND WATER RESOURCE AND IRRIGATION POTENTIAL DUE TO RECHARGE AUGMENTATION FROM CANAL IRRIGATION SYSTEM

MAHARASHTRA

Sr. No.	Districts	Total Replenishable Ground Water Resource from Canal Irrigation System (m.ha.m/Yr)	Provision for Domestic, Industrial & Other Uses (m.ha.m/Yr)	Available Ground Water Resource for Irrigation in Net Terms (m.ha.m/Yr)	Utilisable Ground Water Resource for Irrigation in Net Terms (m.ha.m/Yr)	Gross Draft from Canal Irr. System Estimated on Prorata Basis (1988) (m.ha.m/Yr)	Net Draft from Canal Irrigation System (1988) (m.ha.m/Yr)	Balance Ground Water Resource for Future Use (m.ha.m/Yr)	Level of Ground Water Develop-ment (%)	Weighted Average Delta (m)	Utilisable Irrigation Potential for Development From Canal Irriga-tion System (m.ha)
1	2	3	4	5	6	7	8	9	10	11	12
1	Thane	0.00338	0.00111	0.00227	0.00204	0.00049	0.00034	0.00193	14.98	0.43	0.00475
2	Raigad	0.00329	0.00108	0.00221	0.00199	0.00029	0.00020	0.00201	9.05	0.66	0.00301
3	Ratnagiri	0.00223	0.00073	0.00150	0.00135	0.00016	0.00011	0.00139	7.33	0.81	0.00167
4	Sindhudurga	0.00170	0.00056	0.00114	0.00103	0.00021	0.00015	0.00099	13.16	0.58	0.00177
5	Nasik	0.03074	0.01006	0.02068	0.01861	0.01501	0.01051	0.01017	50.82	1.04	0.01790
6	Jalgaon	0.02782	0.00911	0.01871	0.01684	0.01494	0.01046	0.00825	55.90	0.68	0.02476
7	Dhule	0.01747	0.00572	0.01175	0.01058	0.00706	0.00494	0.00681	42.04	0.94	0.01125
8	Ahmednagar	0.06477	0.02120	0.04357	0.03921	0.04183	0.02928	0.01429	67.20	1.28	0.03064
9	Pune	0.03958	0.01296	0.02662	0.02396	0.01529	0.01070	0.01592	40.20	0.68	0.03523
10	Solapur	0.02384	0.00780	0.01604	0.01444	0.00943	0.00660	0.00944	41.15	0.62	0.02328
11	Kolhapur	0.02804	0.00918	0.01886	0.01697	0.00880	0.00616	0.01270	32.66	0.56	0.03031
12	Sangli	0.00457	0.00150	0.00307	0.00276	0.00216	0.00151	0.00156	49.19	0.52	0.00531
13	Satara	0.02578	0.00844	0.01734	0.01561	0.01166	0.00816	0.00918	47.06	1.07	0.01459
14	Aurangabad	0.01463	0.00479	0.00984	0.00886	0.00616	0.00431	0.00553	43.80	0.45	0.01968
15	Jalna	0.02545	0.00833	0.01712	0.01541	0.00510	0.00357	0.01355	20.85	0.53	0.02907
16	Parbhani	0.01253	0.00410	0.00843	0.00759	0.00229	0.00160	0.00683	18.98	0.56	0.01355
17	Beed	0.01038	0.00340	0.00698	0.00628	0.00191	0.00134	0.00564	19.20	0.67	0.00938
18	Nanded	0.02153	0.00705	0.01448	0.01303	0.00323	0.00226	0.01222	15.61	0.96	0.01358
19	Usmanabad	0.00965	0.00316	0.00649	0.00584	0.00294	0.00206	0.00443	31.74	0.47	0.01243
20	Latur	0.00845	0.00277	0.00568	0.00511	0.00183	0.00128	0.00440	22.54	0.47	0.01088
21	Amravati	0.00280	0.00092	0.00188	0.00169	0.00086	0.00060	0.00128	31.91	0.67	0.00253
22	Yeotmal	0.00772	0.00253	0.00519	0.00467	0.00097	0.00068	0.00451	13.10	0.72	0.00649
23	Buldana	0.00890	0.00291	0.00599	0.00539	0.00234	0.00164	0.00435	27.38	0.36	0.01498
24	Akola	0.01132	0.00371	0.00761	0.00685	0.00157	0.00110	0.00651	14.45	0.70	0.00978
25	Nagpur	0.00944	0.00309	0.00635	0.00572	0.00211	0.00148	0.00487	23.31	0.80	0.00714
26	Bhandara	0.01187	0.00389	0.00798	0.00718	0.00209	0.00146	0.00652	18.30	0.45	0.01596
27	Wardha	0.00210	0.00069	0.00141	0.00127	0.00059	0.00041	0.00100	29.08	0.45	0.00282
28	Chandrapur	0.00810	0.00265	0.00545	0.00491	0.00054	0.00038	0.00507	6.97	0.54	0.00908
29	Gadchiroli	0.00867	0.00284	0.00583	0.00525	0.00134	0.00094	0.00489	16.12	0.45	0.01166
	TOTAL	0.44675	0.14628	0.30047	0.27042	0.16319	0.11423	0.18624	38.02		0.39346

GROUND WATER RESOURCE AND IRRIGATION POTENTIAL DUE TO RECHARGE AUGMENTATION FROM CANAL IRRIGATION SYSTEM

ORISSA

Sr. No.	Districts	Total Replenishable Ground Water Resource from Canal Irrigation System (m.ha.m/Yr)	Provision for Domestic, Industrial & Other Uses (m.ha.m/Yr)	Available Ground Water Resource for Irrigation in Net Terms (m.ha.m/Yr)	Utilisable Ground Water Resource for Irrigation in Net Terms (m.ha.m/Yr)	Gross Draft from Canal Irr. System Estimated on Prorata Basis (1992) (m.ha.m/Yr)	Net Draft from Canal Irrigation System (1992) (m.ha.m/Yr)	Balance Ground Water Resource for Future Use (m.ha.m/Yr)	Level of Ground Water Develop-ment (%)	Weighted Average Delta (m)	Utilisable Irrigation Potential for Development From Canal Irriga-tion System (m.ha)
1	2	3	4	5	6	7	8	9	10	11	12
1	Angul	0.00803	0.00120	0.00683	0.00614	0.00072	0.00050	0.00533	7.32	0.340	0.01808
2	Balasore	0.00847	0.00127	0.00720	0.00648	000342	0.00240	0.00480	33.33	0.440	0.01473
3	Bargarh	0.05219	0.00783	0.04436	0.03993	0.00190	0.00133	0.04303	3.00	0.340	0.11742
4	Bhadrak	0.01885	0.00283	0.01602	0.01442	0.00332	0.00232	0.01370	14.48	0.440	0.03277
5	Bolangir	0.01617	0.00243	0.01374	0.01237	0.00191	0.00134	0.01240	9.75	0.340	0.03637
6	Cuttack	0.01574	0.00236	0.01338	0.01204	0.00153	0.00107	0.01231	8.00	0.390	0.03068
7	Dhenkanal	0.00771	0.00116	0.00655	0.00590	0.00054	0.00038	0.00617	5.80	0.340	0.01734
8	Gajpathi	0.00326	0.00049	0.00277	0.00249	0.00053	0.00037	0.00240	13.36	0.360	0.00693
9	Ganjam	0.04161	0.00624	0.03537	0.03184	0.00754	0.00528	0.03009	14.93	0.370	0.08604
10	Jagatsinghpur	0.01071	0.00161	0.00910	0.00819	0.00134	0.00094	0.00816	10.33	0.440	0.01861
11	Jajpur	0.01731	0.00260	0.01471	0.01324	0.00306	0.00214	0.01257	14.55	0.430	0.03079
12	Kalahandi	0.00716	0.00107	0.00609	0.00548	0.00078	0.00055	0.00554	9.03	0.340	0.01612
13	Keonjhar	0.01110	0.00160	0.00944	0.00849	0.00078	0.00055	0.00889	5.83	0.350	0.02427
14	Kendrapara	0.00239	0.00036	0.00203	0.00183	0.00072	0.00051	0.00152	25.12	0.440	0.00415
15	Khurda	0.01825	0.00274	0.01551	0.01396	0.00132	0.00092	0.01459	5.93	0.350	0.03988
16	Koraput	0.00297	0.00045	0.00252	0.00227	0.00007	0.00005	0.00247	1.98	0.340	0.00667
17	Malkangiri	0.00357	0.00054	0.00303	0.00273	0.00003	0.00002	0.00301	0.66	0.340	0.00802
18	Mayurbhanj	0.01433	0.00215	0.01218	0.01096	0.00098	0.00068	0.01150	5.58	0.390	0.02811
19	Nawapara	0.00349	0.00052	0.00297	0.00267	0.00060	0.00042	0.00255	14.14	0.340	0.00786
20	Nowrangpur	0.00198	0.00030	0.00168	0.00151	0.00011	0.00008	0.00161	4.76	0.340	0.00445
21	Nayagarh	0.01722	0.00258	0.01464	0.01317	0.00189	0.00132	0.01333	9.02	0.350	0.03765
22	Phulbani	0.00358	0.00054	0.00304	0.00274	0.00017	0.00012	0.00292	3.95	0.340	0.00805
23	Puri	0.01356	0.00203	0.01153	0.01037	0.00153	0.00107	0.01045	9.28	0.430	0.02413
24	Rayagada	0.00411	0.00062	0.00349	0.00315	0.00025	0.00018	0.00332	5.16	0.420	0.00748
25	Sambalpur	0.02338	0.00351	0.01987	0.01788	0.00143	0.00100	0.01887	5.03	0.340	0.05260
26	Suvarnapur	0.01627	0.00244	0.01383	0.01245	0.00052	0.00037	0.01346	2.68	0.340	0.03661
27	Sundargarh	0.00814	0.00122	0.00692	0.00623	0.00059	0.00041	0.00651	5.92	0.340	0.01832
	TOTAL	**0.35155**	**0.05274**	**0.29881**	**0.26893**	**0.03758**	**0.02632**	**0.27249**	**8.81**		**0.73433**

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GROUND WATER RESOURCE AND IRRIGATION POTENTIAL DUE TO RECHARGE AUGMENTATION FROM CANAL IRRIGATION SYSTEM

PUNJAB

Sr. No.	Districts	Total Replenishable Ground Water Resource from Canal Irrigation System (m.ha.m/Yr)	Provision for Domestic, Industrial & Other Uses (m.ha.m/Yr)	Available Ground Water Resource for Irrigation in Net Terms (m.ha.m/Yr)	Utilisable Ground Water Resource for Irrigation in Net Terms (m.ha.m/Yr)	Gross Draft from Canal Irr. System Estimated on Prorata Basis (1992) (m.ha.m/Yr)	Net Draft from Canal Irrigation System (1992) (m.ha.m/Yr)	Balance Ground Water Resource for Future Use (m.ha.m/Yr)	Level of Ground Water Develop-ment (%)	Weighted Average Delta (m)	Utilisable Irrigation Potential for Development From Canal Irriga-tion System (m.ha)
1	2	3	4	5	6	7	8	9	10	11	12
1	Amritsar	0.10218	0.01022	0.09196	0.08276	0.13996	0.09797	-0.00601	106.54	0.518	0.15978
2	Jalandhar	0.05255	0.00525	0.04730	0.04257	0.12000	0.08400	-0.03670	177.59	0.518	0.08218
3	Kapurthala	0.00114	0.00011	0.00103	0.00093	0.00380	0.00266	-0.00163	258.25	0.518	0.00179
4	Ludhiana	0.09687	0.00969	0.08718	0.07846	0.15339	0.10737	-0.02019	123.16	0.518	0.15147
5	Rupnagar	0.01591	0.00159	0.01432	0.01289	0.01017	0.00712	0.00720	49.72	0.518	0.02488
6	Patiala	0.07287	0.00729	0.06558	0.05902	0.12907	0.09035	-0.02477	137.77	0.518	0.11394
7	Hoshiarpur	0.03060	0.00306	0.02754	0.02479	0.01823	0.01276	0.01478	46.33	0.518	0.04785
8	Bhatinda	0.07860	0.00786	0.07074	0.06367	0.04359	0.03051	0.04023	43.13	0.518	0.12291
9	Ferozepur	0.18397	0.01840	0.16557	0.14901	0.15217	0.10652	0.05905	64.34	0.518	0.28767
10	Faridkot	0.11235	0.01123	0.10112	0.09101	0.09384	0.06569	0.03543	64.96	0.518	0.17569
11	Sangrur	0.09132	0.00913	0.08219	0.07397	0.17586	0.12310	-0.04091	149.77	0.518	0.14280
12	Gurdaspur	0.08058	0.00806	0.07252	0.06527	0.06959	0.04871	0.02381	67.17	0.518	0.12600
	TOTAL	**0.91894**	**0.09189**	**0.82705**	**0.74435**	**1.10966**	**0.77676**	**0.05029**	**93.92**		**1.43696**

GROUND WATER RESOURCE AND IRRIGATION POTENTIAL DUE TO RECHARGE AUGMENTATION FROM CANAL IRRIGATION SYSTEM

RAJASTHAN

Sr. No.	Districts	Total Replenishable Ground Water Resource from Canal Irrigation System (m.ha.m/Yr)	Provision for Domestic, Industrial & Other Uses (m.ha.m/Yr)	Available Ground Water Resource for Irrigation in Net Terms (m.ha.m/Yr)	Utilisable Ground Water Resource for Irrigation in Net Terms (m.ha.m/Yr)	Gross Draft from Canal Irr. System Estimated on Prorata Basis (1990) (m.ha.m/Yr)	Net Draft from Canal Irrigation System (1990) (m.ha.m/Yr)	Balance Ground Water Resource for Future Use (m.ha.m/Yr)	Level of Ground Water Develop-ment (%)	Weighted Average Delta (m)	Utilisable Irrigation Potential for Development From Canal Iriga-tion System (m.ha)
1	2	3	4	5	6	7	8	9	10	11	12
1	Ajmer	0.00024	0.00004	0.00020	0.00018	0.00021	0.00015	0.00005	75.00	0.55714	0.00032
2	Alwar	0.00259	0.00039	0.00220	0.00198	0.00332	0.00232	-0.00012	105.45	0.55714	0.00355
3	Banswara	0.01165	0.00175	0.00990	0.00891	0.00188	0.00132	0.00858	13.33	0.55714	0.01599
4	Barmer										
5	Bharatpur	0.01023	0.00153	0.00870	0.00783	0.00896	0.00627	0.00243	72.07	0.55714	0.01405
6	Bhilwara	0.01306	0.00196	0.01110	0.00999	0.00716	0.00502	0.00608	45.23	0.55714	0.01793
7	Bikaner	0.00215	0.00035	0.00180	0.00162	0.00000	0.00000	0.00180	0.00	0.60000	0.00270
8	Bundi	0.03976	0.00596	0.03380	0.03042	0.00664	0.00464	0.02916	13.73	0.45714	0.06654
9	Chittorgarh	0.00305	0.00046	0.00260	0.00234	0.00214	0.00150	0.00110	57.69	0.55714	0.00420
10*	Churu										
11	Dholpur	0.00459	0.00069	0.00390	0.00351	0.00432	0.00302	0.00088	77.44	0.60000	0.00585
12	Dungarpur	00282	0.00042	0.00240	0.00216	0.00093	0.00065	0.00175	27.08	0.55714	0.00388
13	Jaipur										
14	Jaisalmer										
15	Jalore										
16	Jhalawar	0.00212	0.00032	0.00180	0.00162	0.00165	0.00116	0.00064	64.44	0.45714	0.00354
17	Jhunjhunu										
18	Jodhpur										
19	Kota	0.06980	0.01050	0.05930	0.05337	0.00824	0.00577	0.05353	9.73	0.45714	0.11675
20	Nagaur										
21	Pali										
22	Sawai Madhopur	0.00506	0.00076	0.00430	0.00387	0.00358	0.00251	0.00179	58.37	0.55714	0.00695
23	Sikar										
24	Sirohi										
25	Tonk										
26	Udaipur	0.00518	0.00078	0.00440	0.00396	0.00220	0.00154	0.00286	35.00	0.55714	0.00711
27	Sri Ganganagar					NOT ASSESSED					
	TOTAL	0.17231	0.02591	0.14640	0.13176	0.05123	0.03587	0.11053			0.26937

GROUND WATER RESOURCE AND IRRIGATION POTENTIAL DUE TO RECHARGE AUGMENTATION FROM CANAL IRRIGATION SYSTEM

TAMIL NADU

Sr. No.	Districts	Total Replenishable Ground Water Resource from Canal Irrigation System (m.ha.m/Yr)	Provision for Domestic, Industrial & Other Uses (m.ha.m/Yr)	Available Ground Water Resource for Irrigation in Net Terms (m.ha.m/Yr)	Utilisable Ground Water Resource for Irrigation in Net Terms (m.ha.m/Yr)	Gross Draft from Canal Irr. System Estimated on Prorata Basis (1992) (m.ha.m/Yr)	Net Draft from Canal Irrigation System (1992) (m.ha.m/Yr)	Balance Ground Water Resource for Future Use (m.ha.m/Yr)	Level of Ground Water Develop-ment (%)	Weighted Average Delta (m)	Utilisable Irrigation Potential for Development From Canal Irriga-tion System (m.ha)
1	2	3	4	5	6	7	8	9	10	11	12
1	Chengal-MGR	0.09376	0.01406	0.07970	0.07172	0.06952	0.04866	0.03104	61.05	0.758	0.09461
2	N.Arcot	0.04182	0.00627	0.03555	0.03199	0.03738	0.02616	0.00939	73.59	0.871	0.03673
3	Thiruvannamalai-Sambuvaryar	0.04513	0.00677	0.03836	0.03453	0.02967	0.02077	0.01759	54.14	0.832	0.04149
4	South Arcot	0.12425	0.01864	0.10561	0.09505	0.10978	0.07685	0.02876	72.77	0.709	0.13403
5	Dharmapuri	0.01484	0.00223	0.01261	0.01136	0.01191	0.00834	0.00427	66.14	0.719	0.01579
6	Salem	0.06385	0.00958	0.05427	0.04885	0.06488	0.04541	0.00886	83.67	0.599	0.08154
7	Coimbatore	0.02503	0.00375	0.02128	0.01915	0.02640	0.01848	0.00280	86.84	0.467	0.04105
8	Periyar	0.01331	0.00200	0.01131	0.01018	0.01395	0.00977	0.00154	86.38	0.561	0.01815
9	Thiruchirappalli	0.04909	0.00736	0.04173	0.03756	0.03099	0.02169	0.02004	51.98	0.731	0.05139
10	Thanjavur										
11	Nagapattinam-Quid-e-Milleth	0.01601	0.00240	0.01361	0.01224	0.01937	0.01356	0.00005	99.63	0.789	0.01552
12	Madurai	0.04629	0.00694	0.03935	0.03541	0.02993	0.02095	0.01840	53.24	0.662	0.05352
13	Dindigul Anna	0.01601	0.00240	0.01361	0.01225	0.01181	0.00827	0.00534	60.76	0.652	0.01879
14	Pudukkottai	0.05202	0.00780	0.04422	0.03980	0.01479	0.01035	0.03387	23.41	0.934	0.04260
15	Nilgiris										
16	Ramanathapuram	0.01123	0.00168	0.00955	0.00859	0.00100	0.00070	0.00885	7.33	0.731	0.01175
17	P.M.Ramalingam Thevar	0.04472	0.00671	0.03801	0.03421	0.00681	0.00477	0.03324	12.55	0.785	0.04358
18	Kamarajar	0.01781	0.00267	0.01514	0.01362	0.01035	0.00724	0.00780	47.82	0.769	0.01771
19	Thirunelvali-Katt.	0.04417	0.00663	0.03754	0.03379	0.02897	0.02028	0.01726	54.00	0.633	0.05339
20	V.O.Chidambaranar	0.00866	0.00130	0.00736	0.00662	0.00549	0.00385	0.00351	52.31	0.662	0.01000
21	Kanyakumari	0.02013	0.00302	0.01711	0.01540	0.00172	0.00120	0.01591	7.01	0.817	0.01885
	TOTAL	0.74813	0.11221	0.63592	0.57232	0.52472	0.36730	0.26862	57.76		0.80049

