Report of the Working Group on
“Land and Water”

Twelfth Five Year Plan (2012-2017)
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Constitution of Working Group on “Land and Water” for the Twelfth Five Year Plan (2012-2017) by the Planning Commission
Mr Arun Maira  
Member (Industry)  
Planning Commission  
Government of India  
New Delhi

4th October 2011


Dear Mr. Maira:

Report of the Working Group on Land and Water

This has reference to the letter No. I&M-3(1)/2011-SC dated 15.4.11 from the Planning Commission (Industry Division) constituting a Working Group on “Land and Water” under my chairmanship.

The Working Group as well as the Sub-groups on land as well as on water held several meetings and have finalized their recommendations.

Enclosed are the recommendations of the Working Group on Land and Water submitted for your perusal.

With regards,

Yours sincerely,

B Muthuraman  
Chairman  
Working Group on ‘Land & Water’  
Constituted by the Planning Commission,  
Government of India

Encl.

Cc.to: Dr Renu Parmar
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1 Summary of recommendations of the Working Group

- A National Land Use Policy should be developed to take care of the growing requirements of land for sectors other than agriculture. State Governments should formulate appropriate Land Use Policy in alignment with the National Land Use Policy. The main features of this policy should be Land Mapping (record of types & quanta of land available), Land zoning and Digitization of Land Records. The Land Use Policy should also look at measures to optimize utilization of land by benchmarking current utilization efficiency with global benchmarks, and setting standards, incentives for more efficient utilization.

- There is a need to establish an independent and autonomous regulator which can lay down guidelines, monitor the functioning of the sector and provide oversight. The Regulator should
  - Encourage state and local governments to define zoning of land, ear-marking them for different uses, and encourage digital land records
  - Define guidelines for valuing various types of land for different uses
  - Establish norms for setting-up and operating Land Development Corporations (LDCs) and monitor adherence to the norms by these institutions
  - Lay down the guidelines for acquiring land by a corporate body
  - Establish norms for process of land acquisition, compensation and relocation & rehabilitation of various stakeholders for different project characteristics

- Value of land can be determined, as per the guidelines laid down by the Regulator, in the following ways:
  - Open-offer price: Land owners will be asked to submit their application for sale of land in a reverse-auction process.
  - Multiple of historical price: The Regulator can set a price based on a multiple of the historical land prices, as mentioned in the land records of the government.

- The acquiring agent for land should be an independent commercial entity – Land Development Corporation – that has been licensed by the Regulator to acquire land. The role of LDC would be to acquire and develop the land on behalf of its clients (end users) in exchange of the process and maintenance fee. A state can have multiple LDCs and each LDC will execute projects through SPVs. The operations of the LDC will be under the purview of the Regulator.

- The process of land acquisition will be guided by the Regulatory framework applicable for the project characteristics as defined by the LDC in its SPV. The role of local/state government authorities in supporting the acquisition process should be laid out clearly by the regulator based on project characteristics. The acquisition process may vary depending upon
- **Compensation for land** needs to factor the following:
  - Upfront payment
  - Annuity income stream or permanent employment or upfront amount equivalent to NPA of annuity.
  - Participation in the future appreciation due to growth as a result of land development

In addition to the above factors, the land owner needs to have the flexibility to choose a compensation package
  - An owner can choose to take the full-value in upfront compensation or take a part of it as annuity payouts (determined by prevailing financial indicators of the time)
  - However, every land owner will necessarily have the component of "Participation in future appreciation" as part of the compensation

- **The LDC has to operate a rehabilitation and resettlement program** with combination of different elements which have been defined by the regulator based on the project characteristics; these include elements like
  - Alternative dwelling, if displaced
  - Skill development
  - Assistance in employment / income-generating opportunities
  - Community development

- **The Industry must be responsible for payment of cost of land acquisition**, including market price, share of the appreciating value, and cost of the comprehensive R&R

- **There should be a timeframe defined for land acquisition**, and the LDCs must interface appropriately not only with the local self-governance bodies, but also other grass-root level organizations in order to **build awareness about the land acquisition process**
2 Introduction

Among all the traditional factors of production for any economic activity, land being natural, immovable & non-renewable, is a distinct resource. Further, it carries a huge tangible and emotional value for owners and also for those whose livelihoods depend on it. Thus, the issue of land acquisition needs to be viewed and treated with utmost sensitivity & care, so as to accommodate the interest of all stakeholders in a just, equitable and efficient manner.

Land Acquisition, typically refers to a process of acquiring land by government or by some government agency, as authorized by the law for a public purpose from individual landowner(s) after paying compensation, as fixed by government, in lieu of losses that may be suffered by the land owner(s) due to surrendering of his/their land to the concerned government/government agency.

In recent times, the issue of land acquisition has acquired headlines because of the delays and uncertainties resulting from mass protests by the people affected / displaced. Some examples are Singur and Nandigram in West Bengal and POSCO in Orissa. Similar protests of varied magnitude have been experienced in States like Maharashtra, Uttar Pradesh, Kerala and Karnataka. Most of the protests are due to the fact that lands of farmers have been taken over by the State without undergoing stakeholder consultations and market negotiations. But availability of land is posing a major bottleneck in industrial investment and cannot be ignored. The issue needs to be addressed in a holistic manner such that no one loses.

2.1 Scope of the Working Group

The Working Group on Land & Water was constituted by the Planning Commission to evaluate the current position with regard to availability of land and estimate medium and long term requirements of land for industrial growth. The Group was mandated to specifically look into the issues, related to land acquisition for industry and suggest strategies to address them.

The Group met 4 times in a span of 4 months and had detailed discussions covering the key and fundamental aspects of land acquisition, which include

- Land usage for industry: creation of land banks and development of land clusters in states
- The process of Land Acquisition, compensation and R&R measures

2.2 Issues related to land

**Imperfect market:** The land market is inherently imperfect mainly because land is immobile. No two pieces of land are same irrespective of their location. Each piece of land is easily differentiated because of this unique characteristic. Hence land is not substitutable. One cannot simply take away a piece of land and compensate the owner with another
piece of land. Hence the landowner enjoys a certain degree of monopolistic power. Furthermore, the value of a piece of land effectively changes when we change its usage and due to development of surrounding areas. The market knows what can be earned from a piece of land. This determines the market value. But the owner’s calculation of expected future benefits out of the piece of land could be quite different. In addition, the owner is often emotionally attached to his land. In India, land is considered a very important asset from an emotional perspective. The landowner typically has a stronger social identity because of the land he owns. All these factors assign a private value to the land which is different from its market value. As a result the owner may not be willing to part with his land even if market value is given. Similarly changing the usage of land may not be liked by the residents because of the possible after effects perceived by them.

**Highly fragmented ownership:** A major characteristic of land ownership in India is that the landholdings are typically small. Typical industrial usage requires development of large tracts of land. Consequently, industrial development has as a prerequisite the need to acquire land from a large number of owners in order to develop a contiguous piece of land for industrial use. This leads to a long and arduous process of consolidation which takes years of effort and often results in standoffs between the landowners and the acquirers. Many landowners are unwilling to part with their land as they expect the price in the area to rise because of the project. In addition, because of the increased importance of the later acquisitions in one area, the landowners are in a position to leverage which they can use to withhold their land.

**Poor land records:** Another problem in the land market is the incomplete, outdated, and inaccurate land records, which give rise to disputes and litigation. Since industrial projects require large amounts of land and land holding in India is fragmented, industrialists have to deal with a large number of landowners and consequently face substantial risk of litigation. This gives rise to the consideration of land acquisition being done through the State.

**Usage policies:** In addition, there are some restrictions on usage of agricultural land for nonagricultural purposes. Non-Agricultural Use Clearance (NAC) from the local / state government is necessary before agricultural land can be considered for other uses. Non-agricultural Use Clearance (NAC) is normally not granted to a farmer who wants to continue to use the land for agriculture while looking for a buyer. As a result the farmer is unable to enjoy the value accretion arising out of alternative use, in case of acquisition.
3 Land use policy

An appropriate National Land Use Policy will have to be developed to take care of the growing requirements of land for all users (the last such policy was announced way back in the 1990s). This is necessary so that the states can formulate their Land Use Policies in alignment with the National Policy, and hence can work towards a common national goal in addition to the individual goals for the state.

Land is a resource, and like any resource it can be looked at in terms of supply (availability of land), demand (usage of land), and the factors that link the supply and the demand.

Some of the critical issues which need to be looked at in terms of land are populated in the following framework:

India has sufficient land for all uses – agriculture, industry, human dwelling, infrastructure other uses – as long as it is used with prudence and productivity.

Currently industry utilizes only about 2-4% of all land in India. Even at heightened industrial activity in the future, it is expected that there would be sufficient land for all users, including industry.

3.1 Managing land supply

The two main issues which need consideration as far as the supply of land is concerned are

1. Types and quanta of land available
2. Zoning of land or demarcation for industrial usage
3.1.1 Information system

A pressing need in India is for a universal system of information registry as far as land availability is concerned. Land records should be digitized so that we can have a sense of the availability of land. We need to look at how land can be mapped as well as the practical methodologies of the process of mapping.

Some important considerations while mapping the land are land utilization under agricultural use (mono-crop / multi-crop land), availability of other natural resources like water and minerals, as well as accessibility constraints due to natural features.

Agricultural land can be of multiple types: a large portion of agricultural land is single crop and hence gives low returns (of the order of Rs. 10-15k / acre / annum). A significant step in planning would be to identify the type of land, and hence its productivity. A key consideration here is that while we should definitely explore the potential utilization of agricultural land for other purposes like industry, this needs to be done with caution.

Agriculturally unproductive land (fallows) and wasteland are another type of land which needs to be considered. This land is particularly important given that industry can be developed on it without significant opportunity cost in terms of lost agricultural produce.

We also need to consider special types of land like tribal land. Laws related to tribal areas are very archaic and have to be reviewed as they hamper the development of such areas and in fact can also lead to extremist / Naxal activities, which further restrict the flow of capital to these areas.

3.1.2 Zoning

Another key imperative for the effective management of land supply is the process of zoning of land. Zoning is a device of land use planning used by local governments in many developed countries. The word is derived from the practice of designating permitted uses of land based on mapped zones which separate one set of land uses from another. Theoretically, the primary purpose of zoning is to segregate uses that are thought to be incompatible.

It is extremely important to co-locate industries in order to get efficient synergies in terms of infrastructure and costs. In addition, it is essential to protect the land for the purpose designated, in this case industry, in order for it to develop since not all companies will come in at once. Also, if one leaves land development to the private entrepreneur, clusters would not naturally develop. Here the importance of zoning of land gets highlighted. This needs to be done by the government. The government also then needs to ensure that industry comes up only in such areas.
Currently, large tracts of barren land are available, but industry does not develop there because of cost constraints. It is known that industries flourish in clusters, since through clustering the costs of transactions and infrastructure get reduced.

Zoning is commonly controlled by local governments such as counties or municipalities, though the nature of the zoning regime may be determined or limited by state or national planning authorities or through enabling legislation. The details of how individual planning systems incorporate zoning into their regulatory regimes vary though the intention is always similar. For example, in the state of Victoria, Australia, land use zones are combined with a system of planning scheme overlays to account for the multiplicity of factors that impact on desirable urban outcomes in any location. In the US, the county has a huge determination factor about what kind of industry will be developed in the region. Similarly, in India, we need to encourage planning and zoning at the state and district level. India is too large a country for there to be only one approach and that one needs to look at different states and learn from their methodologies.

A key aspect of the methodology to perform zoning is the responsibility of doing this exercise, and the creation of a body of which one of the roles is to plan out the zoning of land. This concept has been explored in a later section under the ambit of a Regulator.

Some other important considerations while performing a zoning exercise would include:

- Supply and availability of other resources like water and mineral deposits
- Environmental concerns, e.g. regulations / targets on minimum cover of forest land, etc
- Societal concerns, including location of potentially hazardous industries with respect to residential regions and cities

Adoption of zoning methods in India will lead to the optimal usage of available land. Zoning can be effectively combined with clustering to solve the problem of land availability for industrial use. This zoning exercise should also be digitized for easy accessibility and usage.

### 3.2 Managing demand for land

There are various end-users of land resources. Each type of user has a certain set of requirements as far as land type and quantum are concerned. Given that land is a fixed and limited resource, it is equally critical to manage the demand and optimize it to the fullest extent possible.
Productivity of land would vary across each user type and the framework to optimize the demand-side issues should include appropriate measurements of productivity of each type of land use as well as benchmarks of best practices around the globe.

It is critical that the various types of land use be identified as a first step to analyzing the demand-side issues to suggest measures. Land use would typically include:

- Agriculture – including single-crop land, multi-crop land, etc. Land usage and productivity would typically vary across different crop types, etc.
- Industry – land usage and productivity would typically vary across various sectors
- Others

The National Land Use Policy may also use the following framework for looking at optimizing utilization of land.

Based on the above, pockets of inefficiencies in terms of land usage could be identified for the various uses and measures can be suggested to improve productivity and land utilization.
4 Land Acquisition

4.1 Introduction

Land acquisition is a complex process involving myriad stakeholders that have, in recent times, underpinned the debate around our industrial growth story. Of India's available land of about 329 million hectares, only about 2 – 4% is used for industrial use. Yet, there have been several high-profile cases of green-field industrial expansion that have been stalled by lack of ability to close land acquisition.

4.2 Evolution of the land acquisition process

The history of land acquisition laws in India started with the Bengal Regulation Act (I) of 1824. In 1850 this was replaced by an Act by which the provision for land acquisition was extended to Calcutta town. The objective of these laws was that the land needed for public works be obtained without legal hassles. By 1857, various laws on the subject of land acquisition were consolidated as Act IV applicable to the whole of British India. Finally, the Land Acquisition Act of March 1894 replaced all previous laws relating to land acquisition.

Even after the independence the status quo was maintained as far as land acquisition laws were concerned. In the 1950s zamindari system was abolished and land was acquired from the rich zamindars with token compensation. The Government adopted the heavy industrialization strategy largely under the domain of public sector which required acquisition of large tracts of land. Land was acquired using the 1894 law, thus causing massive displacement of small farmers, agricultural labor, landless village workers, artisans, and forest dwellers.

Public sector and government projects were not the only purposes for which land was forcibly acquired by the state. Rather, states acquired land for private companies too on public purpose in the interest of development of states. After a few legal battles the law of 1894 was repealed through the Land Acquisition (Amendment) Act, 1962, to allow land to be acquired for a company, which was engaged in or was taking steps for engaging in any industry or work for a public purpose. The status quo was maintained till late 1980s.

In the 1990s as the Economic reforms were ushered in private sector got a fillip as a plethora of activities that were historically dominated by the public sector were now open to the private sector. This resulted in the requirement of large tracts of land which the Government started acquiring on behalf of private companies citing the reason of being 'public purpose'. This phenomenon of 'acquiring land for a public purpose for use by a private industry' was not acceptable to the public, notwithstanding its legal sanctity. Popular protests have, in the recent past, been frequently politicized by complex interplay of vested interests.
4.3 Land Acquisition Framework

In the process of land acquisition, several questions need to be answered:

- What is the purpose of land acquisition?
- What is the type and size of land required?
- Who gets impacted as a result of the acquisition?
- How should these stakeholders be compensated?
- Who decides the compensation?
- What is the true value of land? How do we ensure it is fair and reflects the potential?
- What is the mechanics of the acquisition?
  - Who acquires? Over what timeframe?
- Is there a regulatory framework that guides this acquisition process?

These and many other questions that need to get answered are inherently inter-linked.

As described in the figure, a robust regulatory framework needs to lay down guidelines for some of these questions and then depending on the nature of acquisition and characteristics of the project, appropriate acquisition process, compensation and R&R gets triggered.
4.3.1 Regulator

There is a need to establish an independent and autonomous regulator which can lay down guidelines, monitor the functioning of the sector and provide oversight. Specifically, the Regulator should

- Encourage state and local governments to define zoning of land, ear-marking them for different uses, and encourage digital land records
- Define guidelines for valuing various types of land for different uses
  - Components of land value
  - Methodology for computing these components, by type of land and type of end-use
- Establish norms for setting-up and operating Land Development Corporations (LDCs) and monitor adherence to the norms by these institutions
  - Ownership of LDCs
  - Funding of LDCs
  - Responsibilities of LDCs
- Lay down the guidelines for acquiring land by a corporate body
  - Define type of land that can be acquired by different agencies
  - Define the guidelines for process of land acquisition
  - Define the various stakeholders that get impacted by these acquisitions
  - Define the nature / elements of compensation that needs to be paid out to the impacted stakeholders
- Establish norms for process of land acquisition, compensation and relocation & rehabilitation of various stakeholders for different project characteristics
  - Role of LDCs
  - Role of government
  - Role of private sector

4.3.2 Land zoning and valuation

Land use in a populous country like India needs to be made efficient. It is essential to earmark land for different uses by the Regulator. The zoning of land should be done to ensure balance such that there is minimal negative impact of land acquisition on the community at large and industrial/infrastructure growth is not undermined. For this, the overall productivity of land should be taken into consideration. For example multi-crop agricultural land should not be earmarked for industrial usage.