GROUND WATER RESOURCE AND IRRIGATION POTENTIAL DUE TO RECHAGE AUGMENTATION FROM CANAL IRRIGATION SYSTEM

TRIPURA

Sr. No.	Districts	Total Replenishable Ground Water Resource from Canal Irrigation System (m.ha.m/Yr)	Provision for Domestic, Industrial & Other Uses Net Terms (m.ha.m/Yr)	Available Ground Water Resource for Irrigation in Net Terms (m.ha.m/Yr)	Utilisable Ground Water Resource for Irrigation in Prorata Basis (1992) (m.ha.m/Yr)	Gross Draft from Canal Irr. System Estimated on (1992) (m.ha.m/Yr)	Net Draft from Canal Irrigation System for Future Use (m.ha.m/Yr)	Balance Ground Water Resource (m.ha.m/Yr)	Level of Ground Water Develop-ment (%)	Weighted Average Delta (m)	Utilisable Irrigation Potential for Development From Canal Iriga-tion System (m.ha)
1	2	3	4	5	6	7	8	9	10	11	12
1	North Tripura	0.00249	0.00037	0.00212	0.00191	0.00052	0.00037	0.00175	17.45	0.63	0.00303
2	South Tripura	0.00300	0.00045	0.00255	0.00230	0.00102	0.00071	0.00184	27.84	0.63	0.00364
3	West Tripura	0.00406	0.00061	0.00345	0.00311	0.00245	0.00172	0.00173	49.86	0.63	0.00493
	TOTAL	**0.00955**	**0.00143**	**0.00812**	**0.00732**	**0.00399**	**0.00280**	**0.00532**	**34.48**		**0.01160**

GROUND WATER RESOURCE AND IRRIGATION POTENTIAL DUE TO RECHARGE AUGMENTATION FROM CANAL IRRIGATION SYSTEM

UTTAR PRADESH

Sr. No.	Districts	Total Replenishable Ground Water Resource from Canal Irrigation System (m.ha.m/Yr)	Provision for Domestic, Industrial & Other Uses (m.ha.m/Yr)	Available Ground Water Resource for Irrigation in Net Terms (m.ha.m/Yr)	Utilisable Ground Water Resource for Irrigation in Net Terms (m.ha.m/Yr)	Gross Draft from Canal Irr. System Estimated on Prorata Basis (1991) (m.ha.m/Yr)	Net Draft from Canal Irrigation System (1991) (m.ha.m/Yr)	Balance Ground Water Resource for Future Use (m.ha.m/Yr)	Level of Ground Water Develop-ment (%)	Weighted Average Delta (m)	Weighted Average Delta for Utilised Irr. pot./ for Balance potential (m.ha)	Utilisable Irrigation Potential for Development From Canal Irriga-tion System
1	2	3	4	5	6	7	8	9	10	11	12	13
1	Agra	004510	0.00677	0.03833	0.03450	0.03035	0.02124	0.01709	55.41	0.206	0.50	0.16361
2	Aligarh	0.11590	0.01738	0.09852	0.08866	0.06261	0.04382	0.05470	44.48	0.261	0.50	0.31474
3	Allahabad	0.04230	0.00635	0.03595	0.03236	0.01623	0.01136	0.02459	31.60	0.380	0.50	0.08271
4	Azamgarh	0.06516	0.00977	0.05539	0.04985	0.03531	0.02472	0.03067	44.63	0.480	0.50	0.12138
5	Budaun											
6	Bahraich											
7	Ballia	0.01630	0.00245	0.01385	0.01247	0.00656	0.00459	0.00926	33.14	0.419	0.50	0.03077
8	Banda	0.03350	0.00503	0.02847	0.02563	0.00779	0.00545	0.02302	19.14	0.276	0.50	0.06686
9	Bara Banki	0.06950	0.01043	0.05907	0.05317	0.02958	0.02071	0.03835	35.06	0.433	0.50	0.13049
10	Baraelli	0.02230	0.00335	0.01895	0.01706	0.00887	0.00621	0.01274	32.77	0.482	0.50	0.03950
11	Basti	0.00535	0.00080	0.00455	0.00409	0.00284	0.00199	0.00256	43.74	0.482	0.50	0.00991
12	Bijnor	0.01260	0.00189	0.01071	0.00964	0.00837	0.00586	0.00485	54.71	0.633	0.50	0.02064
13	Bulandshar	0.07480	0.01122	0.06358	0.05722	0.05592	0.03914	0.02444	61.56	0.298	0.50	0.21287
14	Dehradun	0.00720	0.00108	0.00612	0.00551	0.00024	0.00017	0.00595	2.78	0.344	0.50	0.01134
15	Deoria	0.07300	0.01095	0.06205	0.05585	0.02844	0.01991	0.04214	32.09	0.517	0.50	0.12534
16	Etah	0.05940	0.00891	0.05049	0.04544	0.01976	0.01383	0.03686	27.39	0.312	0.50	0.12303
17	Etawah	0.06130	0.00920	0.05210	0.04689	0.02464	0.01725	0.03485	33.11	0.323	0.50	0.13148
18	Faizabad	0.03650	0.00548	0.03102	0.02792	0.01881	0.01317	0.01785	42.46	0.457	0.50	0.06839
19	Farrukhabad	0.04120	0.00618	0.03502	0.03152	0.02680	0.01876	0.01626	53.57	0.318	0.50	0.10514
20	Fatehpur	0.03310	0.00497	0.02813	0.02532	0.01505	0.01053	0.01760	37.43	0.347	0.50	0.07070
21	Firozabad											
22	Ghaziabad	0.05730	0.00859	0.04871	0.04383	0.02875	0.02013	0.02858	41.33	0.400	0.50	0.11612
23	Ghazipur	0.05700	0.00855	0.04845	0.04361	0.02577	0.01804	0.03041	37.23	0.435	0.50	0.10808
24	Gonda	0.00110	0.00017	0.00093	0.00084	0.00045	0.00031	0.00062	33.33	0.383	0.50	0.00217
25	Gorakhpur	0.01525	0.00229	0.01296	0.01167	0.00800	0.00560	0.00736	43.21	0.409	0.50	0.03086
26	Hamirpur	0.02670	0.00401	0.02269	0.02043	0.00652	0.00457	0.01812	20.14	0.208	0.50	0.09087
27	Hardoi	0.02760	0.00414	0.02346	0.02111	0.00930	0.00651	0.01695	27.75	0.337	0.50	0.05533
28	Haridwar											
29	Jalaun	0.02660	0.00399	0.02261	0.02035	0.00378	0.00265	0.01996	11.72	0.203	0.50	0.05269
30	Jaunpur	0.02810	0.00422	0.02388	0.02150	0.02035	0.01424	0.00964	59.63	0.412	0.50	0.06181

1	2	3	4	5	6	7	8	9	10	11	12	13
31	Jhansi	0.01020	0.00153	0.00867	0.00780	0.00526	0.00368	0.00499	42.45	0.224	0.50	0.03015
32	Kanpur City											
33	Kanpur Dehat	0.05220	0.00783	0.04437	0.03993	0.01788	0.01252	0.03185	28.22	0.300	0.50	0.11098
34	Kheri	0.05350	0.00803	0.04547	0.04093	0.02594	0.01816	0.02731	39.94	0.509	0.50	0.09504
35	Lalitpur	0.00750	0.00113	0.00637	0.00574	0.00417	0.00292	0.00345	45.84	0.235	0.50	0.02222
36	Lucknow	0.03660	0.00549	0.03111	0.02800	0.01490	0.01043	0.02068	33.53	0.388	0.50	0.07176
37	Maharajganj	0.00825	0.00124	0.00701	0.00631	0.00205	0.00144	0.00557	20.54	0.506	0.50	0.01368
38	Mainpuri	0.08390	0.01258	0.07132	0.06418	0.03309	0.02316	0.04816	32.47	0.316	0.50	0.18047
39	Mathura	0.06250	0.00938	0.05312	0.04781	0.04101	0.02870	0.02442	54.03	0.290	0.50	0.17135
40	Maunath Bhanjan	0.02534	0.00380	0.02154	0.01939	0.01243	0.00870	0.01284	40.39	0.491	0.50	0.04591
41	Meerut	0.07320	0.01098	0.06222	0.05600	0.04324	0.03027	0.03195	48.65	0.536	0.50	0.13006
42	Mirzapur	0.01110	0.00166	0.00944	0.00849	0.00186	0.00130	0.00814	13.77	0.365	0.50	0.01922
43	Moradabad	0.02010	0.00302	0.01708	0.01538	0.01541	0.01079	0.00629	63.17	0.476	0.50	0.04045
44	Muzaffarnagar	0.09220	0.01383	0.07837	0.07053	0.04521	0.03165	0.04672	40.39	0.597	0.50	0.15227
45	Nainital											
46	Pilibhit	0.01680	0.00252	0.01428	0.01285	0.00598	0.00418	0.01010	29.27	0.529	0.50	0.02834
47	Pratapgarh	0.03700	0.00555	0.03145	0.02831	0.01510	0.01057	0.02088	33.61	0.414	0.50	0.07040
48	Rae Bareli	0.06200	0.00930	0.05270	0.04743	0.01778	0.01245	0.04025	23.62	0.406	0.50	0.11187
49	Rampur	0.01160	0.00174	0.00986	0.00887	0.00574	0.00402	0.00584	40.77	0.489	0.50	0.02107
50	Saharanpur	0.08220	0.01233	0.06987	0.06288	0.05833	0.04083	0.02904	58.44	0.522	0.50	0.15290
51	Shahjahanpur	0.02100	0.00315	0.01785	0.01607	0.01142	0.00799	0.00986	44.76	0.445	0.50	0.04086
52	Sidharthnagar	0.00365	0.00055	0.00310	0.00279	0.00138	0.00097	0.00213	31.29	0.469	0.50	0.00650
53	Sitapur	0.08590	0.01289	0.07301	0.06571	0.03692	0.02585	0.04716	35.41	0.449	0.50	0.15891
54	Sonbhadra											
55	Sultanpur	0.07550	0.01133	0.06417	0.05776	0.03767	0.02637	0.03780	41.09	0.444	0.50	0.14437
56	Unnao	0.03770	0.00566	0.03204	0.02884	0.01936	0.01355	0.01849	42.29	0.350	0.50	0.08303
57	Varanasi	0.01470	0.00221	0.01249	0.01125	0.00689	0.00482	0.00767	38.59	0.387	0.50	0.02983
	TOTAL	2.03880	0.30590	1.73290	1.55969	0.88011	0.68608	1.04682	39.59			4.24847

GROUND WATER RESOURCE AND IRRIGATION POTENTIAL DUE TO RECHARGE AUGMENTATION FROM CANAL IRRIGATION SYSTEM

WEST BENGAL

Sr. No.	Districts	Total Replenishable Ground Water Resource from Canal Irrigation System (m.ha.m/Yr)	Provision for Domestic, Industrial & Other Uses (m.ha.m/Yr)	Available Ground Water Resource for Irrigation in Net Terms (m.ha.m/Yr)	Utilisable Ground Water Resource for Irrigation in Net Terms (m.ha.m/Yr)	Gross Draft from Canal Irr. System Estimated on Prorata Basis (1991) (m.ha.m/Yr)	Net Draft from Canal Irrigation System (1991) (m.ha.m/Yr)	Balance Ground Water Resource for Future Use (m.ha.m/Yr)	Level of Ground Water Develop-ment (%)	Weighted Average Delta (m)	Utilisable Irrigation Potential for Development From Canal Irriga-tion System (m.ha)
1	2	3	4	5	6	7	8	9	10	11	12
1	Bankura	0.04247	0.00637	0.03610	0.03249	0.00749	0.00524	0.03086	14.52	0.38-0.56	0.06228
2	Bardhaman	0.05482	0.00822	0.04660	0.04194	0.01629	0.01140	0.03520	24.46	0.42-0.58	0.07488
3	Birbhum	0.06259	0.00939	0.05320	0.04788	0.01069	0.00748	0.04572	14.06	0.45-0.51	0.09972
4	Coochbehar	0.00047	0.00007	0.00040	0.00036	0.00003	0.00002	0.00038	5.00	0.47	0.00072
5	Darjeeling	0.00165	0.00025	0.00140	0.00126	0.00003	0.00002	0.00138	1.43	0.38	0.00333
6	Howrah	0.00424	0.00064	0.00360	0.00324	0.00071	0.00049	0.00311	13.61	0.68	0.00531
7	Hooghly	0.03365	0.00505	0.02860	0.02574	0.01275	0.00892	0.01968	31.19	0.56	0.04590
8	Jalpaiguri	0.00153	0.00023	0.00130	0.00117	0.00002	0.00001	0.00129	0.77	0.38	0.00216
9	Malda	0.00682	0.00102	0.00580	0.00522	0.00246	0.00172	0.00408	29.66	0.35-0.55	0.01026
10	Medinipur	0.03541	0.00531	0.03010	0.02709	0.01200	0.00840	0.02170	27.91	0.38-0.68	0.05202
11	Murshidabad	0.01918	0.00288	0.01630	0.01467	0.01146	0.00802	0.00828	49.20	0.47	0.03114
12	Nadia	0.00212	0.00032	0.00180	0.00162	0.00144	0.00101	0.00079	56.11	0.33-0.70	0.00333
13	Purulia	0.01024	0.00154	0.00870	0.00783	0.00104	0.00073	0.00797	8.39	0.38	0.02052
14	N-24 Parganas	0.00106	0.00016	0.00090	0.00081	0.00072	0.00050	0.00040	55.56	0.37-0.75	0.00126
15	Uttar & Dakshin Dinajpur	0.00306	0.00046	0.00260	0.00234	0.00085	0.00059	0.00201	22.69	0.36-0.55	0.00432
	TOTAL	0.27931	0.04191	0.23740	0.21366	0.07798	0.05455	0.18285	22.98		0.41715

Note: Utilisable Irrigation Potential is limited to the area available in some districts.

GROUND WATER RESOURCE AND IRRIGATION POTENTIAL DUE TO RECHARGE AUGMENTATION FROM CANAL IRRIGATION SYSTEM

DADRA AND NAGAR HAVELI

Sr. No.	Union Territory	Total Replenishable Ground Water Resource from Canal Irrigation System (m.ha.m/Yr)	Provision for Domestic, Industrial & Other Uses (m.ha.m/Yr)	Available Ground Water Resource for Irrigation in Net Terms (m.ha.m/Yr)	Utilisable Ground Water Resource for Irrigation in Net Terms (m.ha.m/Yr)	Gross Draft from Canal Irr. System Estimated on Prorata Basis (1990) (m.ha.m/Yr)	Net Draft from Canal Irrigation System (1990) (m.ha.m/Yr)	Balance Ground Water Resource for Future Use (m.ha.m/Yr)	Level of Ground Water Develop-ment (%)	Weighted Average Delta (m)	Utilisable Irrigation Potential for Development From Canal Irriga-tion System (m.ha)
1	2	3	4	5	6	7	8	9	10	11	12
1	Dadra & Nagar Haveli	0.00064	0.00009	0.00055	0.00049	0.00010	0.00007	0.00048	12.73	0.64	0.00077
	TOTAL	**0.00064**	**0.00009**	**0.00055**	**0.00049**	**0.00010**	**0.00007**	**0.00048**	**12.73**		**0.00077**

GROUND WATER RESOURCE DUE TO RECHARGE AUGMENTATION FROM CANAL IRRIAGATION SYSTEM

NCT DELHI

Sr. No.	Blocks	Total Replenishable Ground Water Resource from Canal Irrigation System (m.ha.m/Yr)	Committed Gross Draft from Recharge Augmentation Due to canal Irrigation System (1991) (m.ha.m/Yr)	Committed Net Draft from Recharge Augmentation Due to canal Irrigation System (1991) (m.ha.m/Yr)	Balance Provision for Domestic, Industrial & Other Uses (m.ha.m/Yr)
1	2	3	4	5	6
1	Najafgarh	0.00089	0.00149	0.00105	Nil.
2	Khanjawala	0.00115	0.00124	0.00087	0.00028
3	Alipur	0.00122	0.00086	0.00060	0.00062
4	Mehrauli	0.00055	0.00076	0.00053	0.00002
5	Shadhara	0.00013	0.00004	0.00003	0.00010
6	City	0.00132	--	--	0.00132
	TOTAL	**0.00526**	**0.00439**	**0.00308**	**0.00234**

ANNEXURE - III(a)

STATE-WISE GROUND WATER RESOURCES AND IRRIGATION POTENTIAL

ANNEXURE-III(a)