Land has traditionally been a source of security for families in India and provides multiple revenue streams. Typically, the perceived value of land comprises the following elements:

- Perpetual capital appreciating asset
In India, given the supply demand imbalance and strong growth, land is considered to be perpetually appreciating.

- In addition, the capital value of land is influenced, apart from growth, by several other factors such as end-use of land, adjacency to economic activity

- Annuity income stream
  - Rent
  - Agricultural produce
  - Commercial activity

- Emotional / intangible value
  - Safe asset difficult to be dispossessed
  - Primary source of net worth
  - Legacy asset for family and descendants

In addition, there are several stakeholders that partake in the value of land:

- Land owner
- Tenant
- Tertiary users like land tillers
- Local community

The value of land differs from one stakeholder to the other; however, it is important to consider all stakeholders and all elements of the value of land while determining the nature and extent of compensation for purchase of land.

Value of land can be determined, as per the guidelines laid down by the Regulator, in the following ways:

- **Open-offer price**: After obtaining the consent of land owners, they will be asked to submit their application for sale of land in a reverse-auction process. Once the bidding is complete, the fair value of land can be
determined. Prior to determination of this open offer price, the LDC should have clearly and transparently (as mentioned above) laid down the details of the project

- Open offer can be revised upwards any number of times, with a maximum time limit for validity
- All landowners who tender in the offer finally get the same final 'offer'. [any side deals illegal; and all other land owners become eligible for the same benefit]; which is required to get majority acceptance to the offer; irrespective of when they tendered
- Once a land is tendered in an open offer, it cannot be withdrawn, unless the offer is withdrawn by the acquirer or the time limit expires
- All parties tendering in an open offer, get a "bonus" payment in case the offer is accepted
- In case an offer is accepted, government to facilitate acquisition of remaining land on the same term as the offer, without bonus payments.

- **Multiple of historical price**: The Regulator can set a price based on a multiple of the historical land prices, as mentioned in the land records of the government. The multiple can be derived, by the Regulator, in consultation with different stakeholders such as government land agencies, land owners, local community, land developers / LDCs etc. The value thus derived can be set as the base price and the actual offer can be higher than this value.

### 4.3.3 Acquiring agency

There has been much debate on who should acquire land and while no consensus has been reached, opinions have ranged from government to private sector to a combination of the two.

We recommend that the acquiring agent for land should be an independent commercial entity - Land Development Corporation – that has been licensed by the Regulator to acquire land. The role of LDC would be to acquire and develop the land on behalf of its clients (end users) in exchange of the process and maintenance fee. A state can have multiple LDCs and each LDC will execute projects through SPVs. The operations of the LDC will be under the purview of the Regulator.

The formation of an LDC can be undertaken by a legal commercial entity so long as it meets various criteria set out by the Regulator

- Financial criteria like minimum paid up capital, recommended debt : equity ratios,
- Ownership structure like % of private holding, maximum % of foreign holding, minimum equity holding reserved for the impacted stakeholders in its SPVs, etc.
- Prior experience of one or more partners in land development, rehabilitation etc.
• The LDC needs to clearly spell out the end-use of the land it acquires such as manufacturing park, special industry focused park, geographic focused park etc.

The LDC will be responsible for the following:

• Land acquisition based on zoning performed by the Regulator/ state governments/ local governments

• Building infrastructure on the acquired land
  o transportation, utilities, roads
  o human development infrastructure such as ITIs, schooling, colleges, vocational programs for the displaced
  o social infrastructure like housing colony etc.

• Rehabilitation and resettlement of the impacted stakeholders
  o The LDC has to invest in setting-up and operating an R&R division, which will be funded from the proceeds of the LDC's business to facilitate the above activities. It will need to have the following:
    • Training and skill development infrastructure
    • Vocational training capability and infrastructure
    • Adherence to minimum standards of alternative dwelling
    • Capability in community development such as schools, places of worship etc.

The LDC has to form a Special Purpose Vehicle (SPV) for each of its project outlining clearly the elements of the projects such as

• Proposed end-use of the acquired land
• Timeframe in which the land would be developed
• Type of land that needs to be acquired such as forest land, agricultural land, tribal land, fallow / barren land
• Size of land that needs to be acquired
• Extent of impact of community

The LDC, once formed and licensed by the Regulator, can raise funds for specific projects through SPVs for each project. Typical funding sources for these SPVs can be

• equity participation by financial investors – institutional and retail
• debt from banks and developmental agencies
• long-term special rate loan from government through its special schemes for industrial development
• Land acquisition and development fee from owner of the projects (private or government) for which LDC has acquired land (including cost and margin for LDC)
• The SPV or the parent LDC will have to will have to publish their book value shares, with land values marked to market, or to be listed in the stock exchange such that the value of shares in the SPV can be transparently determined or Process of acquisition

4.3.4 Process of acquisition

The process of land acquisition will be guided by the Regulatory framework applicable for the project characteristics as defined by the LDC in its SPV. The role of local/state government authorities in supporting the acquisition process should be laid out clearly by the regulator based on project characteristics.

The following steps needs to be undertaken in the acquisition process:

• LDC – SPV needs to formally define and communicate the project details to the local community and land owners
• Lay down the compensation structure and the elements of the proposed rehabilitation and resettlement programs (before communication of this, it needs to have been approved by the Regulator)
• Communicate the process, as approved by the Regulator, of determining the fair price of land to all the owners
• Invites applications for sale of land
• Obtain consent for sale of land from different stakeholders (e.g. in certain cases, stakeholders apart from land owners may need to be consented)
• Complete legal documentation and initiate R&R process

Depending on the type of land (e.g. agricultural, forest, fallow etc.) and other project characteristics, the acquisition process may vary

• Minimum % that the SPV needs to acquire from individual land holders before regulation mandates compulsory acquisition of land from other owners
  • E.g. in a certain type of land, once say 75% of the required land has been acquired or consent for acquisition acquired, then the remaining 25% will have to surrender their land at the appropriate compensation
• Nature of consent required from different stakeholders
  • Certain types of projects and land, may require consent from the local community e.g. building of an infrastructure like a dam may have a wider implication on the ecology than just on the land owners

4.3.5 Compensation

Compensation for land has been at the heart of the land controversy. Perceived lack of fairness, lack of participation in future growth, and first-mover disadvantage are the issues related to land compensation.
Compensation for land needs to factor the following:

- Upfront payment
- Annuity income stream
- Participation in the future appreciation due to growth as a result of land development

In addition to the above factors, the land owner needs to have the flexibility to choose a compensation package;

- An owner can choose to take the full-value in upfront compensation or take a part of it as annuity payouts (determined by prevailing financial indicators of the time).
  - The value of land, as determined by the Open-offer price or the Multiple of historical prices, is the base pool for determining the value of upfront compensation and annuity payouts
  - The upfront payment can be in cash or it can be in the form of an alternative parcel of developed land (valued as per the Regulator)
- However, every land owner will necessarily have the component of "Participation in future appreciation" as part of the compensation
  - Depending on the type of land and the project characteristics, a minimum % of the equity holding in the SPV will have to be allocated for the original land owners. Each land owner will get equity share / units proportionate to his land holding
  - For small projects which cannot get SPVs listed the equity holding will be given from LDCs own shares
  - The land owner will have the flexibility to sell his shares (after a minimum lock-in period, if any) at the market prices

4.3.6 Rehabilitation and resettlement

While a fair compensation and a transparent acquisition process is necessary, it is not sufficient to address the concerns of the land owners, majority of whom may not have the capability – financial or otherwise - to rehabilitate their lives from the immediate impact of displacement.

The LDC has to operate a rehabilitation and resettlement program with combination of different elements as below which have been defined by the regulator based on the project characteristics:

- Alternative dwelling, if displaced
- Skill development
- Assistance in employment / income-generating opportunities
  - Opportunities for self-employment (often a preferred mode of livelihood)
  - Employment through vocational training
- Community development
4.3.7 Some other important considerations for land acquisition

Industry responsibility for payment of cost of land acquisition
Industry, as it buys the land from the Land Development Corporation, pays the total cost incurred by the LDC in terms of the market price, share of the appreciating value, and cost of the comprehensive R&R.

Timeframe for land acquisition
There are numerous issues such as cost escalations, delay in project executions, etc, that arise out of the lengthy process of land acquisition. We need to try and ensure that the various following steps in acquisition take place in as short a timeframe as possible:

- Planning for land acquisition and development
- Process of land purchase, transfer
- Development and R&R

Awareness building for landowners
In addition, it would be beneficial for the LDCs to interface appropriately not only with the local self-governance bodies, but also other grass-root level organizations like NGOs in order to build awareness about the land acquisition process, compensation and other issues among the farmers and other landowners.
5 Comments on the draft Land Acquisition and R&R Bill 2011

The Group took a cognizance of the draft Land Acquisition and R&R Bill 2011, brought out by the Ministry of Rural Development, and made the following recommendations and observations:

Consent of Families before undertaking land acquisition
As per the draft bill 80% of the project affected families should give consent before land acquisition can take place for ultimate purpose to transfer it for the use of private companies for stated public purposes. The Group observed that this is too high a percentage and should be revised to 60%.

Acquisition of Multi-Crop Land
The Group felt that though acquisition of multi-crop land should be avoided to the maximum extent possible, it may be unavoidable in certain project categories and states. Hence rather than putting a blanket ban on acquisition of multi-crop land, there should be a separate mechanism to handle exceptions to deal with such acquisition.

Cost of LA & RR Package
The principle of compensating for land should be that the value paid as compensation, upfront, should be such that the normal bank interest earned from it should be higher than the normal earnings from the produce of the land. However, the Group felt that the proposed provisions of multiple of 6X in rural and 3X in urban areas + R&R entitlements would increase the cost of land to prohibitively high levels. This could adversely affect the pace of industrialisation in the country and hence should be carefully re-examined and revised to bring down the cost to industry. In addition, instead of there being a hardwired multiple for the cost, there should be the provision of an alternative in the form of an open-offer price.

Skill development
The Group felt that land acquirers should accord importance to skill development and consider establishing training schools for affected families.

Return of Unutilized Land
One of the clauses in the proposed Bill states that if land that is acquired is not utilised for five years it should be returned. On this issue, the Group opined that rather than imposing 5 years time limit across the board, flexibility should be provided in the Act for State Governments to decide on the time-limit pertaining to return of utilised land depending upon industry type and location of the project, as well as the land use plan proposed by the industry at the time of acquisition.
Industry views on the LARR Bill 2011
The CII have done an exhaustive analysis of the LARR Bill 2011. The comments of the CII are enclosed as Annexure-A.
LARR BILL 2011

1. Acquiring Consent of 80% of affected families and the distinction being made between Government acquiring land for its use / for use of Public Sector & Government Undertakings and for use by Private Companies for Public Purpose:

The bill stipulates that "provision of land in the public interest for private companies for the production of goods for public or provision of public services" is subject to the consent of at least 80% of the project affected people. **This provision is not applicable if the land is procured by Government for its own use or for use by public sector companies or corporations.**

In a democratic, liberalized economy where the private sector is playing an increasing role in the nation's economic growth, why is this distinction being made? Why is private sector being given a different treatment from the public sector?

Consent of the project affected people is sought to be introduced from the point of view of removing 'coercion'. Is the bill stipulating that 'coercion' of people is acceptable for use of the land by Government and by public sector and it is not acceptable only when the land is acquired for use by the private sector? What is the logic? The word "consent" is from the land losers perspective. It is not from the land buyers or land users perspective. The land loser is indifferent to the subsequent use of the land.

We recommend that 'consent' (to whatever extent is stipulated — we recommend 60%) is applied uniformly and equally to all cases of land acquisitions. irrespective of its end use.

The provisions of LARR Bill have already defined the entitlements of the project affected people including the landless and other project affected people. Thus in order to make the process of obtaining consent 'definitive', we propose that consent to be obtained only from the 'land owners' instead of all the project affected people.
Thus the 'project affected families' in Section 8(4) and the 'project affected people' in Section 3 (za) (vii) be replaced by 'land owners'.

2. **Retrospective Applicability:**

Section 24(1) of the bill states that in the cases, where the awards under Section 11 have not been made, the process would lapse upon enactment of the new Bill.

Therefore it would not be appropriate to have the Section 24(2), which states that “Where possession of land has not been taken, ........”.

Therefore, we suggest that all the cases of the land acquisition where the awards under Section 11 would have commenced should be continued to be acquired as per the LA act 1894. This would help in expediting the ongoing projects and avoid unnecessary delays.

3. **The substantial increase in the Land Compensation:**

We are thankful to the Ministry that the multiplier in rural areas, for determining the land compensation, has been made 2, instead of 3 as was in the earlier draft bill. However the Solatium has been left at 100% as per S.No. 5 of The First Schedule.

The principle of Solatium as per LA act of 1894, was primarily to address the concern of “undervaluation of land, done to avoid stamp duty.” In essence, the “Solatium” is equivalent to the “multiplier”. In the proposed bill, the concept of the multiplier takes care of this aspect of undervaluation. Therefore “No” Solatium should be imposed over and above the multiplier. Thus we would suggest that Section 29(1) may be deleted. In case the Solatium is to be retained as a continuity of the LA act of 1894, then it may be retained, at 30% and the multiplier be reduced to 1.5 instead of 2.

We apprehend that the provisions of the bill will lead to spiral increase of land prices. In order to exercise restraint it should be specifically mentioned in the Bill that compensation amount, as described in The First Schedule should not be treated as market price of the land for subsequent acquisition in adjoining areas. This will also ensure that the land losers from the project would not lose their ability to buy land in the vicinity with the enhanced compensation received.
A sample calculation has been done in (Annexure I) which shows a comparison of cost of land for 1000 acres. as per LA Act of 1894 and as per LARR Bill 2011. This shows that the land acquisition cost would go up by 3 - 3.5 times as per the 2011 bill.

4. The definition of “affected family” and its impact on R&R provisions and the cost of R&R:

There are different categories of people / families that are involved in a land, that is proposed to be acquired. Different categories of people / families get affected in different ways and lose different possessions when land is acquired. Typically, families lose one of the following six combinations of possessions when a land is acquired. These 6 combinations are:

1. Families who lose land, house, assets and livelihood.
2. Families who lose land, house and assets.
3. Families who lose land.
4. Families who lose house, assets and livelihood.
5. Families who lose land and livelihood.
6. Families who lose livelihood.

The type of R&R provisions to be made need to, justifiably, be different for each of the above categories, depending on what they lose as a result of land acquisition, keeping in mind that the families need to be much better off than prior to land acquisition.

The tabulation in Annexure-II details: a) category of family, b) what they lose, c) provisions as per LARR bill of 2011 and d) CII’s comments on what is justifiable, depending on what the families lose and therefore on what they should be compensated.

In view of the above, CII recommends that:

a) Instead of using the broad term “affected families”, each category of family need to be clearly described to avoid confusion in enumeration and in giving R&R benefits.

b) As can be seen in Annexure-II, there are cases, as per the LARR Bill 2011, where the R&R provisions are not in alignment with what is lost due to land
acquisition. There are changes required here, as recommended in Annexure-II, in order to bring alignment.

A sample calculation has been done (Annexure III) which details the cost of Resettlement and Rehabilitation as per the stipulations of the LARR Bill 2011 in comparison to the Orissa R&R Policy 2006 (as an example). This shows that the R&R costs would go up by about 3 times compared to the prevailing practice.

5. **Total cost of Land and R&R**
Taking both the compensation for the Land and the R&R costs as calculated by the stipulations of the current draft bill the total cost goes up by over 3 times as compared to the prevailing costs.

Annexures I and II show that for a 1000 acre land, assuming normal characteristics of such lands in rural area, the cost of land acquisition and R&R provisions, taken together, will go up from Rs.409 Crores to Rs.1309 Crores i.e. by 3.2 times.

6. **Impact on Industry**
What would be the impact of this increase in the project cost? In case of a power plant, a 1000 acre land would accommodate a thermal power plant of about 1000 MW. A 1000 MW power plant would cost roughly Rs 5000 — 6000 crores. This would mean that the land and R&R cost, as per the 2011 bill, would work out to about 20% - 25% of the project cost as against 7.8% with prevailing policies.

7. **Consideration for Mineral Extraction, in view of the natural occurrence of minerals:**
We note that special provision to safeguard food security has been incorporated in Chapter III, Section 10.

Minerals occur naturally and locations of their occurrences are not chosen. The exploitation of minerals is essential for economic development of the nation. Thus we suggest that Section (10), dealing with acquisition of multi-crop land should not be applied in the case of mineral extraction projects.
8. **Return of Unutilized land:**

The Clause 95 of the bill envisages return of the land if not utilized for a period of 10 years. While this clause safeguards against indiscriminate land acquisitions, the delay in the project may be due to reasons beyond the control of the industry.

In addition, land for future expansion plans would need to be acquired and may not be utilized in the initial years. We suggest that:

- Industry must submit a "land use plan" and adhere to the plan
- A Committee under the Chairmanship of the Chief Secretary of the State should be empowered to take decision on a case to case basis.

9. **Provisions for R & R in case of Private Procurement of land:**

In the Section (2), the provisions of R & R are made applicable for procurement of land more than 100 acres in rural areas and more than 50 acres in urban areas.