GROUND WATER RESOURCE AND IRRIGATION POTENTIAL OF INDIA

Sr. No.	States/UTs	Total Replenishable Ground Water Resource (m.ha.m/Yr)	Provision for Domestic, Industrial & Other Uses (m.ha.m/Yr)	Available Ground Water Resource for Irrigation in Net Terms (m.ha.m/Yr)	Utilisable Ground Water Resource for Irrigation in Net Terms (m.ha.m/Yr)	Gross Draft Estimated on Prorata Basis (m.ha.m/Yr)	Net Draft (m.ha.m/Yr)	Balance Ground Water Resource for Future Use in net terms (m.ha.m/Yr)	Level of Ground Water Develop-ment (%)	Weighted Average Delta (m)	Utilisable Irrigation Potential for Development (m.ha)
1	2	3	4	5	6	7	8	9	10	11	12
1	Andhra Pradesh	3.52916	0.52938	2.99978	2.69981	1.01318	0.70922	2.29056	23.64	0.047-1.472	3.96008
2	Arunachal Pradesh	0.14385	0.02158	0.12227	0.11005	--	--	0.12227	--	--	0.01800
3	Assam	2.47192	0.37079	2.10113	1.89102	0.13455	0.09418	2.00695	4.48	1.283	0.90000
4	Bihar	3.35213	0.50282	2.84931	2.56439	0.78108	0.54676	2.30255	19.19	0.40-0.65	4.94763
5	Goa	0.02182	0.00327	0.01855	0.01670	0.00219	0.00154	0.01701	8.30	0.570	0.02928
6	Gujarat	2.03767	0.30565	1.73202	1.55881	1.02431	0.71702	1.01500	41.45	0.45-0.714	2.75590
7	Haryana	0.85276	0.12792	0.72484	0.65236	0.86853	0.60798	0.11686	83.88	0.385-0.6	1.46170
8	Himachal Pradesh	0.03660	0.00731	0.02929	0.02637	0.00757	0.00530	0.02399	18.10	0.385	0.06850
9	Jammu & Kashmir	0.44257	0.06639	0.37618	0.33858	0.00713	0.00500	0.37118	1.33	0.385-0.6	0.70795
10	Karnataka	1.61857	0.24279	1.37578	1.23821	0.61443	0.43010	0.94568	31.26	0.18-0.74	2.57281
11	Kerala	0.79003	0.13135	0.65868	0.59281	0.14374	0.10062	0.55806	15.28	0.53-0.83	0.87925
12	Madhya Pradesh	5.08892	0.76332	4.32560	3.89298	1.01866	0.71312	3.61248	16.49	0.400	9.73249
13	Maharashtra	3.78673	1.23972	2.54701	2.29231	1.10576	0.77403	1.77298	30.39	0.43-1.28	3.65197
14	Manipur	0.31540	0.04730	0.26810	0.24129	Neg.	Neg.	0.26810	Neg.	0.650	0.36900
15	Meghalaya	0.05397	0.00810	0.04587	0.04128	0.00260	0.00182	0.04405	Neg.	0.650	0.06351
16	Mizoram					Not Assessed					
17	Nagaland	0.07240	0.01090	0.06150	0.05535	Neg.	Neg.	0.06150	Neg.	--	---
18	Orissa	2.00014	0.30002	1.70012	1.53009	0.20447	0.14313	1.55699	8.42	0.34-0.44	4.20258
19	Punjab	1.86550	0.18652	1.67898	1.51109	2.25109	1.57576	0.10322	93.85	0.518	2.91715
20	Rajasthan	1.27076	0.19945	1.07131	0.96418	0.77483	0.54238	0.52893	50.63	0.457-0.6	1.77783
21	Sikkim					Not Assessed					
22	Tamil Nadu	2.63912	0.39586	2.24326	2.01892	1.93683	1.35578	0.88748	60.44	0.37-0.93	2.83205
23	Tripura	0.06634	0.00995	0.05639	0.05076	0.02692	0.01885	0.03754	33.43	0.630	0.08056
24	Uttar Pradesh	8.38210	1.25743	7.12467	6.41233	3.83364	2.68354	4.44113	37.67	0.20-0.50	16.79896
25	West Bengal	2.30923	0.34642	1.96281	1.76653	0.67794	0.47452	1.48829	24.18	0.33-0.75	3.31794
	TOTAL STATES	**43.14769**	**7.07414**	**36.07355**	**32.46621**	**16.42936**	**11.50055**	**24.57300**	**31.88**	**--**	**64.04513**
	UNION TERRITORIES										
1	Andaman & Nicobar					Not Assessed					
2	Chandigarh	0.002966	--	--	--	0.00351	0.002454	0.000512	--	--	---
3	Dadar & N.Haveli	0.004220	0.000633	0.003587	0.00323	0.00065	0.000457	0.003130	12.74	0.640	0.00504
4	Daman & Diu	0.001300	0.000200	0.001100	0.00099	0.00129	0.000900	0.000200	--	--	---
5	NCT Delhi	0.029154	0.017832	--	--	0.01684	0.011800	--	--	--	---
6	Lakshadweep	0.000243	--	--	--	0.00022	0.000155	0.000088	63.79	--	---
7	Pondicherry	0.002877	0.000432	0.002445	0.00220	0.00085	0.000595	0.001850	24.34	--	---
	TOTAL UTs	**0.040760**	**0.019197**	**0.007132**	**0.00642**	**0.02336**	**0.016362**	**0.005780**	**--**	**--**	**0.00504**
	GRAND TOTAL	**43.18850**	**7.093337**	**36.080682**	**32.47264**	**16.45272**	**11.516912**	**24.57878**	**31.92**	**--**	**64.05017**

NOTE

1. Col. 5 = Ground Water Resource - Provision for Domestic, Industrial & Other Uses (Col. 3 - Col. 4).

2. Col. 6 = 90% of Column 5.

2. Col. 7 = Gross draft is the total withdrawal from Ground Water Resource for Irrigation.

3. Col. 8 = 70% of Gross draft (bulk of the losses return back to the Ground Water Reservoir).

4. Col. 9 = Col. 5 - Col. 8 in net terms.

5. Col. 10 = Level of Ground Water Development (Col. 8 / Col. 5) X 100.

6. Col. 12** = Utilisable Ground Water Resource for Irrigation / Weighted Average Delta (Col.6 / Col.11).
(This is 90% of Ultimate Irrigation Potential which was computed as per available ground water resource for irrigation and limiting it as per the land availability.)

Note:- ** Utilisable irrigation potential has been kept as 90 % of the ultimate irrigation potential which is reasonable, in view of the following:-

1. To ensure sustainable development, the level of extraction has to be kept at a level reasonably lower than the ultimate availability.

2. To maintain river ecology, minimum flows have to be ensured by limiting extraction of ground water, which contributes to the lean season flows in the rivers.

ANNEXURE - III(b)

DISTRICT-WISE GROUND WATER RESOURCES AND IRRIGATION POTENTIAL

ANNEXURE-III(b)

GROUND WATER RESOURCE AND IRRIGATION POTENTIAL

ANDHRA PRADESH

Sr. No.	Districts	Total Replenishable Ground Water Resource from (m.ha.m/Yr)	Provision for Domestic, Industrial & Other Uses (m.ha.m/Yr)	Available Ground Water Resource for Irrigation in Net Terms (m.ha.m/Yr)	Utilisable Ground Water Resource for Irrigation in Net Terms (m.ha.m/Yr)	Gross Draft Estimated on Prorata Basis (1993) (m.ha.m/Yr)	Net Draft (1993) (m.ha.m/Yr)	Balance Ground Water Resource for Future Use (m.ha.m/Yr)	Level of Ground Water Develop-ment (%)	Weighted Average Delta (m)	Utilisable Irrigation Potential for Development (m.ha)
1	2	3	4	5	6	7	8	9	10	11	12
1	Srikakulam	0.12643	0.01896	0.10767	0.09672	0.02756	0.01929	0.08818	17.95	0.0475-1.472	0.11697
2	Vijayanagaram	0.11173	0.01676	0.09497	0.08548	0.01783	0.01249	0.08248	13.15	0.097-1.472	0.11360
3	Visakhapatnam	0.11415	0.01712	0.09703	0.08733	0.02185	0.01529	0.08174	15.76	0.097-0.872	0.12142
4	East Godavari	0.20915	0.03137	0.17778	0.16000	0.03370	0.02359	0.15419	13.27	0.147-1.472	0.15645
5	West Godavari	0.23456	0.03518	0.19936	0.17945	0.06755	0.04728	0.15210	23.71	0.147-1.472	0.17367
6	Krishna	0.12348	0.01852	0.10496	0.09447	0.02376	0.01664	0.08832	15.85	0.147-1.472	0.12986
7	Guntur	0.28331	0.04249	0.24082	0.21673	0.02252	0.01576	0.22506	6.54	0.662-0.870	0.16867
8	Prakasam	0.18308	0.02747	0.15561	0.14005	0.03019	0.02113	0.13448	13.58	0.047-0.872	0.19565
9	Nellore	0.30411	0.04562	0.25849	0.23264	0.12004	0.08403	0.17446	32.51	0.072-1.470	0.22607
10	Kurnool	0.11535	0.01731	0.09804	0.08824	0.02457	0.01720	0.08084	17.54	0.097-0.872	0.15086
11	Anantapur	0.12490	0.01874	0.10616	0.09554	0.05589	0.03912	0.06704	36.85	0.047-0.872	0.19868
12	Cuddapah	0.10572	0.01585	0.08987	0.08088	0.04499	0.03148	0.05839	35.03	0.147-1.472	0.18836
13	Chittoor	0.15814	0.02372	0.13442	0.12098	0.06479	0.04535	0.08907	33.74	0.147-1.472	0.25330
14	Rangareddy	0.07191	0.01078	0.06112	0.05501	0.03182	0.02228	0.03884	36.45	0.147-1.472	0.10506
15	Hyderabad										
16	Nizamabad	0.11747	0.01762	0.09985	0.08987	0.05030	0.03520	0.06465	35.25	0.072-1.472	0.15897
17	Medak	0.12918	0.01937	0.10981	0.09883	0.04824	0.03377	0.07604	30.75	0.147-1.472	0.21305
18	Mehaboobnagar	0.14501	0.02175	0.12326	0.11094	0.05864	0.04105	0.08221	33.30	0.097-0.872	0.25203
19	Nalgonda	0.19941	0.02991	0.16950	0.15255	0.06590	0.04613	0.12337	27.22	0.147-0.872	0.21398
20	Warangal	0.16730	0.02509	0.14221	0.12799	0.06883	0.04818	0.09403	33.88	0.097-0.872	0.24052
21	Khammam	0.18847	0.02827	0.16021	0.14418	0.02300	0.01610	0.14410	10.05	0.097-0.872	0.19797
22	Karimnagar	0.18078	0.02712	0.15366	0.13829	0.08952	0.06266	0.09100	40.78	0.147-1.472	0.22296
23	Adilabad	0.13552	0.02033	0.11519	0.10367	0.02173	0.01521	0.09998	13.20	0.097-0.872	0.16195
	TOTAL	3.52916	0.52938	2.99978	2.69982	1.01317	0.70922	2.29056	23.64		3.96008

Note: Utilisable Irrigation potential is limited to the land availability.

GROUND WATER RESOURCE AND IRRIGATION POTENTIAL

ARUNACHAL PRADESH

Sr. No.	Districts	Total Replenishable Ground Water Resource (m.ha.m/Yr)	Provision for Domestic, Industrial & Other Uses (m.ha.m/Yr)	Available Ground Water Resource for Irrigation in Net Terms (m.ha.m/Yr)	Utilisable Ground Water Resource for Irrigation in Net Terms (m.ha.m/Yr)	Gross Draft Estimated on Prorata Basis (1992) (m.ha.m/Yr)	Net Draft (1992) (m.ha.m/Yr)	Balance Ground Water Resource for Future Use (m.ha.m/Yr)	Level of Ground Water Develop-ment (%)	Weighted Average Delta (m)	Utilisable Irrigation Potential for Development (m.ha)
1	2	3	4	5	6	7	8	9	10	11	12
1	Lohit	0.06435	0.00965	0.05470	0.04923	--	--	0.05470	--	--	---
2	Siang	0.07800	0.01170	0.06630	0.05967	--	--	0.06630	--	--	---
3	Tirap	0.00150	0.00023	0.00127	0.00115	--	--	0.00127	--	--	---
	TOTAL	**0.14385**	**0.02158**	**0.12227**	**0.11005**	--	--	**0.12227**	--	--	**0.01800**

GROUND WATER RESOURCE AND IRRIGATION POTENTIAL

ASSAM

Sr. No.	Districts	Total Replenishable Ground Water Resource (m.ha.m/Yr)	Provision for Domestic, Industrial & Other Uses (m.ha.m/Yr)	Available Ground Water Resource for Irrigation in Net Terms (m.ha.m/Yr)	Utilisable Ground Water Resource for Irrigation in Net Terms (m.ha.m/Yr)	Gross Draft Estimated on Prorata Basis (1992) (m.ha.m/Yr)	Net Draft (1992) (m.ha.m/Yr)	Balance Ground Water Resource for Future Use (m.ha.m/Yr)	Level of Ground Water Develop-ment (%)	Weighted Average Delta (m)	Utilisable Irrigation Potential for Development (m.ha)
1	2	3	4	5	6	7	8	9	10	11	12
1	Berpeta	0.11610	0.01741	0.09869	0.08882	0.00801	0.00561	0.09308	5.68	1.28320	0.04309
2	Bongaigaon	0.10860	0.01629	0.09231	0.08308	0.00641	0.00449	0.08782	4.86	1.28320	0.03934
3	Goalpara										
4	Cachar	0.08170	0.01226	0.06944	0.06250	0.00014	0.00010	0.06934	0.14	1.28320	0.02942
5	Darsang	0.14070	0.02111	0.11959	0.10763	0.01039	0.00727	0.11232	6.08	1.28320	0.05137
6	Dhemaji										
7	Lakhimpur	0.28270	0.04241	0.24029	0.21626	0.01073	0.00751	0.23278	3.13	1.28320	0.10187
8	Dibrugarh										
9	Tinsukia	0.34670	0.05201	0.29469	0.26523	0.01237	0.00866	0.28603	2.94	1.28320	0.12515
10	Dhubri	0.13000	0.01950	0.11050	0.09945	0.00910	0.00637	0.10413	5.76	1.28320	0.04705
11	Golaghat										
12	Jorhat	0.32550	0.04882	0.27668	0.24901	0.01099	0.00769	0.26899	2.78	1.28320	0.11799
13	Hailakandi										
14	Karimganj	0.02310	0.00347	0.01963	0.01766	0.00094	0.00066	0.01897	3.36	1.28320	0.00838
15	Kamrup										
16	Nalbari	0.18680	0.02802	0.15878	0.14291	0.01546	0.01082	0.14796	6.81	1.28320	0.06824
17	Karbi-Anglong	0.05847	0.00877	0.04970	0.04474	0.00006	0.00004	0.04966	0.08	1.28320	0.02133
18	Kokrajhar	0.15800	0.02370	0.13430	0.12087	0.00503	0.00352	0.13078	2.62	1.28320	0.05715
19	Morigaon	0.12560	0.01884	0.10676	0.09609	0.02413	0.01689	0.08987	15.82	1.28320	0.04833
20	Nagaon										
21	N.C.Hills	0.06065	0.00909	0.05156	0.04641	0.00003	0.00002	0.05154	0.04	1.28320	0.02195
22	Sibsagar	0.16580	0.02487	0.14093	0.12684	0.00500	0.00350	0.13743	2.48	1.28320	0.06015
23	Sonitpur	0.16150	0.02422	0.13728	0.12356	0.01576	0.01103	0.12625	8.03	1.28320	0.05917
	TOTAL	**2.47191**	**0.37079**	**2.10113**	**1.89102**	**0.13455**	**0.09418**	**2.00695**	**4.48**		**0.90000**

Note : Delta is very high.
Utilisable Irrigation Potential is limited to the area available.

GROUND WATER RESOURCE AND IRRIGATION POTENTIAL

GOA

Sr. No.	Districts	Total Replenishable Ground Water Resource (m.ha.m/Yr)	Provision for Domestic, Industrial & Other Uses (m.ha.m/Yr)	Available Ground Water Resource for Irrigation in Net Terms (m.ha.m/Yr)	Utilisable Ground Water Resource for Irrigation in Net Terms (m.ha.m/Yr)	Gross Draft Estimated on Prorata Basis (1992) (m.ha.m/Yr)	Net Draft (1992) (m.ha.m/Yr)	Balance Ground Water Resource for Future Use (m.ha.m/Yr)	Level of Ground Water Develop-ment (%)	Weighted Average Delta (m)	Utilisable Irrigation Potential for Development (m.ha)
1	2	3	4	5	6	7	8	9	10	11	12
1	North Goa	0.01282	0.00192	0.01090	0.00981	0.00121	0.00085	0.01005	7.80	0.57	0.01721
2	South Goa	0.00900	0.00135	0.00765	0.00689	0.00098	0.00069	0.00696	9.02	0.57	0.01207
	TOTAL	**0.02182**	**0.00327**	**0.01855**	**0.01670**	**0.00219**	**0.00154**	**0.01701**	**8.3**		**0.02928**

GROUND WATER RESOURCE AND IRRIGATION POTENTIAL

BIHAR

Sr. No.	Districts	Total Replenishable Ground Water Resource (m.ha.m/Yr)	Provision for Domestic, Industrial & Other Uses (m.ha.m/Yr)	Available Ground Water Resource for Irrigation in Net Terms (m.ha.m/Yr)	Utilisable Ground Water Resource for Irrigation in Net Terms (m.ha.m/Yr)	Gross Draft Estimated on Prorata Basis (1991) (m.ha.m/Yr)	Net Draft (m.ha.m/Yr)	Balance Ground Water Resource for Future Use (m.ha.m/Yr)	Level of Ground Water Develop-ment (%)	Weighted Average Delta (m)	Utilisable Irrigation Potential for Development (m.ha)
1	2	3	4	5	6	7	8	9	10	11	12
1	Siwan	0.06397	0.00960	0.05437	0.04893	0.02723	0.01906	0.03531	35.06	0.65	0.07528
2	Saran	0.07868	0.01180	0.06688	0.06019	0.02314	0.01620	0.05068	24.22	0.65	0.09260
3	Gopalganj	0.06868	0.01030	0.05838	0.05254	0.01976	0.01383	0.04455	23.69	0.65	0.08083
4	W.Champaran	0.19609	0.02941	0.16668	0.15001	0.02599	0.01819	0.14849	10.91	0.65	0.23078
5	E.Champaran	0.13017	0.01952	0.11065	0.09958	0.04144	0.02901	0.08164	26.22	0.65	0.15320
6	Vaishali	0.06329	0.00949	0.05380	0.04842	0.02920	0.02044	0.03336	37.99	0.65	0.07449
7	Muzaffarpur	0.09983	0.01498	0.08485	0.07636	0.04577	0.03204	0.05281	37.76	0.65	0.11748
8	Sitamarhi	0.06676	0.01001	0.05675	0.05108	0.02989	0.02092	0.03583	36.86	0.65	0.07857
9	Samastipur	0.07863	0.01179	0.06684	0.06016	0.03561	0.02493	0.04191	37.30	0.65	0.09254
10	Dharbhanga	0.06879	0.01032	0.05847	0.05262	0.01709	0.01196	0.04651	20.45	0.65	0.08096
11	Madhubani	0.09304	0.01396	0.07908	0.07117	0.01807	0.01265	0.06643	16.00	0.65	0.10949
12	Begusarai	0.06349	0.00952	0.05397	0.04857	0.03180	0.02226	0.03171	41.25	0.65	0.07472
13	Khagaria	0.04552	0.00683	0.03869	0.03482	0.01479	0.01035	0.02834	26.75	0.65	0.05357
14	Purnia	0.12045	0.01807	0.10238	0.09214	0.01847	0.01293	0.08945	12.63	0.65	0.14176
15	Saharsa	0.10703	0.01606	0.09097	0.08187	0.03966	0.02776	0.06321	30.52	0.65	0.12595
16	Madhepura	0.05469	0.00821	0.04648	0.04183	0.02061	0.01443	0.03205	31.05	0.65	0.06435
17	Katihar	0.08883	0.01332	0.07551	0.06796	0.03024	0.02117	0.05434	28.04	0.65	0.10455
18	Araria	0.12922	0.01938	0.10984	0.09886	0.02021	0.01415	0.09569	12.88	0.65	0.15208
19	Kishanganj	0.08334	0.01250	0.07084	0.06376	0.00896	0.00627	0.06457	8.85	0.65	0.09809
20	Jahanabad	0.04790	0.00718	0.04071	0.03664	0.02113	0.01479	0.02592	36.33	0.65	0.05637

Cont..