When the land is procured through negotiations between the land owners and private company, the willing seller would already have protected his interest through the quoted prices. Hence making the provisions of R & R applicable to land owner would push the land prices upwards. Therefore the provisions of R & R should be made applicable to other livelihood losers and not to the land owners per se in such cases. To facilitate this, we suggest that necessary amendments should be made in Section 2(2) and Section 42.

10. **Public Purpose:**

In order to give a boost to economic development of the nation, Government announces large infrastructure, manufacturing and utilities projects through Private or PPP, like DMIC, NMIZ etc. Such projects should also be included in the definition of public purpose in Section 3(za)(ii).

11. We recommend that stamp duty and other fees be waived for the registration of the land or house allotted to the affected families. Similarly the capital gain taxes under income tax act should not be applicable for the compensation
amount received by project affected families.

12. With regard to the Special Provisions forScheduled Castes and Scheduled Tribes: the provisions are too complex to implement. We recommend that SC/ST families get 25% higher benefits as compared to others. We recommend doing away with other provisions.

   With regard to the special provision for SC/ST, mentioned in S.No.11 of the Second Schedule, we suggest that these provisions to be made applicable only to the Notified Scheduled Areas. In case of land acquisition in Non Schedule Area, the Commissioner of R & R should be empowered to settle land Rights of the Government Land in favor of the SC/ST families on case to case basis, on merit.

13. Providing public transport in the resettlement village is difficult to implement. This should be the responsibility of the local Government.

14. Section 25: In case no award is made within 2 years of prescribed time – provisions should be introduced to the priority of the project for grant of land at alternative location identified by the Requiring Body.

15. Section 26(1) b: Definitive Land boundary for determination of the average sale price of land may be defined. The term “nearest vicinity area” brings in subjectivity and may lead to contentious reference value for land. A simple linear distance from the nearest urban area could be used as a reference indicator.

16. Section 38: It should also be applicable in the case where after the award has been made, people do not come forward to accept. Adverse possession should be taken over and encumbrance free land to be handed over to the requiring body.

17. In order to reduce the overall project implementation schedule, the Public Hearings for the SIA (Social Impact Assessment) and Environment Clearances etc. should be combined under one Public Hearing for the consent of the people.

18. Section 37 gives the power to the Collector to take the possession of acquired
land only after the entire compensation and R & R entitlements are disbursed.

We apprehend that vested interest groups might restrict or encourage small section of the people, not to accept the compensation. This would delay the possession of land and hence, would affect the project schedule adversely.

Therefore we suggest a provision like Section 31 of the LA act 1894 to be incorporated in the New Bill, wherein the Collector has the power to take over possession of the land after 80% of the compensation are paid for.

This would be fair considering that 80% consent has been envisaged in the overall bill.
**Comparision of Land Acquisition Act 1894 with Land Acquisition Act & Rehabilitation and Resettlement Bill 2011**

**Assumptions:**
- Total land to be acquired/ alienated for the Project (Area in Acres) (No Forest land) = 1000 Acres
- 10% would be Govt. land @ Rs.10.00 lakh per acre (Area in Acres) = 100 Acres
- 10% would be Homestead land @ Rs.20.00 lakh per acre (Area in Acres) = 100 Acres
- 80% would be Agrl. Land(Pvt) @ Rs.10.00 lakh per acre (Area in Acres) = 800 Acres
- Cost of assets (trees/structures/houses/tanks/well) = Rs.5.00 lakh per acre

### Land Acquisition Act 1894

<table>
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<tr>
<th>S.No</th>
<th>Area (in Acres)</th>
<th>Rate per acre (Rs Lakhs)</th>
<th>Total Amount (Rs. Crs)</th>
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<td>Asset value</td>
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### Land Acquisition and R & R Bill 2011

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## R & R Provision - Recommendations for Alignment

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<th>Sl. No.</th>
<th>Family Category</th>
<th>What is Lost?</th>
<th>Provisions as per the proposed LARR Bill 2011</th>
<th>CII's Recommendations</th>
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</thead>
<tbody>
<tr>
<td>1 (a)</td>
<td>Own Land; Own house &amp; Live there; Earn by cultivating the land</td>
<td>Loss of land</td>
<td>Enhanced Compensation for land</td>
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<tr>
<td>1 (b)</td>
<td>Own Land; Own house, but do not live there; &amp; is solely dependent on the earnings from cultivation of the land.</td>
<td>Loss of house &amp; immovable assets</td>
<td>Compensation for house lost + Compensation for assets + House in R&amp;R township with infrastructural facilities</td>
<td>Agree</td>
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<tr>
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<td></td>
<td>Loss of Livelihood</td>
<td>Employment or Cash-in-Lieu or Annuity</td>
<td></td>
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<tr>
<td>1 (c)</td>
<td>Does not Own Land; Encroached on govt. land &amp; has a house in the land &amp; lives there; &amp; is solely dependent on the earnings from cultivation of the encroached govt land.</td>
<td>Loss of land</td>
<td>For SC / ST Families, the land will be settled &amp; enhanced replacement value. Other encroachers will not get compensation for encroached land</td>
<td>Agree</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Loss of house &amp; immovable assets</td>
<td>Compensation for house lost + Compensation for assets + House in R&amp;R township with infrastructural facilities</td>
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<tr>
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<td>Loss of Livelihood</td>
<td>Employment or Cash-in-Lieu or Annuity</td>
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<td>2 (a)</td>
<td>Own Land; Own house &amp; Live there; But not dependent on the land for livelihood</td>
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<td>Enhanced Compensation for land</td>
<td>As there is no loss of livelihood and they have been compensated well for the land, house and assets. They should not be considered for employment, annuity or cash-in-lieu.</td>
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<tr>
<td>2 (b)</td>
<td>Own Land; Own house, But do not live there; &amp; is not dependent on the earnings from the cultivation of the land.</td>
<td>Loss of house &amp; immovable assets</td>
<td>Compensation for house lost + Compensation for assets + House in R&amp;R township with infrastructural facilities</td>
<td>Employment or Cash-in-Lieu or Annuity</td>
</tr>
<tr>
<td>3</td>
<td>Own Land; does not have a house in the land &amp; does not live there; &amp; is not solely dependent on the earnings from cultivation of the land.</td>
<td>Loss of land</td>
<td>Enhanced Compensation for land</td>
<td>As there is no loss of livelihood and they have been compensated well for the land. They should not be considered for employment, annuity or cash-in-lieu.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Employment or Cash-in-Lieu or Annuity</td>
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<td>Provisions as per the proposed LARR Bill 2011</td>
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<td>---------------------------------------------------------------------------------------</td>
</tr>
</tbody>
</table>
| 4 (a)  | Does not Own Land; But has a house in the land & lives there; & is solely dependent on the earnings from cultivation of the land of other owners in the acquired land. | - Loss of house & immovable assets  
- Loss of Livelihood | Compensation for house lost + Compensation for assets + House in R&R township with infrastructural facilities  
Employment or Cash-in-Lieu or Annuity | Agree |
| 4 (b)  | Does not own land; But lives there and earns livelihood by providing services to the villagers |                                                                          | Compensation for house lost + Compensation for assets + House in R&R township with infrastructural facilities  
Employment or Cash-in-Lieu or Annuity | Artisans / Petty shop owners who live in the village will not lose their livelihood as they can continue to provide the services in the rehabilitation colonies. Therefore, they should not be considered for employment, annuity or cash-in-lieu. |
| 5      | Own Land; does not have a house in the land & does not live there; & is solely dependent on the earnings from cultivation of the land. | Loss of land  
Loss of Livelihood | Enhanced Compensation for land  
Employment or Cash-in-Lieu or Annuity | Agree |
| 6 (a)  | Does not Own Land; Does not live there, But is solely dependent on the earnings from cultivation of the land of other land owners in the | Partial loss or full loss of livelihood |                                                                                                          | Agree |
| 6 (b)  | Does not own land; Does not live there and earns livelihood by providing services to the villagers. | Partial loss of livelihood | Employment or Cash-in-Lieu or Annuity | Artisans & other service providers, not living in the land, will not lose livelihood as they will continue to provide services in the area. Therefore, they should not be considered for employment, annuity or cash-in-lieu. |
| 6 (c)  | Families whose primary source of livelihood is dependent on forests & water bodies in the | Loss of Livelihood |                                                                                                          | Agree |
| 6 (d)  | Tribals & Other Forest Dwellers who have lost their traditional rights due to the land acquisition | Partial loss of livelihood |                                                                                                          | Agree |
### Cost of R & R as per LARR 2011 Bill and Comparison with Earlier Policy