1	2	3	4	5	6	7	8	9	10	11	12
21	Bhojpur	0.14549	0.02182	0.12367	0.11130	0.03541	0.02479	0.09888	20.05	0.65	0.17123
22	Rohtas	0.21663	0.03249	0.18414	0.16573	0.03906	0.02734	0.15680	14.85	0.40	0.41432
23	Aurangabad	0.08679	0.01302	0.07377	0.06639	0.01264	0.00885	0.06492	12.00	0.40	0.16598
24	Gaya	0.11619	0.01743	0.09876	0.08888	0.03151	0.02206	0.07670	22.34	0.40	0.22220
25	Patna	0.09548	0.01432	0.08116	0.07305	0.04763	0.03334	0.04782	41.08	0.65	0.11238
26	Nalanda	0.06506	0.00975	0.05531	0.04978	0.01679	0.01175	0.04356	21.25	0.40	0.12445
27	Nawada	0.04810	0.00722	0.04088	0.03679	0.01703	0.01192	0.02896	29.16	0.40	0.09198
28	Munger	0.11485	0.01723	0.09762	0.08786	0.02241	0.01569	0.08193	16.07	0.40	0.21965
29	Bhagalpur	0.16900	0.02535	0.14365	0.12929	0.02220	0.01554	0.12811	10.82	0.40	0.32321
30	Sahebganj	0.02846	0.00427	0.02419	0.02177	0.00401	0.00281	0.02138	11.62	0.40	0.05444
31	Palamu	0.07675	0.01151	0.06524	0.05872	0.00129	0.00090	0.06434	1.38	0.40	0.14679
32	Ranchi	0.05264	0.00790	0.04474	0.04027	0.00126	0.00088	0.04386	1.97	0.40	0.10067
33	Lohardagga	0.01286	0.00193	0.01093	0.00984	0.00113	0.00079	0.01014	7.23	0.40	0.02459
34	Gumla	0.06938	0.01041	0.05897	0.05307	0.00149	0.00104	0.05793	1.76	0.40	0.13267
35	E.Singhbhum	0.02842	0.00426	0.02416	0.02174	0.00231	0.00163	0.02254	6.71	0.40	0.05436
36	W.Singhbhum	0.05610	0.00841	0.04769	0.04292	0.00014	0.00010	0.04759	0.21	0.40	0.10730
37	Hazaribagh	0.07236	0.01085	0.06151	0.05536	0.00127	0.00089	0.06062	1.45	0.40	0.13839
38	Giridih	0.05607	0.00842	0.04766	0.04289	0.00083	0.00058	0.04708	1.22	0.40	0.10723
39	Deoghar	0.01634	0.00245	0.01389	0.01250	0.00157	0.00110	0.01279	7.92	0.40	0.03125
40	Godda	0.01308	0.00196	0.01112	0.01001	0.00084	0.00059	0.01053	5.30	0.40	0.02502
41	Dhanbad	0.02121	0.00318	0.01803	0.01623	0.00040	0.00028	0.01775	1.55	0.40	0.04056
42	Dumka	0.04247	0.00637	0.03610	0.03249	0.00080	0.00056	0.03554	1.55	0.40	0.08122
	TOTAL	3.35213	0.50282	2.84931	2.56439	0.78108	0.54676	2.30255	19.19		4.94763

GROUND WATER RESOURCE AND IRRIGATION POTENTIAL
GUJARAT

Sr. No.	Districts	Total Replenishable Ground Water Resource (m.ha.m/Yr)	Provision for Domestic, Industrial & Other Uses (m.ha.m/Yr)	Available Ground Water Resource for Irrigation in Net Terms (m.ha.m/Yr)	Utilisable Ground Water Resource for Irrigation in Net Terms (m.ha.m/Yr)	Gross Draft Estimated on Prorata Basis (1991) (m.ha.m/Yr)	Net Draft (1991) (m.ha.m/Yr)	Balance Ground Water Resource for Future Use (m.ha.m/Yr)	Level of Ground Water Develop-ment (%)	Weighted Average Delta (m)	Utilisable Irrigation Potential for Development (m.ha)
1	2	3	4	5	6	7	8	9	10	11	12
1	Ahmadabad	0.12542	0.01881	0.10661	0.09595	0.09520	0.06664	0.03997	62.51	0.510	0.18814
2	Amreli	0.08227	0.01234	0.06993	0.06294	0.04604	0.03223	0.03770	46.09	0.450	0.13987
3	Banaskantha	0.14502	0.02176	0.12326	0.11093	0.11201	0.07841	0.04485	63.61	0.520	0.21333
4	Baroda	0.11865	0.01780	0.10085	0.09077	0.05663	0.03964	0.06121	39.31	0.706	0.12657
5	Bhavnagar	0.13297	0.01995	0.11302	0.10172	0.04921	0.03445	0.07857	30.48	0.523	0.19449
6	Bharuch	0.08402	0.01260	0.07142	0.06428	0.02283	0.01598	0.05544	22.37	0.714	0.09004
7	Dang	0.01443	0.00216	0.01227	0.01104	0.00004	0.00003	0.01224	0.24	0.510	0.02165
8	Gandhinagar	0.01228	0.00184	0.01044	0.00940	0.01009	0.00706	0.00338	67.62	0.580	0.01620
9	Jamnagar	0.09936	0.01490	0.08446	0.07601	0.04009	0.02806	0.05640	33.22	0.489	0.15544
10	Junagadh	0.12512	0.01877	0.10635	0.09571	0.07789	0.05452	0.05183	51.26	0.510	0.18767
11	Kheda	0.16026	0.02404	0.13622	0.12260	0.07059	0.04941	0.08681	36.27	0.601	0.20399
12	Kutch	0.08029	0.01205	0.06824	0.06141	0.03466	0.02426	0.04398	35.55	0.616	0.09969
13	Mehsana	0.08643	0.01297	0.07346	0.06611	0.13026	0.09118	-0.01772	124.12	0.650	0.10171
14	Panchmahals	0.11160	0.01674	0.09486	0.08538	0.03729	0.02610	0.06876	27.51	0.564	0.15138
15	Rajkot	0.13617	0.02042	0.11575	0.10417	0.06093	0.04265	0.07310	36.85	0.616	0.16911
16	Sabarkantha	0.12632	0.01895	0.10737	0.09664	0.07571	0.05300	0.05437	49.36	0.580	0.16662
17	Surat	0.19602	0.02941	0.16661	0.14995	0.03384	0.02369	0.14292	14.22	0.564	0.26587
18	Surendranagar	0.08672	0.01301	0.07371	0.06634	0.03820	0.02674	0.04697	36.28	0.626	0.10597
19	Valsad	0.11432	0.01715	0.09717	0.08745	0.03281	0.02297	0.07420	23.64	0.560	0.15616
	TOTAL	**2.03767**	**0.30565**	**1.73202**	**1.55881**	**1.02430**	**0.71702**	**1.01500**	**41.45**		**2.75590**

GROUND WATER RESOURCE AND IRRIGATION POTENTIAL
HARYANA

Sr. No.	Districts	Total Replenishable Ground Water Resource (m.ha.m/Yr)	Provision for Domestic, Industrial & Other Uses (m.ha.m/Yr)	Available Ground Water Resource for Irrigation in Net Terms (m.ha.m/Yr)	Utilisable Ground Water Resource for Irrigation in Net Terms (m.ha.m/Yr)	Gross Draft Estimated on Prorata Basis (1992) (m.ha.m/Yr)	Net Draft (1992) (m.ha.m/Yr)	Balance Ground Water Resource for Future Use (m.ha.m/Yr)	Level of Ground Water Develop-ment (%)	Weighted Average Delta (m)	Utilisable Irrigation Potential for Development (m.ha)
1	2	3	4	5	6	7	8	9	10	11	12
1	Ambala	0.05530	0.00830	0.04700	0.04230	0.04606	0.03224	0.01476	68.60	0.600	0.07050
2	Bhiwani	0.04793	0.00719	0.04074	0.03667	0.02109	0.01476	0.02598	36.23	0.385	0.09524
3	Faridabad	0.03634	0.00546	0.03088	0.02779	0.03210	0.02247	0.00841	72.77	0.385	0.07219
4	Gurgaon	0.04707	0.00706	0.04001	0.03601	0.05329	0.03730	0.00271	93.23	0.385	0.09353
5	Hisar	0.14540	0.02181	0.12359	0.11123	0.05586	0.03910	0.08449	31.64	0.385	0.28891
6	Jind	0.04000	0.00600	0.03400	0.03060	0.03721	0.02605	0.00795	76.62	0.385	0.07948
7	Kaithal	0.05452	0.00818	0.04634	0.04171	0.09211	0.06448	-0.01814	139.15	0.600	0.06951
8	Kurukshetra	0.03116	0.00467	0.02649	0.02384	0.07691	0.05384	-0.02735	203.25	0.600	0.03974
9	Mahendragarh	0.01640	0.00246	0.01394	0.01255	0.03330	0.02331	-0.00937	167.22	0.385	0.03259
10	Panipath	0.04008	0.00601	0.03407	0.03066	0.07081	0.04957	-0.01550	145.49	0.600	0.05111
11	Rewari	0.01926	0.00288	0.01638	0.01474	0.03119	0.02183	-0.00545	133.27	0.385	0.03829
12	Rohtak	0.06283	0.00942	0.05341	0.04807	0.02786	0.01950	0.03391	36.51	0.385	0.12485
13	Sirsa	0.05709	0.00856	0.04852	0.04368	0.02936	0.02055	0.02798	42.34	0.385	0.11345
14	Sonipat	0.05345	0.00802	0.04543	0.04089	0.03743	0.02620	0.01923	57.67	0.385	0.10620
15	Yamunanagar	0.05783	0.00867	0.04916	0.04424	0.06086	0.04260	0.00656	86.66	0.600	0.07374
16	Karnal	0.08810	0.01321	0.07489	0.06740	0.16311	0.11418	-0.03929	152.46	0.600	0.11234
	TOTAL	**0.85276**	**0.12792**	**0.72484**	**0.65236**	**0.86851**	**0.60798**	**0.11686**	**83.88**		**1.46170**

GROUND WATER RESOURCE AND IRRIGATION POTENTIAL
HIMACHAL PRADESH

Sr. No.	Districts	Total Replenishable Ground Water Resource (m.ha.m/Yr)	Provision for Domestic, Industrial & Other Uses (m.ha.m/Yr)	Available Ground Water Resource for Irrigation in Net Terms (m.ha.m/Yr)	Utilisable Ground Water Resource for Irrigation in Net Terms (m.ha.m/Yr)	Gross Draft Estimated on Prorata Basis (1992) (m.ha.m/Yr)	Net Draft (1992) (m.ha.m/Yr)	Balance Ground Water Resource for Future Use (m.ha.m/Yr)	Level of Ground Water Develop-ment (%)	Weighted Average Delta (m)	Utilisable Irrigation Potential for Development (m.ha)
1	2	3	4	5	6	7	8	9	10	11	12
1	Una Valley (Una distt.)	0.00943	0.00188	0.00755	0.00680	0.00377	0.00264	0.00491	34.97	0.385	0.01767
2	Ponta Valley (Sirmour distt.)	0.01130	0.00226	0.00904	0.00814	0.00050	0.00035	0.00869	3.87	0.385	0.02115
3	Nalagarh Valley (Solan distt.)	0.00537	0.00107	0.00430	0.00387	0.00077	0.00054	0.00376	12.56	0.385	0.01005
4	Nurpur Valley (Kangra distt.)	0.00763	0.00152	0.00611	0.00550	0.00194	0.00136	0.00475	22.26	0.385	0.01428
5	Behl Valley (Nandi distt.)	0.00287	0.00058	0.00229	0.00206	0.00054	0.00041	0.00188	17.90	0.385	0.00535
	TOTAL	**0.03660**	**0.00731**	**0.02929**	**0.02637**	**0.00757**	**0.00530**	**0.02399**	**18.10**		**0.06850**

GROUND WATER RESOURCE AND IRRIGATION POTENTIAL
JAMMU & KASHMIR

Sr. No.	Districts	Total Replenishable Ground Water Resource (m.ha.m/Yr)	Provision for Domestic, Industrial & Other Uses (m.ha.m/Yr)	Available Ground Water Resource for Irrigation in Net Terms (m.ha.m/Yr)	Utilisable Ground Water Resource for Irrigation in Net Terms (m.ha.m/Yr)	Gross Draft Estimated on Prorata Basis (1993) (m.ha.m/Yr)	Net Draft (1993) (m.ha.m/Yr)	Balance Ground Water Resource for Future Use (m.ha.m/Yr)	Level of Ground Water Develop-ment (%)	Weighted Average Delta (m)	Utilisable Irrigation Potential for Development (m.ha)
1	2	3	4	5	6	7	8	9	10	11	12
1	Kathua	0.05830	0.00875	0.04955	0.04460	0.00019	0.00013	0.04942	0.26	0.385	0.11585
2	Jammu	0.14346	0.02152	0.12194	0.10975	0.00668	0.00468	0.11726	3.84	0.385	0.28506
3	Srinagar	0.04004	0.00600	0.03404	0.03063	0.00002	0.00002	0.03402	0.06	0.600	0.05105
4	Ananatnag	0.14296	0.02145	0.12151	0.10937	0.00001	0.00001	0.12150	0.01	0.600	0.18228
5	Baramula	0.05781	0.00867	0.04914	0.04423	0.00023	0.00016	0.04898	0.32	0.600	0.07371
	TOTAL	**0.44257**	**0.06639**	**0.37618**	**0.33858**	**0.00713**	**0.00500**	**0.37118**	**1.33**		**0.70795**

GROUND WATER RESOURCE AND IRRIGATION POTENTIAL

KARNATAKA

Sr. No.	Districts	Total Replenishable Ground Water Resource (m.ha.m/Yr)	Provision for Domestic, Industrial & Other Uses (m.ha.m/Yr)	Available Ground Water Resource for Irrigation in Net Terms (m.ha.m/Yr)	Utilisable Ground Water Resource for Irrigation in Net Terms (m.ha.m/Yr)	Gross Draft Estimated on Prorata Basis (1992) (m.ha.m/Yr)	Net Draft (1992) (m.ha.m/Yr)	Balance Ground Water Resource for Future Use (m.ha.m/Yr)	Level of Ground Water Develop-ment (%)	Weighted Average Delta (m)	Utilisable Irrigation Potential for Development (m.ha)
1	2	3	4	5	6	7	8	9	10	11	12
1	Bangalore	0.07635	0.01145	0.06490	0.05841	0.06786	0.04750	0.01740	73.19	0.421	0.13860
2	Belgaum	0.11211	0.01681	0.09531	0.08578	0.05928	0.04150	0.05380	43.54	0.18-0.48	0.20700
3	Bellary	0.07012	0.01052	0.05960	0.05364	0.02071	0.01450	0.04510	24.33	0.400	0.13410
4	Bidar	0.05282	0.00792	0.04490	0.04041	0.01457	0.01020	0.03470	22.72	0.740	0.05461
5	Bijapur	0.11412	0.01712	0.09700	0.08730	0.06028	0.04220	0.05480	43.51	0.400	0.21420
6	Chitradurga	0.07482	0.01122	0.06360	0.05724	0.03957	0.02770	0.03590	43.55	0.393	0.14580
7	Chickmagalur	0.05905	0.00886	0.05019	0.04517	0.00443	0.00310	0.04710	6.18	0.18-0.57	0.10440
8	Dakshina Kannada	0.12447	0.01867	0.10580	0.09522	0.06243	0.04370	0.06210	41.30	0.630	0.07830
9	Dharwad	0.10389	0.01557	0.08831	0.07948	0.02529	0.01770	0.07061	20.04	0.18-0.48	0.18090
10	Gulbarga	0.09812	0.01472	0.08340	0.07506	0.01629	0.01140	0.07200	13.67	0.57-0.74	0.12600
11	Hassan	0.05047	0.00757	0.04290	0.03861	0.00671	0.00470	0.03820	10.96	0.18-0.57	0.08190
12	Kodagu(Coorg)	0.01659	0.00249	0.01410	0.01269	0.00157	0.00110	0.01300	7.80	0.180	0.03600
13	Kolar	0.08036	0.01205	0.06831	0.06148	0.06729	0.04710	0.02121	68.95	0.416	0.14760
14	Mandya	0.07906	0.01186	0.06720	0.06048	0.01114	0.00780	0.05940	11.61	0.463	0.13050
15	Mysore	0.08129	0.01220	0.06909	0.06218	0.02257	0.01580	0.05329	22.87	0.46-0.57	0.12780
16	Raichur	0.10717	0.01608	0.09109	0.08198	0.01900	0.01330	0.07779	14.60	0.40-0.57	0.18180
17	Shimoga	0.14988	0.02248	0.12740	0.11466	0.03729	0.02610	0.10130	20.49	0.18-0.57	0.22500
18	Tumkur	0.08953	0.01343	0.07610	0.06849	0.06257	0.04380	0.03230	57.56	0.39-0.46	0.16740
19	Uttara Kannada	0.07835	0.01176	0.06659	0.05993	0.01557	0.01090	0.05569	16.37	0.18-0.63	0.09090
	TOTAL	1.61857	0.24279	1.37578	1.23821	0.61442	0.43010	0.94568	31.26		2.57281

Note: Utilisable Irrigation Potential is limited to the land availability in some of the districts.