#### Assumptions for the typical case:

<table>
<thead>
<tr>
<th>Area of Land to be acquired (In Acres) - (800 acres pvt. Agril. Land &amp; 100 acres govt. land and 100 acres homestead pvt. land)</th>
<th>Bill-2011</th>
<th>Old Act/policy</th>
</tr>
</thead>
<tbody>
<tr>
<td>1000</td>
<td>1000</td>
<td></td>
</tr>
</tbody>
</table>

#### Enumeration of the Affected Families (Section 3 (c) of the LARR Bill 2011)

<table>
<thead>
<tr>
<th>3 (c)(i) - No. of Families whose land or other immovable property has been acquired or who have been permanently displaced from their land or immovable property</th>
<th>Bill-2011</th>
<th>Old Act/policy</th>
</tr>
</thead>
<tbody>
<tr>
<td>5300</td>
<td>2600</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>No. of Families losing homestead in the land to be acquired: (i.e., those families whose land &amp; homestead land is to be acquired)</th>
<th>Bill-2011</th>
<th>Old Act/policy</th>
</tr>
</thead>
<tbody>
<tr>
<td>1500</td>
<td>700</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>No. of Families whose land is to be acquired, but not losing any homestead: (People staying in nearby villages or towns)</th>
<th>Bill-2011</th>
<th>Old Act/policy</th>
</tr>
</thead>
<tbody>
<tr>
<td>500</td>
<td>200</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>3 (c)(ii) - No. of Families which does not own any land but a member or members of such family may be agricultural labourers, tenants, share croppers or artisans or may be working in the affected area for three years prior to the acquisition, whose primary source of livelihood stand affected by the acquisition of land.</th>
<th>Bill-2011</th>
<th>Old Act/policy</th>
</tr>
</thead>
<tbody>
<tr>
<td>1000</td>
<td>500</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>No. of Families, who does not own any land but reside in the affected area and their primary source of livelihood stand affected.</th>
<th>Bill-2011</th>
<th>Old Act/policy</th>
</tr>
</thead>
<tbody>
<tr>
<td>3600</td>
<td>1800</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>No. of Families, who does not own any land and do not reside in the affected area and their primary source of livelihood stand affected.</th>
<th>Bill-2011</th>
<th>Old Act/policy</th>
</tr>
</thead>
<tbody>
<tr>
<td>600</td>
<td>300</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>3 (c)(iii) No. of Families who are: Tribals and other traditional forest dwellers who have lost any of their traditional rights recognised under the Scheduled Tribes &amp; other Traditional Forest Dwellers Act 2006.</th>
<th>Bill-2011</th>
<th>Old Act/policy</th>
</tr>
</thead>
<tbody>
<tr>
<td>3000</td>
<td>1500</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>3 (c)(iv) - No. of Families whose primary source of livelihood for three years prior to the acquisition of the land is dependent on forests or water bodies and includes gatherers of forest produce, fisher folk and boatmen and such livelihood is affected.</th>
<th>Bill-2011</th>
<th>Old Act/policy</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>3 (c)(v) - No. of Families, who have been assigned land, by the state government or the Central Government under any of its schemes in the affected area.</th>
<th>Bill-2011</th>
<th>Old Act/policy</th>
</tr>
</thead>
<tbody>
<tr>
<td>200</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>

#### No. of Families to be displaced

<table>
<thead>
<tr>
<th>Bill-2011</th>
<th>Old Act/policy</th>
</tr>
</thead>
<tbody>
<tr>
<td>1300</td>
<td>600</td>
</tr>
</tbody>
</table>

### Elements of Resettlement & Rehabilitation Entitlements

<table>
<thead>
<tr>
<th>SI No.</th>
<th>Elements of Resettlement &amp; Rehabilitation Entitlements</th>
<th>As per the Orissa Resettlement &amp; Rehabilitation Policy 2006</th>
<th>Amount (In Rs. Crores)</th>
<th>As per the Land Acquisition, Rehabilitation &amp; Resettlement Bill 2011</th>
<th>Amount (In Rs. Crores)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Provision for Housing units</td>
<td>House building assistance @Rs. 1.5 Lakhs per displaced family (=Rs. 1.5L X 600)</td>
<td>9.00</td>
<td>One-time financial assistance @ Rs. 1.5 Lakhs (=Rs. 1.5L X 1300)</td>
<td>19.50</td>
</tr>
<tr>
<td>2</td>
<td>Employment</td>
<td>Employment or Cash-in-lieu of employment @Rs. 5 Lakhs per displaced family (=Rs. 5L X 600)</td>
<td>30.00</td>
<td>Choice of Annuity or Employment or cash-in-lieu (= Rs. 5L X 5300)</td>
<td>265.00</td>
</tr>
<tr>
<td>3</td>
<td>Subsistence grant for the displaced families</td>
<td>Maintenance Allowance for displaced families @ Rs. 2000 per month for 12 months (=Rs.0.24L X 600)</td>
<td>1.44</td>
<td>Subsistence grant @ Rs. 3000 per month per displaced family for 12 months. (=Rs. 0.38L X 1300)</td>
<td>4.68</td>
</tr>
<tr>
<td>4</td>
<td>Transportation Cost</td>
<td>Transportation cost @ Rs. 2000 per displaced family (=Rs. 2000 X 600)</td>
<td>0.12</td>
<td>Transportation Cost @Rs. 0.5 Lakhs per displaced family. (=Rs. 0.5L X 1300)</td>
<td>6.50</td>
</tr>
<tr>
<td>5</td>
<td>Temporary shed assistance</td>
<td>Temporary shed assistance @ Rs. 10000 per displaced family (=Rs. 0.10L X 600)</td>
<td>0.60</td>
<td>One-time resettlement Allowance @ 0.50 Lakhs (=Rs. 0.5L X 1300)</td>
<td>26.50</td>
</tr>
<tr>
<td>6</td>
<td>Cattle shed / petty shops cost</td>
<td>Each displaced family @Rs. 0.25 Lakhs (=Rs.0.25L X 1300)</td>
<td>3.25</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Rehabilitation Colony infrastructure</td>
<td>Rehabilitation Colony infrastructure</td>
<td>140.00</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Total

<table>
<thead>
<tr>
<th>Bill-2011</th>
<th>Old Act/policy</th>
</tr>
</thead>
<tbody>
<tr>
<td>151.16</td>
<td>465.43</td>
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</table>
REPORT ON WATER
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<th>Contents</th>
<th>Page #</th>
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<td>India is moving towards perennial water shortages; per-capita availability is falling &amp; demand is increasing.</td>
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<td>1.3</td>
<td>Water storage capacity in India is inadequate</td>
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<td>Policy &amp; Institutional Framework</td>
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<td>2.2</td>
<td>Governance deficit and multiple fragmented institutional complexes</td>
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<tr>
<td>2.3</td>
<td>Transfer ‘Water’ into concurrent list</td>
<td>8</td>
</tr>
<tr>
<td>2.4</td>
<td>Create over-arching ‘Water Act’</td>
<td>8</td>
</tr>
<tr>
<td>2.5</td>
<td>Establish a National Water Regulator</td>
<td>9</td>
</tr>
<tr>
<td>2.6</td>
<td>Create River Basin Organization Mandated and Empowered for IWRM</td>
<td>10</td>
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<tr>
<td>2.7</td>
<td>Establish National Water Registry and Information System (NWRIS)</td>
<td>11</td>
</tr>
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<td>3</td>
<td>Water Management in Industries</td>
<td>13</td>
</tr>
<tr>
<td>3.1</td>
<td>Water Usage by Industries</td>
<td>13</td>
</tr>
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<td>3.2</td>
<td>Higher water intensity in the Indian industry compared to global benchmarks</td>
<td>14</td>
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<tr>
<td>3.3</td>
<td>Improve Water use Efficiency</td>
<td>15</td>
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<td>3.4</td>
<td>Establish Bureau of Water Efficiency</td>
<td>15</td>
</tr>
<tr>
<td>3.5</td>
<td>Create Equity and Efficiency based Water Pricing Regime for Industries.</td>
<td>15</td>
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<td>3.5.1</td>
<td>Water Tariff in Indian Industry</td>
<td>16</td>
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<td>3.5.2</td>
<td>Instruments of Water Charging</td>
<td>16</td>
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<td>3.5.3</td>
<td>Approach to Water Pricing for Industry</td>
<td>18</td>
</tr>
<tr>
<td>3.5.4</td>
<td>Suitable tariff structure for industry</td>
<td>19</td>
</tr>
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<td>3.6</td>
<td>Reuse and Recycle of Waste water in Industry</td>
<td>20</td>
</tr>
<tr>
<td>3.6.1</td>
<td>Overview of Water Recycling Practices</td>
<td>20</td>
</tr>
<tr>
<td>3.6.2</td>
<td>Promote reuse and recycle of wastewater in Industries</td>
<td>21</td>
</tr>
<tr>
<td>3.7</td>
<td>Enforce system of ‘Water Return’</td>
<td>22</td>
</tr>
<tr>
<td>3.8</td>
<td>Create Centers of Excellence for Water Efficient Manufacturing Processes and Equipment</td>
<td>22</td>
</tr>
<tr>
<td>3.9</td>
<td>Enhance Ground Water Management and Regulation</td>
<td>23</td>
</tr>
<tr>
<td>3.10</td>
<td>Launch National Program for ‘Awareness, Education &amp; Promotion of Water Conservation’</td>
<td>24</td>
</tr>
<tr>
<td>3.11</td>
<td>Promoting rain water harvesting in industry both within and beyond the fence</td>
<td>24</td>
</tr>
<tr>
<td>3.12</td>
<td>Promote ‘Public Private Community Partnerships’ in Urban Water Sector</td>
<td>24</td>
</tr>
<tr>
<td>3.13</td>
<td>Focused capacity and skill up gradation programs</td>
<td>24</td>
</tr>
<tr>
<td>References</td>
<td></td>
<td>25</td>
</tr>
<tr>
<td>4</td>
<td>Annexes</td>
<td>26</td>
</tr>
<tr>
<td>Annexure I</td>
<td>Sub Groups on Land and Water</td>
<td></td>
</tr>
<tr>
<td>Annexure II</td>
<td>Assessment of Live Storage (+Table A, B &amp;C)</td>
<td></td>
</tr>
<tr>
<td>Annexure III</td>
<td>Advantage of Basin Level Approach</td>
<td></td>
</tr>
<tr>
<td>Annexure IV</td>
<td>Role of National Bureau of Water Efficiency</td>
<td></td>
</tr>
<tr>
<td>Annexure V</td>
<td>Role of National Water Regulatory Authority</td>
<td></td>
</tr>
<tr>
<td>Annexure VI</td>
<td>Technology details for reuse and recycle of wastewater</td>
<td></td>
</tr>
<tr>
<td>Annexure VII</td>
<td>Water Tariff structure of Delhi Jal Board</td>
<td></td>
</tr>
</tbody>
</table>
Abstract