GROUND WATER RESOURCE AND IRRIGATION POTENTIAL

KERALA

Sr. No.	Districts	Total Replenishable Ground Water Resource (m.ha.m/Yr)	Provision for Domestic, Industrial & Other Uses (m.ha.m/Yr)	Available Ground Water Resource for Irrigation in Net Terms (m.ha.m/Yr)	Utilisable Ground Water Resource for Irrigation in Net Terms (m.ha.m/Yr)	Gross Draft Estimated on Prorata Basis (1992) (m.ha.m/Yr)	Net Draft (1992) (m.ha.m/Yr)	Balance Ground Water Resource for Future Use (m.ha.m/Yr)	Level of Ground Water Develop-ment (%)	Weighted Average Delta (m)	Utilisable Irrigation Potential for Development (m.ha)
1	2	3	4	5	6	7	8	9	10	11	12
1	Thiruvananthapuram	0.02996	0.00899	0.02097	0.01887	0.00733	0.00513	0.01584	24.46	0.73	0.02585
2	Quilon	0.04649	0.00929	0.03720	0.03348	0.01013	0.00709	0.03011	19.06	0.71	0.04715
3	Pathanamthitta	0.03739	0.00561	0.03178	0.02860	0.00463	0.00324	0.02854	10.20	0.72	0.03973
4	Alleppey	0.05720	0.00858	0.04862	0.04376	0.00643	0.00450	0.04412	9.26	0.65	0.06731
5	Kottayam	0.04740	0.00711	0.04029	0.03626	0.00581	0.00407	0.03622	10.10	0.69	0.05255
6	Idukki	0.04580	0.00687	0.03893	0.03504	0.00274	0.00192	0.03701	4.93	0.83	0.04221
7	Ernakulam	0.07506	0.01129	0.06380	0.05742	0.01916	0.01341	0.05039	21.00	0.65	0.08834
8	Trichur	0.08352	0.01253	0.07099	0.06389	0.02194	0.01536	0.05563	21.64	0.66	0.09680
9	Palghat	0.08856	0.01328	0.07527	0.06774	0.01123	0.00786	0.06741	10.44	0.53	0.12782
10	Malappuram	0.06856	0.01371	0.05485	0.05211	0.01433	0.01003	0.04482	18.28	0.71	0.06952
11	Calicut	0.05201	0.01040	0.04161	0.03939	0.00761	0.00533	0.03628	12.81	0.75	0.04993
12	Wyanad	0.04246	0.00637	0.03609	0.03249	0.00254	0.00178	0.03431	4.93	0.54	0.06015
13	Cannanore	0.07331	0.01099	0.06232	0.05609	0.01296	0.00907	0.05325	14.55	0.78	0.07191
14	Kasaragod	0.04231	0.00635	0.03596	0.03236	0.01690	0.01183	0.02413	32.90	0.81	0.03996
	TOTAL	**0.79003**	**0.13135**	**0.65868**	**0.59281**	**0.14374**	**0.10062**	**0.55806**	**15.28**		**0.87925**

GROUND WATER RESOURCE AND IRRIGATION POTENTIAL
MADHYA PRADESH

Sr. No.	Districts	Total Replenishable Ground Water Resource (m.ha.m/Yr)	Provision for Domestic, Industrial & Other Uses (m.ha.m/Yr)	Available Ground Water Resource for Irrigation in Net Terms (m.ha.m/Yr)	Utilisable Ground Water Resource for Irrigation in Net Terms (m.ha.m/Yr)	Gross Draft Estimated on Prorata Basis (1990) (m.ha.m/Yr)	Net Draft (1990) (m.ha.m/Yr)	Balance Ground Water Resource for Future Use (m.ha.m/Yr)	Level of Ground Water Develop-ment (%)	Weighted Average Delta (m)	Utilisable Irrigation Potential for Development (m.ha)
1	2	3	4	5	6	7	8	9	10	11	12
1	Balaghat	0.11447	0.01717	0.09730	0.08757	0.01707	0.01195	0.08535	12.28	0.40	0.21892
2	Bastar	0.51974	0.07796	0.44178	0.39760	0.00667	0.00467	0.43711	1.06	0.40	0.99399
3	Betul	0.09653	0.01448	0.08205	0.07384	0.03350	0.02345	0.05860	28.58	0.40	0.18461
4	Bhind	0.08728	0.01309	0.07419	0.06677	0.02126	0.01488	0.05931	20.06	0.40	0.16694
5	Bhopal	0.02715	0.00407	0.02308	0.02077	0.01585	0.01109	0.01199	48.05	0.40	0.05193
6	Bilaspur	0.25126	0.03768	0.21358	0.19221	0.02933	0.02053	0.19305	9.61	0.40	0.48054
7	Chhatarpur	0.10149	0.01523	0.08626	0.07764	0.03666	0.02566	0.06060	29.75	0.40	0.19411
8	Chindwara	0.11112	0.01667	0.09445	0.08500	0.03527	0.02469	0.06976	26.14	0.40	0.21251
9	Damoh	0.04892	0.00734	0.04158	0.03742	0.00878	0.00615	0.03543	14.79	0.40	0.09355
10	Datia	0.02594	0.00389	0.02205	0.01985	0.00584	0.00409	0.01796	18.55	0.40	0.04963
11	Dewas	0.08759	0.01313	0.07446	0.06700	0.03605	0.02523	0.04923	33.88	0.40	0.16750
12	Dhar	0.12089	0.01814	0.10275	0.09248	0.04455	0.03119	0.07156	30.36	0.40	0.23119
13	Durg	0.10678	0.01602	0.09076	0.08169	0.01681	0.01177	0.07899	12.97	0.40	0.20422
14	Guna	0.09418	0.01412	0.08006	0.07205	0.01665	0.01166	0.06840	14.56	0.40	0.18014
15	Gwalior	0.09062	0.01360	0.07702	0.06933	0.01688	0.01182	0.06520	15.35	0.40	0.17332
16	Hoshangabad	0.24334	0.03650	0.20684	0.18615	0.03784	0.02649	0.18035	12.81	0.40	0.46538
17	Indore	0.04874	0.00731	0.04143	0.03729	0.03216	0.02251	0.01892	54.33	0.40	0.09322
18	Jabalpur	0.10072	0.01511	0.08561	0.07705	0.02848	0.01994	0.06567	23.29	0.40	0.19262
19	Jhabua	0.05389	0.00809	0.04580	0.04123	0.00702	0.00492	0.04088	10.74	0.40	0.10307
20	Khandwa	0.09004	0.01350	0.07654	0.06888	0.03480	0.02437	0.05217	31.84	0.40	0.17221
21	Khargone	0.12286	0.01843	0.10443	0.09398	0.04637	0.03246	0.07197	31.08	0.40	0.23496
22	Mandla	0.09041	0.01356	0.07685	0.06916	0.00238	0.00166	0.07519	2.16	0.40	0.17290
23	Mandsaur	0.10408	0.01561	0.08847	0.07962	0.04770	0.03340	0.05507	37.75	0.40	0.19906
24	Morena	0.26895	0.04034	0.22861	0.20574	0.03616	0.02531	0.20330	11.07	0.40	0.51436
25	Narsinghapur	0.10221	0.01533	0.08688	0.07820	0.02579	0.01806	0.06882	20.79	0.40	0.19549

1	2	3	4	5	6	7	8	9	10	11	12
26	Panna	0.03832	0.00575	0.03257	0.02931	0.00778	0.00545	0.02712	16.73	0.40	0.07329
27	Raigarh	0.11252	0.01687	0.09565	0.08608	0.00677	0.00474	0.09091	4.96	0.40	0.21520
28	Raipur	0.29959	0.04494	0.25465	0.22918	0.02338	0.01637	0.23828	6.43	0.40	0.57296
29	Raisen	0.10329	0.01550	0.08779	0.07902	0.01824	0.01277	0.07502	14.55	0.40	0.19754
30	Rajgarh	0.06327	0.00949	0.05378	0.04840	0.03318	0.02323	0.03055	43.19	0.40	0.12100
31	Rajnandgaon	0.11601	0.01740	0.09861	0.08874	0.00490	0.00343	0.09518	3.48	0.40	0.22187
32	Ratlam	0.05393	0.00809	0.04584	0.04126	0.02951	0.02065	0.02519	45.05	0.40	0.10314
33	Rewa	0.05618	0.00842	0.04776	0.04297	0.01184	0.00829	0.03947	17.36	0.40	0.10743
34	Sagar	0.08459	0.01269	0.07190	0.06471	0.02265	0.01586	0.05604	22.06	0.40	0.16178
35	Sarguja	0.20116	0.03017	0.17099	0.15388	0.01163	0.00814	0.16285	4.76	0.40	0.38471
36	Satna	0.09162	0.01375	0.07787	0.07009	0.01534	0.01075	0.06712	13.81	0.40	0.17523
37	Sehore	0.06087	0.00913	0.05174	0.04656	0.02180	0.01525	0.03649	29.47	0.40	0.11641
38	Seoni	0.09902	0.01485	0.08417	0.07575	0.01675	0.01173	0.07244	13.94	0.40	0.18937
39	Shahdol	0.12824	0.01923	0.10901	0.09810	0.00484	0.00339	0.10562	3.11	0.40	0.24525
40	Shajapur	0.04375	0.00656	0.03719	0.03347	0.02416	0.01691	0.02028	45.47	0.40	0.08367
41	Shivpuri	0.08395	0.01260	0.07135	0.06422	0.02367	0.01657	0.05478	23.22	0.40	0.16056
42	Sidhi	0.12022	0.01803	0.10219	0.09197	0.02524	0.01767	0.08452	17.29	0.40	0.22992
43	Tikamgarh	0.07669	0.01150	0.06519	0.05867	0.03984	0.02788	0.03731	42.77	0.40	0.14667
44	Ujjain	0.06548	0.00983	0.05565	0.05009	0.02903	0.02032	0.03533	36.51	0.40	0.12523
45	Vidisha	0.08103	0.01215	0.06888	0.06199	0.00824	0.00577	0.06311	8.38	0.40	0.15497
	TOTAL	5.08892	0.76332	4.32560	3.89298	1.01866	0.71312	3.61248	16.49		9.73249

GROUND WATER RESOURCE AND IRRIGATION POTENTIAL

MAHARASHTRA

Sr. No.	Districts	Total Replenishable Ground Water Resource (m.ha.m/Yr)	Provision for Domestic, Industrial & Other Uses (m.ha.m/Yr)	Available Ground Water Resource for Irrigation in Net Terms (m.ha.m/Yr)	Utilisable Ground Water Resource for Irrigation in Net Terms (m.ha.m/Yr)	Gross Draft Estimated on Prorata Basis (1988) (m.ha.m/Yr)	Net Draft (1988) (m.ha.m/Yr)	Balance Ground Water Resource for Future Use (m.ha.m/Yr)	Level of Ground Water Develop-ment (%)	Weighted Average Delta (m)	Utilisable Irrigation Potential for Development (m.ha)
1	2	3	4	5	6	7	8	9	10	11	12
1	Thane	0.04226	0.01384	0.02842	0.02558	0.00610	0.00427	0.02415	15.02	0.43	0.05949
2	Raigad	0.06056	0.01983	0.04073	0.03667	0.00524	0.00367	0.03706	9.01	0.66	0.05555
3	Ratnagiri	0.06309	0.02065	0.04244	0.03820	0.00457	0.00320	0.03924	7.54	0.81	0.04715
4	Sindhudurga	0.03734	0.01223	0.02511	0.02260	0.00463	0.00324	0.02187	12.90	0.58	0.03898
5	Nasik	0.16554	0.05419	0.11135	0.10022	0.08084	0.05659	0.05476	50.82	1.04	0.09636
6	Jalgaon	0.14368	0.04704	0.09664	0.08698	0.07717	0.05402	0.04262	55.90	0.68	0.12791
7	Dhule	0.13985	0.04578	0.09407	0.08466	0.05644	0.03951	0.05456	42.00	0.94	0.09006
8	Ahmednagar	0.17592	0.05759	0.11833	0.10650	0.11361	0.07953	0.03880	67.21	1.28	0.08320
9	Pune	0.18240	0.05972	0.12268	0.11041	0.07046	0.04932	0.07336	40.20	0.68	0.16238
10	Solapur	0.18209	0.05961	0.12248	0.11023	0.07203	0.05042	0.07206	41.17	0.62	0.17779
11	Kolhapur	0.14399	0.04714	0.09685	0.08717	0.04517	0.03162	0.06523	32.65	0.56	0.15565
12	Sangli	0.11488	0.03761	0.07727	0.06954	0.05431	0.03802	0.03925	49.20	0.52	0.13374
13	Satara	0.13607	0.04455	0.09152	0.08237	0.06150	0.04305	0.04847	47.03	1.07	0.07698
14	Aurangabad	0.11986	0.03924	0.08062	0.07256	0.05050	0.03535	0.04527	43.85	0.45	0.16123
15	Jalna	0.14050	0.04600	0.09450	0.08505	0.02814	0.01970	0.07480	20.85	0.53	0.16048
16	Parbhani	0.21156	0.06926	0.14230	0.12807	0.03870	0.02719	0.11521	19.04	0.56	0.22870
17	Beed	0.15572	0.05098	0.10474	0.09427	0.02870	0.02009	0.08465	19.18	0.67	0.14070
18	Nanded	0.19984	0.06543	0.13441	0.12097	0.02999	0.02099	0.11342	15.62	0.96	0.12602
19	Usmanabad	0.12225	0.04002	0.08223	0.07401	0.03720	0.02604	0.05619	31.67	0.47	0.15746
20	Latur	0.10969	0.03591	0.07378	0.06640	0.02381	0.01667	0.05711	22.59	0.47	0.14129
21	Amravati	0.13119	0.04295	0.08824	0.07942	0.03999	0.02799	0.06025	31.72	0.67	0.11853
22	Yeotmal	0.14677	0.04805	0.09872	0.08885	0.01836	0.01285	0.08587	13.02	0.72	0.12340
23	Buldana	0.13805	0.04519	0.09286	0.08357	0.03634	0.02544	0.06742	27.40	0.36	0.23213
24	Akola	0.17499	0.05729	0.11770	0.10593	0.02430	0.01701	0.10069	14.45	0.70	0.15133
25	Nagpur	0.17443	0.05710	0.11733	0.10560	0.03910	0.02737	0.08996	23.33	0.80	0.13199
26	Bhandara	0.10048	0.03290	0.06758	0.06082	0.01764	0.01235	0.05523	18.27	0.45	0.13517
27	Wardha	0.08360	0.02737	0.05623	0.05061	0.02314	0.01620	0.04003	28.81	0.45	0.11247
28	Chandrapur	0.13327	0.04363	0.08964	0.08068	0.00896	0.00627	0.08337	6.99	0.54	0.14940
29	Gadchiroli	0.05686	0.01862	0.03824	0.03442	0.00880	0.00616	0.03208	16.11	0.45	0.07649
	TOTAL	3.78673	1.23972	2.54701	2.29231	1.10576	0.77403	1.77298	30.39		3.65197

GROUND WATER RESOURCE AND IRRIGATION POTENTIAL
MEGHALAYA

Sr. No.	Districts	Total Replenishable Ground Water Resource (m.ha.m/Yr)	Provision for Domestic, Industrial & Other Uses (m.ha.m/Yr)	Available Ground Water Resource for Irrigation in Net Terms (m.ha.m/Yr)	Utilisable Ground Water Resource for Irrigation in Net Terms (m.ha.m/Yr)	Gross Draft Estimated on Prorata Basis (1993) (m.ha.m/Yr)	Net Draft (1993) (m.ha.m/Yr)	Balance Ground Water Resource for Future Use (m.ha.m/Yr)	Level of Ground Water Development (%)	Weighted Average Delta (m)	Utilisable Irrigation Potential for Development (m.ha)
1	2	3	4	5	6	7	8	9	10	11	12
1	West Khasi Hills	0.00824	0.00124	0.00700	0.00630	Neg.	Neg.	0.00700		0.65	0.00969
2	East Khasi Hills & Ri-Bhoi	0.00730	0.00110	0.00620	0.00558	Neg.	Neg.	0.00620	Neg.	0.65	0.00859
3	East Garo Hills	0.00652	0.00098	0.00554	0.00499	Neg.	Neg.	0.00554	Neg.	0.65	0.00767
4	West Garo Hills	0.01062	0.00159	0.00903	0.00812	Neg.	Neg.	0.00903	Neg.	0.65	0.01250
5	South Garo Hills	0.02129	0.00319	0.01810	0.01629	0.00260	0.00182	0.01628	Neg.	0.65	0.02506
	TOTAL	**0.05397**	**0.00810**	**0.04587**	**0.04128**	**0.00260**	**0.00182**	**0.04405**	**Neg.**		**0.06351**