India is faced with a sense of crisis with its Water Resource Management; arises from lower availability, increasing demand, polluted water bodies, inadequate storage. This is aggravated by deficient guiding policies, lack of legislation and institutional mechanism needed for integrated water resource management. Wide temporal and spatial variations in water availability limit the relevance of national aggregation and averages. Leaving aside the debate around figures of ‘available’ and ‘usable’ water, there is general consensus around the projections that indicate that by 2050 India’s water demands will exceed all available and usable sources of supply. Current water development and management is not sustainable; unless dramatic changes are made – and made soon.

This report is from the working group on 'Land and Water' constituted under Industries Division of the Planning Commission to assess the present position and recommend measures to be include in the Twelfth Five Year Plan (2012-17) to improve upon the two important components affecting the growth of Indian industry; findings are from the 'Water Sub Group'.

Report takes an overall view of Water Resource Management in the country covering all the competing sectors. India’s population is expected to reach 1.66 Billion by 2050 and the production of water-intensive crops is expected to grow by 80% between 2000 and 2050 (Grail Report – Water-The Indian Story); 70% of India’s irrigation needs and 80% of its domestic water supplies come from groundwater, this has seriously depleted water tables and aquifers; Industrial water consumption is expected to increase sharply to 160 BCM by 2050; 40% of industrial waste water and about 75% of the municipal waste water is released untreated resulting in polluted water bodies.

The report proceeds to make specific recommendations with an emphasis on both "demand" and "supply" side management of 'Water for Industries'; within the larger scheme for effective management of this primal resource; in that it discusses a three pronged approach – a) Overarching national policy and enabling legislation b) Technology and Capacity build c) Institutional frame work and an effective operating mechanism. The recommendations made are directional and need to be fleshed out for operational details. CII can work with the Planning Commission in taking each of the recommendations to an 'actionable plan’ with details for implementation by the Indian government.
SECTION I – Background

1.1 Present water availability and precipitation in India

The utilizable water resources of the country have been assessed at 1123 billion cubic meters (BCM), of which 690 BCM is from surface water and 433 BCM from ground water sources. In India, the rainfall pattern is widely varying in time and space. Bulk of the precipitation occurs during four monsoon months which amounts to about 75% of the total annual rainfall. As a result, the Indian rivers, particularly the non-perennial ones, carry very meager discharge during non-monsoon months. The water resource data of the country including precipitation is enclosed herewith in Table 1.1.

Table 1.1 Water resource data for India: (Source-Central Water Commission)

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Sub heads</th>
<th>Quantity in BCM</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Average annual precipitation</td>
<td>4000</td>
</tr>
<tr>
<td>2</td>
<td>Average precipitation during monsoon (Jun – Sep)</td>
<td>3000</td>
</tr>
<tr>
<td>3</td>
<td>Natural runoff</td>
<td>1986.5</td>
</tr>
<tr>
<td>4</td>
<td>Estimated utilizable surface water resources</td>
<td>690</td>
</tr>
<tr>
<td>5</td>
<td>Total utilizable ground water resources</td>
<td>433</td>
</tr>
<tr>
<td></td>
<td>Total annual utilizable resources</td>
<td>1123</td>
</tr>
</tbody>
</table>

1.2 India is moving towards perennial water shortages; per-capita availability is falling & demand is increasing.

With high rate of population growth and intensifying water consumption across all sectors (industry, agriculture, domestic and municipality), the per capita availability of water, one of the many indicators of an oncoming crisis, has declined over the years. Presently it is around 1720.29 cum per capita going by the Central Water Commission data. The total water demand is projected to increase by 22 % by 2025, and 32 % by 2050 (Table 1.2). A major part of the additional water demand is from the domestic and industrial sectors. The water demands of the domestic and industrial sectors will account for 8 % and 11 % of the total water demand by 2025. And these shares will increase to 11 % and 18 %, respectively, by 2050.
Moreover, the domestic and industrial sectors will account for 54% of the additional water demand by 2025, and more than 85% by 2050. *India’s Water Supply and Demand from 2025-2050: Business-as-Usual Scenario and Issues* by: Upali A. Amarasinghe, Tushaar Shah, and 2B.K. Anand - International Water Management Institute, New Delhi, India, 2Consultant, Bangalore, India.

**Table 1.2 Water demand projections** (Source Business-as-Usual Scenario and Issues by: Upali A. Amarasinghe, Tushaar Shah, and B.K. Anand)

<table>
<thead>
<tr>
<th>SECTOR / YEAR</th>
<th>2000</th>
<th>2025</th>
<th>2050</th>
</tr>
</thead>
<tbody>
<tr>
<td>Irrigation (BCM)</td>
<td>605</td>
<td>675</td>
<td>637</td>
</tr>
<tr>
<td>Domestica (BCM)</td>
<td>34</td>
<td>66</td>
<td>101</td>
</tr>
<tr>
<td>Industrialb (BCM)</td>
<td>42</td>
<td>92</td>
<td>161</td>
</tr>
<tr>
<td>Total in BCM</td>
<td>680</td>
<td>833</td>
<td>900</td>
</tr>
</tbody>
</table>

Notes: a) Domestic withdrawals include those for livestock, b) Industrial withdrawals include cooling needs for power generation and BCM is Billion Cubic Meter.

With the reduction in availability and increasing water demand across all the sectors, India is fast moving towards perennial water shortages.

### 1.3 Water storage capacity in India is inadequate

India is among the wettest in the world, getting around 4000 BCM average annual rainfall. In spite of the large total renewal water resources (TRWR) in the form of rain in India, potentially utilizable water resources (PUWR) are only a fraction of the TRWR. The Brahmaputra and Megna basins cannot physically store their massive water resources (677 BCM or 35% of India’s TRWR), and therefore mainly due to such physical constraints, only 18% of the TRWR is potentially utilizable there.

Most other basins, especially those in the peninsular, receive their renewable water resources from the 2 to 3 months of monsoonal rains. As a result, some basins have a very low PUWR. In fact, each of as many as eight basins had a per capita PUWR less than 1,000 m³ of water person in the year 2000, a level indicating severe regional water scarcity according to Falkenmark et al. (1989).

Overall, the PUWR of surface water and groundwater that can be diverted to various human and other uses are estimated as 1,030 BCM (Source: Central Water Commission 2004).
Working Group constituted by the Planning Commission for Water Resources for XI Plan (2007-08 – 2011-12) in its report has stated that creation of more storages in the country is absolutely essential for meeting future water requirement of the country. The live storage in the country has been built up from 15.6 BCM at the time of independence to the present level of about 213 BCM.