GROUND WATER RESOURCE AND IRRIGATION POTENTIAL

ORISSA

Sr. No.	Districts	Total Replenishable Ground Water Resource (m.ha.m/Yr)	Provision for Domestic, Industrial & Other Uses (m.ha.m/Yr)	Available Ground Water Resource for Irrigation in Net Terms (m.ha.m/Yr)	Utilisable Ground Water Resource for Irrigation in Net Terms (m.ha.m/Yr)	Gross Draft Estimated on Prorata Basis (1992) (m.ha.m/Yr)	Net Draft (1992) (m.ha.m/Yr)	Balance Ground Water Resource for Future Use (m.ha.m/Yr)	Level of Ground Water Develop-ment (%)	Weighted Average Delta (m)	Utilisable Irrigation Potential for Development (m.ha)
1	2	3	4	5	6	7	8	9	10	11	12
1	Angul	0.07863	0.01179	0.06684	0.06015	0.00701	0.00490	0.06194	7.33	0.340	0.17693
2	Balasore	0.09880	0.01482	0.08398	0.07558	0.03992	0.02794	0.05604	33.27	0.440	0.17178
3	Bargarh	0.12203	0.01831	0.10372	0.09335	0.00443	0.00310	0.10062	2.99	0.340	0.27455
4	Bhadrak	0.05985	0.00898	0.05087	0.04578	0.01054	0.00738	0.04349	14.51	0.440	0.10405
5	Bolangir	0.07776	0.01166	0.06610	0.05949	0.00919	0.00643	0.05967	9.73	0.340	0.17494
6	Cuttack	0.06736	0.01010	0.05726	0.05153	0.00655	0.00458	0.05268	8.00	0.390	0.13214
7	Dhenkanal	0.05481	0.00823	0.04659	0.04193	0.00383	0.00268	0.04391	5.75	0.340	0.12330
8	Gajpati	0.02092	0.00314	0.01778	0.01600	0.00342	0.00239	0.01539	13.44	0.360	0.04445
9	Ganjam	0.12070	0.01810	0.10260	0.09234	0.02186	0.01530	0.08730	14.91	0.370	0.24957
10	Jagatsinghpur	0.05826	0.00874	0.04952	0.04456	0.00728	0.00510	0.04442	10.30	0.440	0.10129
11	Jajpur	0.07258	0.01089	0.06169	0.05552	0.01284	0.00899	0.05270	14.57	0.430	0.12912
12	Kalahandi	0.05824	0.00874	0.04951	0.04456	0.00633	0.00443	0.04508	8.95	0.340	0.13106
13	Keonjhar	0.10734	0.01610	0.09124	0.08213	0.00757	0.00530	0.08594	5.81	0.350	0.23462
14	Kundrapara	0.00551	0.00083	0.00468	0.00421	0.00167	0.00117	0.00351	25.00	0.440	0.00957
15	Khurda	0.07388	0.01108	0.06280	0.05652	0.00533	0.00373	0.05907	5.94	0.350	0.16149
16	Koraput	0.08429	0.01264	0.07165	0.06448	0.00190	0.00133	0.07032	1.86	0.340	0.18964
17	Malkangiri	0.05965	0.00895	0.05070	0.04563	0.00051	0.00036	0.05034	0.71	0.340	0.13421
18	Mayurbhanj	0.13545	0.02032	0.11513	0.10363	0.00922	0.00646	0.10867	5.61	0.390	0.26568
19	Nawapara	0.02545	0.00381	0.02163	0.01947	0.00438	0.00308	0.01855	14.23	0.340	0.05728
20	Nawrangpur	0.05364	0.00804	0.04560	0.04104	0.00292	0.00204	0.04356	4.47	0.340	0.12068
21	Nayagarh	0.05368	0.00805	0.04562	0.04106	0.00588	0.00412	0.04150	9.03	0.350	0.11733
22	Phulbani	0.12171	0.01826	0.10344	0.09310	0.00592	0.00414	0.09930	4.00	0.340	0.27384
23	Puri	0.04734	0.00710	0.04024	0.03621	0.00536	0.00375	0.03649	9.32	0.430	0.08422
24	Rayagada	0.06822	0.01023	0.05799	0.05219	0.00416	0.00292	0.05507	5.04	0.420	0.12424
25	Sambalpur	0.13392	0.02009	0.11383	0.10245	0.00821	0.00575	0.10808	5.05	0.340	0.30131
26	Sonepur	0.04669	0.00701	0.03968	0.03571	0.00151	0.00105	0.03863	2.65	0.340	0.10506
27	Sundargarh	0.09343	0.01402	0.07941	0.07147	0.00673	0.00471	0.07470	5.93	0.340	0.21023
	TOTAL	2.00014	0.30002	1.70012	1.53009	0.20447	0.14313	1.55699	8.42		4.20258

GROUND WATER RESOURCE AND IRRIGATION POTENTIAL
PUNJAB

Sr. No.	Districts	Total Replenishable Ground Water Resource (m.ha.m/Yr)	Provision for Domestic, Industrial & Other Uses (m.ha.m/Yr)	Available Ground Water Resource for Irrigation in Net Terms (m.ha.m/Yr)	Utilisable Ground Water Resource for Irrigation in Net Terms (m.ha.m/Yr)	Gross Draft Estimated on Prorata Basis (1992) (m.ha.m/Yr)	Net Draft (1992) (m.ha.m/Yr)	Balance Ground Water Resource for Future Use (m.ha.m/Yr)	Level of Ground Water Develop-ment (%)	Weighted Average Delta (m)	Utilisable Irrigation Potential for Development (m.ha)
1	2	3	4	5	6	7	8	9	10	11	12
1	Amritsar	0.18383	0.01838	0.16545	0.14891	0.25179	0.17625	-0.01080	106.53	0.518	0.28746
2	Jalandhar	0.09908	0.00990	0.08918	0.08026	0.22626	0.15838	-0.06920	177.60	0.518	0.15495
3	Kapurthala	0.03417	0.00341	0.03076	0.02768	0.11394	0.07976	-0.04900	259.30	0.518	0.05344
4	Ludhiana	0.18676	0.01868	0.16808	0.15127	0.29573	0.20701	-0.03893	123.16	0.518	0.29203
5	Rupnagar	0.06293	0.00629	0.05664	0.05098	0.04023	0.02816	0.02848	49.72	0.518	0.09841
6	Patiala	0.14935	0.01494	0.13441	0.12097	0.26454	0.18518	-0.05077	137.77	0.518	0.23353
7	Hoshiarpur	0.11183	0.01118	0.10065	0.09059	0.06663	0.04664	0.05401	46.34	0.518	0.17487
8	Bhatinda	0.16195	0.01619	0.14576	0.13118	0.08980	0.06286	0.08290	43.13	0.518	0.25325
9	Ferozepur	0.29579	0.02958	0.26621	0.23959	0.24467	0.17127	0.09494	64.34	0.518	0.46253
10	Faridkot	0.24828	0.02482	0.22346	0.20111	0.20739	0.14517	0.07829	64.96	0.518	0.38825
11	Sangrur	0.15424	0.01542	0.13882	0.12494	0.29701	0.20791	-0.06909	149.77	0.518	0.24119
12	Gurdaspur	0.17729	0.01773	0.15956	0.14361	0.15310	0.10717	0.05239	67.17	0.518	0.27723
	TOTAL	**1.86550**	**0.18652**	**1.67898**	**1.51109**	**2.26109**	**1.57576**	**0.10322**	**93.85**		**2.91715**

GROUND WATER RESOURCE AND IRRIGATION POTENTIAL
RAJASTHAN

Sr. No.	Districts	Total Replenishable Ground Water Resource (m.ha.m/Yr)	Provision for Domestic, Industrial & Other Uses (m.ha.m/Yr)	Available Ground Water Resource for Irrigation in Net Terms (m.ha.m/Yr)	Utilisable Ground Water Resource for Irrigation in Net Terms (m.ha.m/Yr)	Gross Draft Estimated on Prorata Basis (1990) (m.ha.m/Yr)	Net Draft (1990) (m.ha.m/Yr)	Balance Ground Water Resource for Future Use (m.ha.m/Yr)	Level of Ground Water Develop-ment (%)	Weighted Average Delta (m)	Utilisable Irrigation Potential for Development (m.ha)
1	2	3	4	5	6	7	8	9	10	11	12
1	Ajmer	0.02706	0.00419	0.02287	0.02058	0.02379	0.01665	0.00622	72.80	0.557	0.03694
2	Alwar	0.07205	0.01081	0.06124	0.05512	0.09246	0.05472	-0.00348	105.68	0.557	0.09893
3	Banswara	0.04142	0.00621	0.03521	0.03169	0.00670	0.00469	0.03052	13.32	0.557	0.05688
4	Barmer	0.03075	0.00557	0.02518	0.02266	0.00930	0.00651	0.01867	25.85	0.600	0.03777
5	Bharatpur	0.05191	0.00778	0.04413	0.03972	0.04546	0.03182	0.01231	72.11	0.557	0.07129
6	Bhilwara	0.06413	0.00962	0.05451	0.04906	0.03519	0.02463	0.02988	45.18	0.557	0.08805
7	Bikaner	0.01465	0.00238	0.01227	0.01104	0.00000	0.00000	0.01227	0.00	0.600	0.01841
8	Bundi	0.06896	0.01034	0.05862	0.05276	0.01150	0.00805	0.05057	13.73	0.457	0.11541
9	Chittorgarh	0.06227	0.00934	0.05293	0.04764	0.04353	0.03047	0.02246	57.57	0.557	0.08550
10	Churu	0.01526	0.00306	0.01220	0.01098	0.00054	0.00038	0.01182	3.11	0.600	0.01830
11	Dholpur	0.02471	0.00371	0.02100	0.01890	0.02326	0.01628	0.00472	77.52	0.600	0.03150
12	Dungarpur	0.01940	0.00291	0.01649	0.01484	0.00636	0.00445	0.01204	26.99	0.557	0.02664
13	Jaipur	0.09565	0.01690	0.07875	0.07088	0.10419	0.07293	0.00582	92.61	0.600	0.11813
14	Jaisalmer	0.01019	0.00155	0.00864	0.00778	0.00007	0.00005	0.00859	0.58	0.600	0.01296
15	Jalore	0.02947	0.00461	0.02486	0.02237	0.05057	0.03540	-0.01054	142.40	0.600	0.03729
16	Jhalawar	0.04002	0.00600	0.03402	0.03062	0.03121	0.02185	0.01217	64.23	0.457	0.06698
17	Jhunjhunu	0.02157	0.00432	0.01725	0.01552	0.02181	0.01527	0.00198	88.52	0.600	0.02588
18	Jodhpur	0.03182	0.00682	0.02500	0.02250	0.02831	0.01982	0.00518	79.28	0.600	0.03750
19	Kota	0.15660	0.02356	0.13304	0.11974	0.01849	0.01294	0.12010	9.73	0.457	0.26192
20	Nagaur	0.05783	0.00940	0.04843	0.04359	0.02369	0.01658	0.03185	34.23	0.557	0.07823
21	Pali	0.04296	0.00644	0.03652	0.03287	0.02554	0.01788	0.01864	48.96	0.557	0.05898
22	Sawai Madhopur	0.06640	0.01000	0.05640	0.05076	0.04701	0.03291	0.02349	58.35	0.557	0.09111
23	Sikar	0.03360	0.00509	0.02851	0.02566	0.03386	0.02370	0.00481	83.13	0.600	0.04277
24	Sirohi	0.02224	0.00334	0.01890	0.01701	0.01684	0.01179	0.00711	62.38	0.557	0.03053
25	Tonk	0.04102	0.00617	0.03485	0.03137	0.02159	0.01511	0.01974	43.36	0.557	0.05630
26	Udaipur	0.09587	0.01438	0.08149	0.07334	0.04071	0.02850	0.05299	34.96	0.557	0.13164
27	Sri Ganganagar	0.03294	0.00494	0.02800	0.02520	0.01286	0.00900	0.01900	32.14	0.600	0.04200
	TOTAL	1.27076	0.19945	1.07131	0.96418	0.77483	0.54238	0.52893	50.63		1.77783

GROUND WATER RESOURCE AND IRRIGATION POTENTIAL
TAMIL NADU

Sr. No.	Districts	Total Replenishable Ground Water Resource (m.ha.m/Yr)	Provision for Domestic, Industrial & Other Uses (m.ha.m/Yr)	Available Ground Water Resource for Irrigation in Net Terms (m.ha.m/Yr)	Utilisable Ground Water Resource for Irrigation in Net Terms (m.ha.m/Yr)	Gross Draft Estimated on Prorata Basis (1992) (m.ha.m/Yr)	Net Draft (1992) (m.ha.m/Yr)	Balance Ground Water Resource for Future Use (m.ha.m/Yr)	Level of Ground Water Develop-ment (%)	Weighted Average Delta (m)	Utilisable Irrigation Potential for Development (m.ha)
1	2	3	4	5	6	7	8	9	10	11	12
1	Chengai-MGR	0.21522	0.03228	0.18294	0.16464	0.15958	0.11170	0.07124	61.06	0.758	0.21718
2	N.Arcot Ambedkar	0.15038	0.02255	0.12783	0.11504	0.13440	0.09407	0.03376	73.59	0.871	0.13208
3	Thiruvannamalai-Sambuvaryar	0.20035	0.03005	0.17030	0.15327	0.13171	0.09220	0.07810	54.14	0.832	0.18419
4	South Arcot	0.42181	0.06327	0.35854	0.32268	0.37268	0.26088	0.09766	72.76	0.709	0.45500
5	Dharmapuri	0.11547	0.01732	0.09815	0.08834	0.09263	0.06485	0.03330	66.07	0.719	0.12281
6	Salem	0.17367	0.02605	0.14762	0.13286	0.17645	0.12351	0.02411	83.67	0.599	0.22177
7	Coimbatore	0.09415	0.01412	0.08003	0.07203	0.09930	0.06951	0.01052	86.85	0.467	0.15440
8	Periyar	0.12328	0.01849	0.10479	0.09430	0.12920	0.09045	0.01434	86.32	0.561	0.16808
9	Thiruchirappalli	0.22280	0.03342	0.18938	0.17045	0.14066	0.09846	0.09092	51.99	0.731	0.23323
10	Thanjavur	0.16316	0.02447	0.13869	0.12482	0.08298	0.05809	0.08060	41.88	0.900	0.13863
11	Nagapattinam-Quid-e-Milleth	0.05906	0.00886	0.05020	0.04517	0.07147	0.05003	0.00017	99.66	0.789	0.05725
12	Madurai	0.13200	0.01980	0.11220	0.10098	0.08534	0.05974	0.05246	53.24	0.662	0.15261
13	Dindugul Anna	0.09278	0.01392	0.07886	0.07098	0.06846	0.04792	0.03094	60.77	0.652	0.10892
14	Pudikkottai	0.11810	0.01771	0.10039	0.09035	0.03358	0.02350	0.07689	23.41	0.934	0.09671
15	Nilgiris	0.00580	0.00087	0.00493	0.00444	0.00023	0.00016	0.00477	3.25	0.371	0.01197
16	Ramanathapuram	0.02261	0.00339	0.01922	0.01729	0.00201	0.00141	0.01781	7.34	0.731	0.02366
17	P.M.Ramalingam Thevar	0.07536	0.01131	0.06405	0.05765	0.01148	0.00804	0.05601	12.55	0.785	0.07343
18	Kamarajar	0.08059	0.01209	0.06850	0.06165	0.04683	0.03277	0.03573	47.84	0.769	0.08014
19	Thirunelvali-Katt.	0.11837	0.01776	0.10061	0.09055	0.07764	0.05435	0.04626	54.02	0.633	0.14307
20	V.O.Chidambaranar	0.02837	0.00426	0.02411	0.02170	0.01800	0.01260	0.01151	52.26	0.662	0.03276
21	Kanyakumari	0.02579	0.00387	0.02192	0.01973	0.00220	0.00154	0.02038	7.03	0.817	0.02416
	TOTAL	2.63912	0.39586	2.24326	2.01892	1.93683	1.35578	0.88748	60.44		2.83205

GROUND WATER RESOURCE AND IRRIGATION POTENTIAL
TRIPURA

Sr. No.	Districts	Total Replenishable Ground Water Resource (m.ha.m/Yr)	Provision for Domestic, Industrial & Other Uses (m.ha.m/Yr)	Available Ground Water Resource for Irrigation in Net Terms (m.ha.m/Yr)	Utilisable Ground Water Resource for Irrigation in Net Terms (m.ha.m/Yr)	Gross Draft Estimated on Prorata Basis (1992) (m.ha.m/Yr)	Net Draft (1992) (m.ha.m/Yr)	Balance Ground Water Resource for Future Use (m.ha.m/Yr)	Level of Ground Water Develop-ment (%)	Weighted Average Delta (m)	Utilisable Irrigation Potential for Development (m.ha)
1	2	3	4	5	6	7	8	9	10	11	12
1	North Tripura	0.01894	0.00284	0.01610	0.01449	0.00397	0.00278	0.01332	17.27	0.63	0.02300
2	South Tripura	0.02145	0.00322	0.01823	0.01641	0.00727	0.00509	0.01314	27.92	0.63	0.02604
3	West Tripura	0.02595	0.00389	0.02206	0.01986	0.01568	0.01098	0.01108	49.77	0.63	0.03151
	TOTAL	**0.06634**	**0.00995**	**0.05639**	**0.05076**	**0.02692**	**0.01885**	**0.03754**	**33.43**		**0.08056**

GROUND WATER RESOURCE AND IRRIGATION POTENTIAL

UTTAR PRADESH

Sr. No.	Districts	Total Replen-ishable Ground Water Resource (m.ha.m/Yr)	Provision for Domestic, Industrial & Other Uses (m.ha.m/Yr)	Available Ground Water Resource for Irrigation in Net Terms (m.ha.m/Yr)	Utilisable Ground Water Resource for Irrigation in Net Terms (m.ha.m/Yr)	Gross Draft Estimated on Prorata Basis (1991) (m.ha.m/Yr)	Net Draft (1991) (m.ha.m/Yr)	Balance Ground Water Resource for Future Use (m.ha.m/Yr)	Level of Ground Water Develop-ment (%)	Weighted Average Delta in Practice (m)	Weighted Average Delta for Balance Potential (m)	Utilisable Irrigation Potential for Development (m.ha)
1	2	3	4	5	6	7	8	9	10	11	12	13
1	Agra	0.10251	0.01538	0.08713	0.07842	0.06898	0.04828	0.03885	55.41	0.206	0.50	0.37187
2	Aligarh	0.18921	0.02838	0.16083	0.14474	0.10221	0.07154	0.08929	44.48	0.261	0.50	0.51381
3	Allahabad	0.18493	0.02774	0.15719	0.14147	0.07096	0.04967	0.10752	31.60	0.380	0.50	0.36159
4	Azamgarh	0.16370	0.02455	0.13915	0.12523	0.08870	0.06210	0.07705	44.63	0.480	0.50	0.30494
5	Budaun	0.13498	0.02025	0.11473	0.10326	0.09597	0.06718	0.04755	58.55	0.339	0.50	0.34076
6	Bahraich	0.24738	0.03711	0.21027	0.18924	0.08016	0.05611	0.15416	26.68	0.353	0.50	0.48209
7	Ballia	0.13680	0.02052	0.11628	0.10465	0.05509	0.03856	0.07772	33.16	0.419	0.50	0.25827
8	Banda	0.11537	0.01731	0.09806	0.08826	0.02683	0.01878	0.07928	19.15	0.276	0.50	0.23025
9	Bara Banki	0.24495	0.03675	0.20820	0.18739	0.10426	0.07298	0.13522	35.05	0.433	0.50	0.45991
10	Baraelli	0.18509	0.02777	0.15732	0.14160	0.07365	0.05156	0.10576	32.77	0.482	0.50	0.32789
11	Basti	0.17822	0.02673	0.15149	0.13634	0.09450	0.06615	0.08534	43.67	0.482	0.50	0.33006
12	Bijnor	0.14426	0.02164	0.12262	0.11036	0.09581	0.06707	0.05555	54.70	0.633	0.50	0.23629
13	Bulandshar	0.16034	0.02405	0.13629	0.12266	0.11987	0.08391	0.05238	61.57	0.298	0.50	0.45631
14	Dehradun	0.06101	0.00915	0.05186	0.04668	0.00203	0.00142	0.05044	2.74	0.344	0.50	0.09609
15	Deoria	0.26621	0.03993	0.22628	0.20365	0.10371	0.07260	0.15368	32.08	0.517	0.50	0.45706
16	Etah	0.16168	0.02425	0.13743	0.12369	0.05378	0.03764	0.09979	27.39	0.312	0.50	0.33488
17	Etawah	0.12630	0.01895	0.10735	0.09661	0.05076	0.03554	0.07181	33.11	0.323	0.50	0.27089
18	Faizabad	0.17868	0.02681	0.15187	0.13669	0.09207	0.06445	0.08742	42.44	0.467	0.50	0.33480
19	Farrukhabad	0.10659	0.01599	0.09060	0.08155	0.06934	0.04854	0.04206	53.58	0.318	0.50	0.27202
20	Fatehpur	0.12879	0.01932	0.10947	0.09852	0.05855	0.04098	0.06849	37.43	0.347	0.50	0.27508
21	Firozabad	0.07107	0.01066	0.06041	0.05437	0.04829	0.03380	0.02661	55.95	0.267	0.50	0.21083
22	Ghaziabad	0.13726	0.02058	0.11668	0.10500	0.06888	0.04822	0.06846	41.33	0.400	0.50	0.27817
23	Ghazipur	0.14320	0.02148	0.12172	0.10955	0.06474	0.04532	0.07640	37.23	0.435	0.50	0.27152
24	Gonda	0.28635	0.04296	0.24339	0.21906	0.11612	0.08128	0.16211	33.39	0.383	0.50	0.56439
25	Gorakhpur	0.14860	0.02229	0.12631	0.11368	0.07793	0.05455	0.07176	43.19	0.409	0.50	0.30073

1	2	3	4	5	6	7	8	9	10	11	12	13
26	Hamirpur	0.10004	0.01501	0.08503	0.07654	0.02444	0.01711	0.06792	20.12	0.208	0.50	0.22808
27	Hardoi	0.21729	0.03259	0.18470	0.16622	0.07324	0.05127	0.13343	27.76	0.337	0.50	0.43560
28	Haridwar	0.09746	0.01462	0.08284	0.07456	0.03363	0.02354	0.05930	28.42	0.549	0.50	0.16187
29	Jalaun	0.09061	0.01359	0.07702	0.06932	0.01288	0.00902	0.06800	11.71	0.203	0.50	0.17950
30	Jaunpur	0.14129	0.02120	0.12009	0.10809	0.10231	0.07161	0.04848	59.63	0.412	0.50	0.31080
31	Jhansi	0.05991	0.00899	0.05092	0.04583	0.03088	0.02162	0.02930	42.46	0.224	0.50	0.17711
32	Kanpur City	0.02114	0.00317	0.01797	0.01617	0.00940	0.00658	0.01139	35.62	0.313	0.50	0.04752
33	Kanpur Dehat	0.13486	0.02023	0.11463	0.10317	0.04620	0.03234	0.08229	28.21	0.300	0.50	0.28673
34	Kheri	0.27540	0.04132	0.23408	0.21068	0.13353	0.09347	0.14061	39.93	0.509	0.50	0.48922
35	Lalitpur	0.04894	0.00735	0.04169	0.03744	0.02721	0.01905	0.02254	45.80	0.235	0.50	0.14502
36	Lucknow	0.08831	0.01325	0.07506	0.06756	0.03595	0.02516	0.04990	33.52	0.388	0.50	0.17315
37	Maharajganj	0.16819	0.02523	0.14296	0.12866	0.04190	0.02933	0.11363	20.52	0.506	0.50	0.27908
38	Mainpuri	0.12303	0.01845	0.10458	0.09411	0.04852	0.03396	0.07062	32.47	0.318	0.50	0.26464
39	Mathura	0.09295	0.01395	0.07900	0.07111	0.06099	0.04269	0.03631	54.04	0.290	0.50	0.25484
40	Maunath Bhanjan	0.06313	0.00947	0.05366	0.04830	0.03097	0.02168	0.03198	40.40	0.491	0.50	0.11438
41	Meerut	0.17784	0.02668	0.15116	0.13605	0.10505	0.07353	0.07763	48.64	0.536	0.50	0.31598
42	Mirzapur	0.09393	0.01408	0.07985	0.07185	0.01572	0.01100	0.06885	13.78	0.365	0.50	0.16264
43	Moradabad	0.18500	0.02776	0.15724	0.14153	0.14186	0.09931	0.05793	63.16	0.476	0.50	0.37231
44	Muzaffarnagar	0.23805	0.03571	0.20234	0.18210	0.11673	0.08171	0.12063	40.38	0.597	0.50	0.39314
45	Nainital	0.11120	0.01668	0.09452	0.08507	0.03612	0.02528	0.06924	26.75	0.507	0.50	0.18875
46	Pilibhit	0.18079	0.02712	0.15367	0.13830	0.06431	0.04501	0.10866	29.29	0.529	0.50	0.30496
47	Pratapgarh	0.13004	0.01951	0.11053	0.09949	0.05308	0.03716	0.07337	33.62	0.414	0.50	0.24742
48	Rae Bareli	0.18785	0.02818	0.15967	0.14370	0.05387	0.03771	0.12196	23.62	0.406	0.50	0.33894
49	Rampur	0.11221	0.01683	0.09538	0.08584	0.05550	0.03885	0.05653	40.73	0.489	0.50	0.20386
50	Saharanpur	0.16210	0.02432	0.13778	0.12400	0.11503	0.08052	0.05726	58.44	0.522	0.50	0.30152
51	Shahjahanpur	0.16958	0.02544	0.14414	0.12974	0.09222	0.06455	0.07959	44.78	0.445	0.50	0.32998
52	Sidharthnagar	0.12155	0.01824	0.10331	0.09299	0.04595	0.03217	0.07114	31.14	0.469	0.50	0.21634
53	Sitapur	0.21974	0.03297	0.18677	0.16810	0.09445	0.06612	0.12065	35.40	0.449	0.50	0.40652
54	Sonbhadra	0.07813	0.01172	0.06641	0.05977	0.00730	0.00511	0.06130	7.69	0.300	0.50	0.13225
55	Sultanpur	0.18077	0.02712	0.15365	0.13829	0.09019	0.06314	0.09051	41.09	0.444	0.50	0.34567
56	Unnao	0.15658	0.02349	0.13309	0.11978	0.08041	0.05629	0.07680	42.29	0.350	0.50	0.34484
57	Varanasi	0.15071	0.02261	0.12810	0.11530	0.07061	0.04942	0.07868	38.58	0.387	0.50	0.30582
	TOTAL	8.38210	1.25743	7.12467	6.41233	3.83364	2.68354	4.44113	37.67			16.79896

GROUND WATER RESOURCE AND IRRIGATION POTENTIAL

WEST BENGAL

Sr. No.	Districts	Total Replenishable Ground Water Resource (m.ha.m/Yr)	Provision for Domestic, Industrial & Other Uses (m.ha.m/Yr)	Available Ground Water Resource for Irrigation in Net Terms (m.ha.m/Yr)	Utilisable Ground Water Resource for Irrigation in Net Terms (m.ha.m/Yr)	Gross Draft Estimated on Prorata Basis (1991) (m.ha.m/Yr)	Net Draft (1991) (m.ha.m/Yr)	Balance Ground Water Resource for Future Use (m.ha.m/Yr)	Level of Ground Water Development (%)	Weighted Average Delta (m)	Utilisable Irrigation Potential for Development (m.ha)
1	2	3	4	5	6	7	8	9	10	11	12
1	Bankura	0.13885	0.02083	0.11802	0.10622	0.02449	0.01714	0.10088	14.52	0.38-0.56	0.20664
2	Bardhaman	0.28790	0.04318	0.24472	0.22025	0.08555	0.05988	0.18484	24.47	0.42-0.58	0.31455
3	Birbhum	0.15657	0.02349	0.13308	0.11977	0.02673	0.01871	0.11437	14.06	0.45-0.51	0.24669
4	Coochbehar	0.16091	0.02414	0.13677	0.12309	0.00864	0.00605	0.13072	4.42	0.47	0.25902
5	Darjeeling	0.04700	0.00705	0.03995	0.03596	0.00076	0.00053	0.03942	1.33	0.38	0.09459
6	Howrah	0.02413	0.00362	0.02051	0.01846	0.00402	0.00281	0.01770	13.70	0.68	0.02718
7	Hooghly	0.15169	0.02276	0.12893	0.11604	0.05746	0.04022	0.08871	31.20	0.56	0.20718
8	Jalpaiguri	0.32005	0.04801	0.27204	0.24484	0.00409	0.00286	0.26918	1.05	0.38	0.41103
9	Malda	0.09627	0.01444	0.08183	0.07365	0.03469	0.02428	0.05755	29.67	0.35-0.55	0.14553
10	Medinipur	0.24943	0.03741	0.21202	0.19082	0.08451	0.05916	0.15286	27.90	0.38-0.68	0.34722
11	Murshidabad	0.19495	0.02925	0.16570	0.14913	0.11652	0.08156	0.08414	49.22	0.47	0.31734
12	Nadia	0.15555	0.02334	0.13221	0.11899	0.10555	0.07389	0.05832	55.89	0.33-0.70	0.24021
13	Purulia	0.07273	0.01091	0.06182	0.05564	0.00737	0.00516	0.05666	8.35	0.38	0.14643
14	N-24 Parganas	0.11823	0.01774	0.10049	0.09044	0.08006	0.05604	0.04445	55.77	0.37-0.75	0.15471
15	Uttar & Dakshin Dinajpur	0.13497	0.02025	0.11472	0.10325	0.03748	0.02623	0.08849	22.86	0.36-0.55	0.19962
	TOTAL	**2.30923**	**0.34642**	**1.96281**	**1.76653**	**0.67794**	**0.47452**	**1.48829**	**24.18**		**3.31794**

Note : Utilisable Irrigation Potential is limited to the area available in some districts.

GROUND WATER RESOURCE AND IRRIGATION POTENTIAL

DADRA AND NAGAR HAVELI

Sr. No.	Union Territory	Total Replenishable Ground Water Resource (m.ha.m/Yr)	Provision for Domestic, Industrial & Other Uses (m.ha.m/Yr)	Available Ground Water Resource for Irrigation in Net Terms (m.ha.m/Yr)	Utilisable Ground Water Resource for Irrigation in Net Terms (m.ha.m/Yr)	Gross Draft Estimated on Prorata Basis (1990) (m.ha.m/Yr)	Net Draft (1990) (m.ha.m/Yr)	Balance Ground Water Resource for Future Use (m.ha.m/Yr)	Level of Ground Water Develop-ment (%)	Weighted Average Delta (m)	Utilisable Irrigation Potential for Development (m.ha)
1	2	3	4	5	6	7	8	9	10	11	12
1	Dadra & Nagar Haveli	0.00422	0.00063	0.00359	0.00323	0.00065	0.00046	0.00313	12.81	0.64	0.00505
	TOTAL	0.00422	0.00063	0.00359	0.00323	0.00065	0.00046	0.00313	12.81		0.00505

GROUND WATER RESOURCE AND IRRIGATION POTENTIAL

N.C.T.DELHI

Sr. No.	Districts	Total Replenishable Ground Water Resource (m.ha.m/Yr)	Committed Gross Draft Estimated on Prorata Basis (1991) (m.ha.m/Yr)	Committed Net Draft (1991) (m.ha.m/Yr)	Balance Provision for Domestic, Industrial & Other Uses (m.ha.m/Yr)
1	2	3	4	5	6
1	Najafgarh	0.00272	0.00457	0.00320	Nil.
2	Khanjawala	0.00449	0.00485	0.00340	0.00109
3	Alipur	0.00607	0.00428	0.00300	0.00307
4	Mehrauli	0.00187	0.00257	0.00180	0.00007
5	Shadhara	0.00175	0.00057	0.00040	0.00135
6	City	0.01225	--	--	0.01225
	TOTAL	**0.02915**	**0.01684**	**0.01180**	**0.01783**

ANNEXURE - IV(a)

CATEGORISATION OF BLOCKS / MANDALS / TALUKS / WATERSHEDS AS OVEREXPLOITED AND DARK ON ALL INDIA BASIS

ANNEXURE-IV(a)

CATEGORISATION OF BLOCKS/MANDALS/TALUKS/WATERSHEDS AS OVER EXPLOITED AND DARK ON ALL INDIA BASIS

Sr. No.	STATE/UTS	Number of Districts	Number of Blocks/Mandals/Taluks/Watersheds	NO.OF BLOCKS/TAKLUKS/MANDALS/WATERSHEDS			
				Over Exploited		Dark	
				No.	%	No.	%
1	2	3	4	5	6	7	8
1	Andhra Pradesh	23	1104	6	0.54	24	2.17
2	Arunachal Prades	8	48	--	--	--	--
3	Assam	23	134	--	--	--	--
4	Bihar	42	585	--	--	1	0.17
5	Goa	3	12	--	--	--	--
6	Gujarat	19	184	12	6.52	14	7.61
7	Haryana	16	108	45	41.67	6	5.56
8	Himachal Pradesh	12	69	--	--	--	--
9	Jammu & Kashmir	14	123	--	--	--	--
10	Karnataka	19	175	6	3.43	12	6.86
11	Kerala	14	154	--	--	1	0.65
12	Madhya Pradesh	45	459	--	--	3	0.65
13	Maharashtra	30	1503	--	--	34	2.26
14	Manipur	6	26	--	--	--	--
15	Meghalaya	5	29	--	--	--	--
16	Mizoram	3	20	--	--	--	--
17	Nagaland	7	21	--	--	--	--
18	Orissa	27	314	--	--	--	--
19	Punjab	12	118	62	52.54	8	6.78
20	Rajasthan	30	236	45	19.07	11	4.66
21	Sikkim	4	4	--	--	--	--
22	Tamil Nadu	21	384	54	14.06	43	11.20
23	Tripura	3	17	--	--	--	--
24	Uttar Pradesh	63	895	19	2.12	22	2.46
25	West Bengal	16	341	--	--	--	--
	TOTAL STATES	**465**					

No. of Blocks (Except A.P.,	4272	231		107	
Gujarat & Maharashtra)					
No. of Mandals (A.P.)	1104	6		24	
No. of Taluks (Gujarat)	184	12		14	
No. of Watersheds (Maharashtra)	1503	--		34	

Andhra Pradesh - 1104 Mandals/ 309 Blocks.
Gujarat - 184 Taluks/218 Blocks.
Maharashtra - 1503 Watersheds/231 Taluks/ 366 Blocks.

ANNEXURE - IV(b)

STATE-WISE CATEGORISATION OF OVEREXPLOITED AND DARK BLOCKS / MANDALS / TALUKS / WATERSHEDS

ANNEXURE - IV (b)

STATEWISE CATEGORISATION OF OVER-EXPLOITED AND DARK BLOCKS / TALUKS / MANDALS / WATERSHEDS

ANDHRA PRADESH

S.No.	District	Over Exploited Mandals (>100%)	Dark Mandals (100 to 85%)
1.	Anantpur	--	1. Rolla 2. Parigi 3. Yadiki
2.	Chittoor	1. Tirupati(R)	1. Chandragiri 2. Somala 3. Kammapalle
3.	Cuddapah	1. Vempalli	1. Proddatur
4.	Guntur	--	1. Thullar
5.	Karimnagar	--	1. Bejjanki 2. Ramadugu 3. Veenavanka 4. Elkathurthy 5. Metpalli 6. Kothalapur 7. Boinapalli
6.	Mahaboobnagar	1. Midjal	--
7.	Medak	--	1. Daulatabad
8.	Nalgonda	--	1. Chityal 2. Marguda 3. Nutankal
9.	Nizamabad	--	1. Armoor 2. Sirikonda 3. Kammarapally
10.	Rangareddy	--	1. Moinabad
11.	Warangal	1. Duggondi	1. Bachchannapet 2. Ghanpur
12.	West Godavari	1. Undrajavaram	--

ABSTRACT

No. of Districts	Total No. of Mandals	Over Exploited Mandals	Dark Mandals
23	1104	6	24

BIHAR

S.No.	District	Over Exploited Blocks (>100%)	Dark Blocks (100 to 85%)
1.	Samastipur	--	1. Pusa

ABSTRACT

No. of Districts	Total No. of Blocks	Over Exploited Blocks	Dark Blocks
42	585	--	1

GUJARAT

S.No.	District	Over Exploited Taluks (>100%)	Dark Talukas (100 to 85%)
1.	Ahmedabad	1. Dahegaon	1. City & Daskroi
2.	Amreli	1. Kodinar	--
3.	Banaskantha	1. Tharad 2. Vadgam	1. Deodar 2. Dhanera 3. Palanpur
4.	Baroda	--	1. Sinor 2. Baroda
5.	Jamnagar	--	1. Jodia
6.	Junagarh	1. Maliya	1. Veraval
7.	Kutch	--	1. Bhachu
8.	Kheda	--	1. Kapadganj 2. Nehemadabad
9.	Mehsana	1. Chansma 2. Harij 3. Kadi 4. Kheralu 5. Mehsana 6. Patan 7. Sidhpur	1. Kalol 2. Vijapur 3. Visnagar

ABSTRACT

No. of Districts	Total No. of Taluks	Over Exploited Taluks	Dark Taluks
19	184	12	14

HARYANA

S.No.	District	Over Exploited Blocks (>100%)	Dark Blocks (100 to 85%)
1.	Ambala	1. Bavana	--
2.	Bhiwani	1. Dadri-II	--
3.	Faridabad	1. Ballabgarh 2. Faridabad	1. Hodal 2. Palwal
4.	Gurgaon	1. Farukhnagar 2. Gurgaon 3. Pataudi 4. Sohana	--
5.	Hisar	1. Bas 2. Bhuna 3. Hissar-I 4. Hissar-II	--
6.	Jind	1. Alewa 2. Jind 3. Narwana	--
7.	Kaithal	1. Gulha 2. Kaithal 3. Pundri	--
8.	Karnal	1. Gharaunda 2. Indri 3. Karnal 4. Nilokheri 5. Nissang	--
9.	Kurukshetra	1. Ladwa 2. Pehowa 3. Shahbad 4. Thanesar	--
10.	Mahendragarh	1. Ateli Nangal 2. Kanina 3. Mahendragarh 4. Nangal Chowdhry 5. Narnaul	--

S.No.	District	Over Exploited Blocks (>100%)	Dark Blocks (100 to 85%)
11.	Panipat	1. Assandh 2. Israna 3. Panipat 4. Samalkha	1. Mandlanda
12.	Rewari	1. Jatusana 2. Khol 3. Nahar 4. Rewari	1. Bawal
13.	Rohtak	1. Salawas	1. Jhajjar
14.	Sirsa	1. Odhan	--
15.	Sonipat	1. Rai	--
16.	Yamunanagar	1. Jagadhari 2. Radaur	1. Bilaspur

ABSTRACT

No. of Districts	Total No. of Blocks	Over Exploited Blocks	Dark Blocks
16	108	45	6

KARNATAKA

S.No.	District	Over Exploited Blocks (>100%)	Dark Blocks (100 to 85%)
1.	Bangalore	1. Anekal 2. Bangalore (North) 3. Devanahally 4. Hoskote	1. Bangalore (South) 2. Channapatna
2.	Belgaum		1. Hukkeri 2. Rayabag
3.	Bijapur	--	1. Indi
4.	Kolar	1. Kolar 2. Malur	1. Chikballapur 2. Gauribidanur 3. Mulbagal 4. Sidlaghatta
5.	Mysore	--	1. Kollegal
6.	Tumkur	--	1. Tiptur 2. Tumkur

ABSTRACT

No. of Districts	Total No. of Blocks	Over Exploited Blocks	Dark Blocks
19	175	6	12

KERALA

S.No.	District	Over Exploited Blocks (>100%)	Dark Blocks (100 to 85%)
1.	Trivandrum	--	1. Chirayinki

ABSTRACT

No. of Districts	Total No. of Blocks	Over Exploited Blocks	Dark Blocks
14	154	--	1

MADHYA PRADESH

S.No.	District	Over Exploited Blocks (>100%)	Dark Blocks (100 to 85%)
1.	Indore	--	1. Sanwer
2.	Mandsaur	--	1. Mandsaur 2. Neemuch

ABSTRACT

No. of Districts	Total No. of Blocks	Over Exploited Blocks	Dark Blocks
45	459	--	3

MAHARASHTRA

S.No.	District	Over Exploited Watersheds (>100%)	Dark Watersheds (100 to 85%)
1.	Nasik	--	1. GV - 7 2. GV - 15 3 GV - 21 4. TE - 96 5. TE - 109
2.	Jalgaon	--	1. TE - 1 2. TE - 2 3. TE - 35 4. TE - 37A 5. TE - 50A 6. TE - 51A 7. TE - 60A
3.	Ahmednagar	-	1. GV - 38B 2. GV - 107 3. GV - 109 4. GV - 110 5. GV - 117 6. GV - 123
4.	Pune	--	1. BM - 5 2. BM - 7 3. BM - 12 4. BM - 58 5. BM - 59 6. BM - 75
5.	Solapur	--	1. SA - 27 2. SA - 29
6.	Kolhapur	--	1. KR - 84
7.	Sangli	--	1. KR - 38 2. KR - 39
8.	Nagpur	--	1. WGKCC- 1 2. WRJ - 1
9.	Usmanabad	--	1. MR - 36A
10.	Warda	--	1. WRK - 2
11.	Amravati	--	1. WB - 2

ABSTRACT

No. of Districts	Total No. of Blocks	Over Exploited Blocks	Dark Blocks
30	1503	--	34

PUNJAB

S.No.	District	Over Exploited Blocks (>100%)	Dark Blocks (100 to 85%)
1.	Amritsar	1. Patti 2. Gandiwind 3. Raya 4. Ajnala 5. Verka 6. Taran Taran 7. Khadoor Saheb 8. Valtoha 9. Tarsikka 10.Jandisla 11.Bhikhiwind	1. Naushera Panu
2.	Jalundhar	1. Nurmahal 2. Jullandhar East 3. Banga 4. Jullandhar West 5. Shahkot 6. Bhogpur 7. Adampur 8. Nakodar 9. Nawan Shehar 10.Phillaur 11.Goraya 12.Aur	--
3.	Kapurthala	1. Phagwara 2. Kapurthala 3. Nadala 4. Sultanpur	1. Sidhwan Bet 2. Machhwara
4.	Ludhiana	1. Pakhowal 2. Jagraon 3. Mangat 4. Sudhar 5. Samrala 6. Doraha 7. Ludhiana	--
5.	Rupnagar	1. Chamkaur Saheb	--
6.	Patiala	1. Patiala 2. Bhunerheri 3. Nabha 4. Samana 5. Ghanaur 6. Bassi Pathana	--

S.No.	District	Over Exploited Blocks (>100%)	Dark Blocks (100 to 85%)
		7. Rajpura 8. Sirhind	
7.	Hoshiarpur	1. Tanda	--
8.	Bhatinda	1. Phul(East)	--
9.	Ferozepur	--	1. Ghalkhurd 2. Zira 3. Ferozepur
10.	Faridkot	1. Nihal Singh Wala 2. Moga-I 3. Bagh Purana 4. Moga-II	--
11.	Sangrur	1. Sangrur 2. Mahlkalan 3. Sunam 4. Lehardaga 5. Dhuri 6. Barnala 7. Ahmedgarh 8. Malerkotla 9. Bhawanigarh	1. Sehna
12.	Gurdaspur	1. Dara Baba Nanak 2. Kalanaur 3. Batala 4. Hargobindpur	1. Dhariwal

ABSTRACT

No. of Districts	Total No. of Blocks	Over Exploited Blocks	Dark Blocks
12	118	62	8

RAJASTHAN

S.No.	District	Over Exploited Blocks (>100%)	Dark Blocks (100 to 85%)
1.	Ajmer	1. Jawaja 2. Pisangan	1. Srinagar
2.	Alwar	1. Behror 2. Kathumar 3. Kishengarh 4. Kotkasim 5. Laxmangarh 6. Mandwar 7. Neemrana 8. Rajgarh 9. Reni 10. Tijara	1. Ramgarh
3.	Barmer	--	1. Dhorimanna
4.	Bharatpur	1. Deeg 2. Kumher 3. Nadbai	--
5.	Chittorgarh	--	1. Chhoti Sadri
6.	Dholpur	1. Dholpur 2. Rajakhera	--
7.	Jaipur	1. Amer 2. Bairath 3. Bandikui 4. Govindgarh 5. Jhotwara 6. Lalsot 7. Sambhar 8. Sanganer	1. Bassi 2. Kotputli
8.	Jalore	1. Ahore 2. Bhinmal 3. Jalore 4. Raniwara 5. Sanchore 6. Sayala	--
9.	Jhalawar	1. Pirawa	--

S.No.	District	Over Exploited Blocks (>100%)	Dark Blocks (100 to 85%)
10.	Jhunjhunu	1. Bohana 2. Chirawa 3. Surajgarh	1. Khetri 2. Udaipurwati
11.	Jodhpur	1. Balesar 2. Bilara 3. Osian	--
12.	Sawai Madhopur	1. Gangapur 2. Hindon 3. Mahua 4. Toda Bhim	1. Bamanwas
13.	Sikar	1. Khandela 2. Neem Ka Thana 3. Srimadhopur	1. Danta Ramgarh
14.	Sirohi		1. Reodar

ABSTRACT

No. of Districts	Total No. of Blocks	Over Exploited Blocks	Dark Blocks
30	236	45	11

TAMIL NADU

S.No.	District	Over Exploited Blocks (>100%)	Dark Blocks (100 to 85%)
1.	Chenganpet-MGR	1. R.K.Pet 2. Poondi 3. Minjur 4. Thiruvalangadu 5. Thiruvallur 6. Madhavaram	1. Sholavaram
2.	North Arcot-Ambedkar	1. Kanniyampadi 2. K.V.Kuppam 3. Madanur 4. Thirupattur 5. Villore	1. Anaicut
3.	Thiruvannamalai Sambuvarayar	--	1. Chengam
4.	South Arcot	1. Koliyanur 2. Thiruvennainallur 3. Kandamangalam 4. Nellikuppam 5. Vikravandi 6. Keerapalayam 7. Ulundurpet 8. Thiurnavalur	1. Gingee 2. Vallam
5.	Salem	1. Konganapuram 2. Mallasamudram 3. Attur 4. Rasipuram 5. Vennandur 6. Paramathi Velur 7. P.W.Palayam 8. Erumaipatti 9. Namagiripettai 10.Mohanur	1. Omalur 2. Kabilarmalai 3. Elachipalayam 4. Gangavalli 5. Valapadi 6. Panamarathupatti 7. Puduchatram 8. Senthamangalam
6.	Periyar	1. Modakurichi 2. T.N.Palayam 3. Nambiyur 4. Andhiyur 5. Bhavani Sagar 6. Kodumudi	1. Erode 2. Uthukuli 3. Chennimalai
7.	Coimbatore	1. Palladam 2. Sulur	1. Pollachi (N) 2. Thondamuthur

S.No.	District	Over Exploited Blocks (>100%)	Dark Blocks (100 to 85%)
		3. Annur 4. Tiruppur 5. Avinashi 6. Madukkarai 7. Sultanpet 8. Pongalur	3. Gudimangalam
8.	Dharmapuri	1. Palacode 2. Bargur 3. Mathur 4. Krishnagiri 5. Harur	1. Dharmapuri 2. Pappireddipatti
9.	Tiruchirappalli	--	1. Kulithalai
10.	Thanjavur	1. Papanasam 2. Kumbakonam 3. Thiruvidaimarudur 4. Thiruppanandal	1. Thiruvaiyar
11.	Nagapattinam Quiad-e-Milleth	1. Mayiladudurai 2. Kuttalam 3. Kollidam 4. Sirkali 5. Sembanarkoil 6. Neeedamangalam	1. Nannilam 2. Koradachery
12.	Madurai	1. Theni 2. Chinnamanur	1. Usilampatti 2. T.Kallupatti
13.	Dindigul-Anna	1. Reddiyarchatram 2. Vadipatti 3. Alanganallur	1. Vattalagundu
14.	Kamarajar	--	1. Rajapalayam
15.	Tirunelveli-Kattabomman	--	1. Alangulam 2. Melaneelithanallur
16.	V.O.Chidambaranar	--	1. Vilathikulam 2. Udangudi 3. Sathankulam

ABSTRACT

No. of Districts	Total No. of Blocks	Over Exploited Blocks	Dark Blocks
21	384	54	43

UTTAR PRADESH

S.No.	District	Over Exploited Blocks (>100%)	Dark Blocks (100 to 85%)
1.	Agra	--	1. Barauli Ahir
2.	Badaun	1. Wazirganj	1. Junnawai 2. Islamnagar 3. Binawar (Salarpur) 4. Ambiapur
3.	Bijnor	1. Aku	1. Noorpur 2. Jalilpur 3. Kiratpur 4. Burhanpur
4.	Bulandshahar	1. B.B.Nagar	1. Unchagaon 2. Danpur 3. Jehangirabad 4. Lakhaoti 5. Shikarpur
5.	Farrukhabad	--	1. Kamalganj
6.	Firozabad	--	1. Khairgarh
7.	Gaziabad	1. Hapur	--
8.	Lakhimpur-Kheri	--	1. Behjam
9.	Mathura	--	1. Sahpau 2. Sadabad
10.	Meerut	1. Binauli	1. Pilana 2. Kharkhauda 3. Rajpura
11.	Moradabad	1. Bahjoi 2. Sambhal 3. Joya	1. Dingerpur 2. Bilari 3. Baniakhera 4. Asmoli 5. Pawansa
12.	Muzaffar Nagar	--	1. Shahpur
13.	Saharanpur	1. Gangoh 2. Nakur	1. Nangal 2. Sarsawa
14.	Varanasi	--	1. Gyanpur

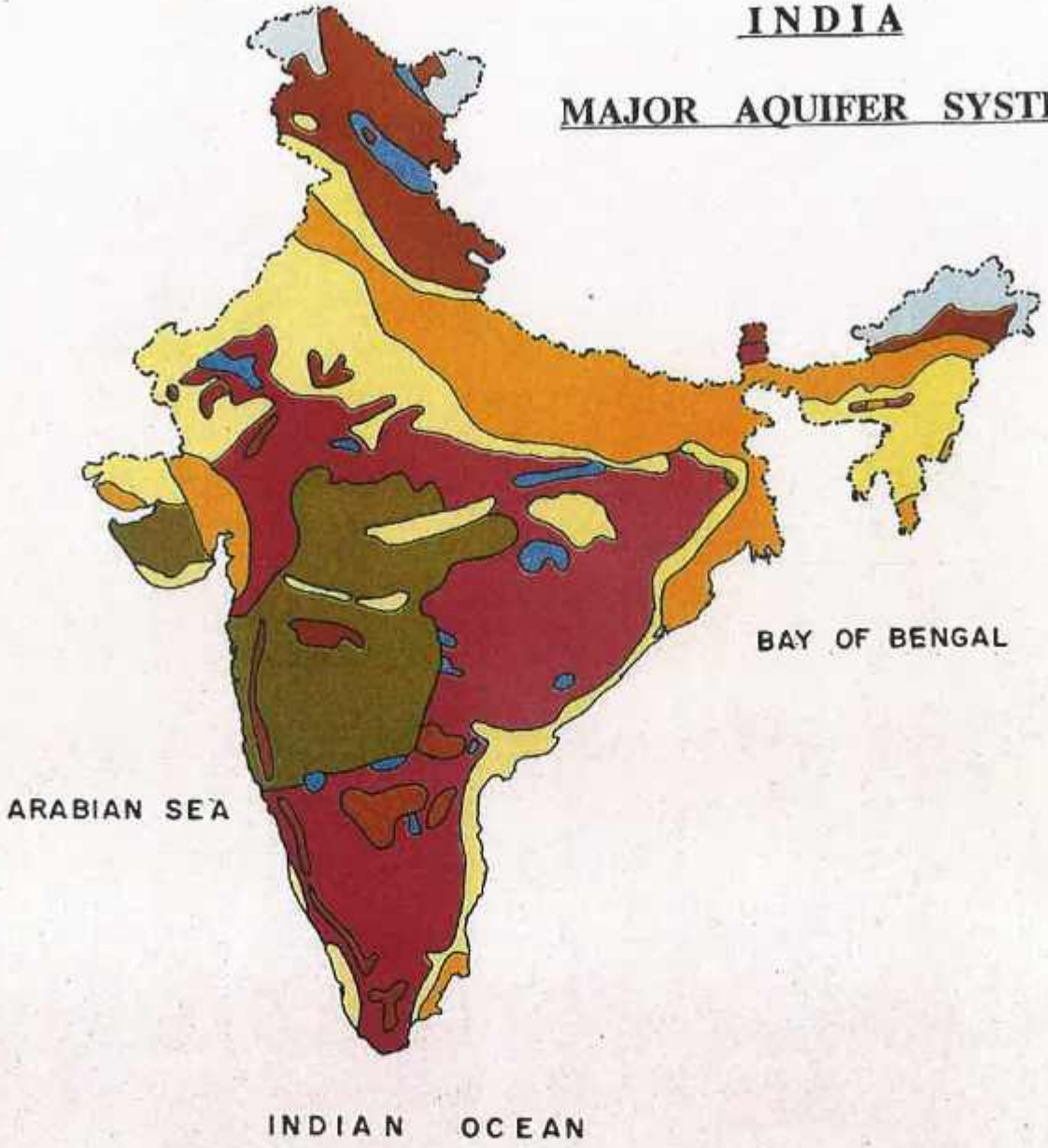
ABSTRACT

No. of Districts	Total No. of Blocks	Over Exploited Blocks	Dark Blocks
63	895	19	22

PLATES

INDIA

MAJOR AQUIFER SYSTEMS

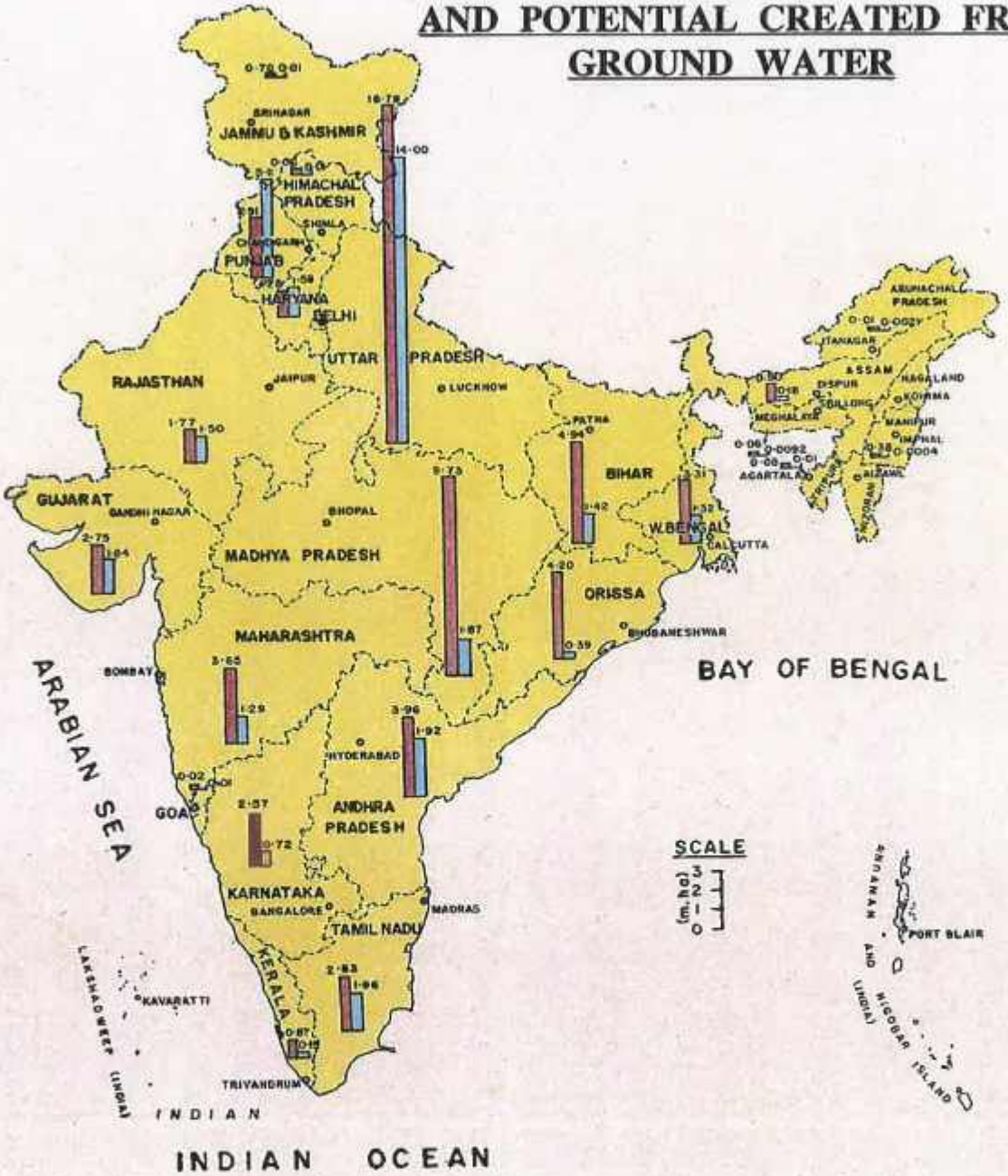


EXPLANATIONS

Aquifer Systems	Yield Potential(LPS)
Alluvium, extensive	> 40
Alluvium & Sandstones, discont.	10 - 40
Limestones	5 - 25
Crystalline rocks	1 - 40
Basalts	1 - 25
Aquifers in hilly areas	< 1

INDIA

UTILISABLE IRRIGATION POTENTIAL AND POTENTIAL CREATED FROM GROUND WATER



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Utilisable Irrigation Potential

Irrigation Potential Created