Even after attainment of such position, the per capita storage in the country is only about 210 m³, which is way behind the achievement in many of the developed & developing countries, such as, Russia (6103 m³), Australia (4733 m³), Brazil (3145 m³), USA (1964 m³), Turkey (1739 m³), Spain (1410 m³), Mexico (1245 m³), China (1111 m³) and South Africa (753 m³).

The global scenario is definitely a pointer towards need for creation of more storage to cope up with temporal and spatial variation in rainfall in the country and erratic climatic change. Further information water storage is enclosed as below:

- **Annexure II**  
  Assessment of live storage.
- **Table B & C**  
  Basin wise storage in the country & State wise position of live storage capacity

*It is with this in the backdrop that key issues facing the Water Sector in India is discussed in the next section and recommendations are made. Approach has been to maintain the 'center of gravity' around issues related to 'Water for Industries' and where necessary touch other sectors for the inter-linkage and in matters of Policy and Legislation.*
SECTION II – Key Issues & Recommendations.

2. Policy & Institutional Framework

2.1 Governance deficit and multiple fragmented institutional complexes.

Water is a state subject and here is the overview of the Constitutional background:

*Under the scheme of the Constitution, 'Water' is basically a State subject and the Union comes in only in the case of inter-state river waters.*

*The rural water supply too is a State subject and State Governments/ its agencies are primarily responsible for drinking water supply in rural areas. After the 73rd Amendment in the Constitution of India, rural water supply has been placed in the 11th Schedule of the Constitution and is to be transferred to Panchayati Raj Institutions (PRIs).*

At the national level, Ministry of Water Resources (MOWR) is responsible for managing water resources.

While under MOWR, there are number of technical agencies, such as Central Water Commission (CWC) to manage surface water, Central Ground Water Board (CGWB) on ground water resources and National Water Development Agency (NWDA) in assessing inter-basin transfer options, the Minister of Urban Development is responsible for managing the Urban Water and the Ministry of Rural Development is in-charge of managing the rural water supply.

With increasing demand, growing water shortages there is a need to pursue integrated water resource planning with an emphasis on convergence of the various water programs.

Hence, the need for a single binding ‘Act’ that will thread together at National level the multiple ministries and departments involved, for integrated management of Water.

If the environmental, ecological, social/human, and rights concerns relating to water had been as sharply present to the makers of the Constitution as they are to us now, it seems very probable that the entries in the Constitution would have been different. (Incidentally, there are serious concerns now relating to groundwater — rapid depletion of aquifers in many parts of the country, the emergence of arsenic and fluoride in many States, etc. — however there is no explicit reference to groundwater or aquifers in the Constitution.)

Also a new factor not foreseen even a few decades ago is climate change and its impact on water resources. This is a subject, which is still under study and research, but it is clear that coordinated action will be called for not only at the national level but also at the regional and international levels. The Central government has necessarily to play a lead role in this regard.
In light of the above, of all the subjects that are or ought to be in the Concurrent List of the constitution, water ranks higher than any other and hence the policy recommendations that follow:

2.2 Transfer ‘Water’ into concurrent list

For good governance and integrated planning of the water resources of our country at National Level we suggest shifting of ‘water’ as a subject under the Concurrent List of the Indian Constitution in line with single directive on water in European Union. However the entire procedure is to be carefully drafted since putting water into the Concurrent List is not necessarily an act of centralization, though it could lead to such a development. That danger is real and needs to be avoided.

Legislation and executive action must continue to be undertaken at the appropriate level (Central, State or at local self-Government bodies) in each case. The subsidiarity principle, i.e., the principle that decisions must be taken at the lowest appropriate level, will continue to be valid. The practical and political difficulties of shifting it remain, but these would need to be overcome. The Central government has necessarily to play a lead role in this regard.

The Centre should also exercise its legislative powers relating to inter-State rivers provided for in Entry 56 in the Union List, and should re-activate the dormant River Boards Act 1956.

It would further have to be supplemented by recourse to the wide-ranging provisions of the Environment (Protection) Act 1986 (EPA). It is of course possible for Parliament to legislate on a State subject if a certain number of State assemblies pass resolutions to that effect; which was the route followed in the case of the Water (Control and Prevention of Pollution) Act 1974.

At present, the EPA is being extensively used by the Centre for water-related action. For instance, the Central Groundwater Authority was set up in 1998 by a notification under the EPA. More recently, when it was considered necessary to set up a National Ganga River Basin Authority this was done under the EPA, instead of following the right but difficult course of enacting legislation under Entry 56.

2.3 Create over-arching ‘Water Act’

The Government of India should enact an over-arching Water Act to signal water sector as an important policy priority.

At present, different parts of the water value chain and service delivery are addressed by different Acts such as Inter-state Water Disputes Act, Pollution Control regulations etc., resulting in a diffused policy and legal framework for Water sector.
In this context, a comprehensive over-arching legal framework at the national level could signal greater recognition and importance accorded to the Water sector. This is consistent with similar initiative in the Electricity sector that has contributed in no small measure to greater clarity on policy objectives, institutional frameworks and targets for access and service delivery. Similar legislation for water also exists in other countries. There is national level legislation on similar lines in the United Kingdom and South Africa.

An over-arching legislation could pave the way for greater clarity on water rights, regulation and protection of water resources, better community participation, effective dispute resolution etc. It should encourage water efficiency in industry, agriculture and municipality.

2.4 Establish a National Water Regulator

The recent addition to reform measure in the Water Sector is establishment of independent regulatory authorities brought in through enactment of laws at the State level. Such laws have already been passed in States like Maharashtra, Uttar Pradesh, Andhra Pradesh and Arunachal Pradesh. Other States are also planning for the same.

Perspective

The National Regulator should be able to meet the expectations of two broad stakeholders, one is the interest of the service users and the other is the interest of the market including the private sector players. The key interventions expected from the regulatory body in Indian water sector are:

- It should be the core of the institutional framework for water resource management – lay down the rules and methods for State regulators
- Create overarching legal & regulatory framework for water management – rights, usage, priority and pricing.
- Build collaborative framework/platform for river basin management
- Bringing out the public interest at the center stage of the governance of the sector.
- Ensure participation of all key stakeholders including marginalized sections of the society.

Conclusion

Establishment of regulatory authority in water sector is expected to change the process of decision making by offsetting political influences, would create an enabling environment for private investor in this sector, thus increasing the efficiency in the sector.
However we need to ensure that the regulatory authority is accountable by putting in place robust procedures to bring transparency and public participation in the functioning of the regulatory agency.

The role envisaged for the National Regulatory Authority of India is enclosed as Annexure V.

2.5 Create River Basin Organizations Mandated and Empowered for IWRM

The fifth goal of the National Water Mission is to promote basin level integrated water resource management. Convergence among various programs, water related Government institutions and departments is the need of the hour. This would lead to comprehensive water resource management both at State and National Level involving all the respective stakeholders.

River Basin Organizations in India are typically either headed by the Ministry of Water Resources or Power or a Chairman appointed by the GOI (who may be a chief engineer of that particular basin or in certain cases may be the Chairman of the Central Water Commission).

The structure of the RBOs is generally highly bureaucratic, with no participation of the stakeholders. A few water users of water using sector are generally represented on these boards. Over the past 50 years several River Basin Authorities have been constituted. A few noteworthy RBOs are; the Damodar Valley Corporation, the Tungabhadra Board, Bhakra – Beas Management Board, Cauvery river authority, Ganga Flood Control Board, Brahmaputra Board, etc. Despite this, the National Commission for Integrated Water Resources Development Plan admits in one of its reports submitted in 1999 that India does not have a successful model of RBO and it is in this report it recommended for a model RBO. Till date such a model RBO has not yet been constituted.

There is a need to promote a few pilot RBOs as models to refine and replicate later. The RBOs must be mandated and empowered for IWRM; Coordinated and conjunctive use of all water – by location (surface, ground), by users (rural, urban, peri-urban) or by use (domestic, irrigation, industrial and institutional) – is a working definition of integrated water resource management (IWRM). In the absence of demand management (inducing water conservation through prices or other incentives) in urban as well as rural India, supply augmentation alone is not likely to bring supply in line with demand.

The advantages of river basin level water resources management is enclosed as Annexure III.
2.6 Establish National Water Registry and Information System (NWRIS)

For water management to be effective it has to cut across State & political boundaries. A National institutional framework supported by a robust information backbone and a transaction platform is envisaged to be a definitive step towards integrated water management. The concept proposed here does not address the institutional requirement but articulates the ‘information frame work’ necessary for any such organization to be effective. In water sector ‘what needs to be done’ is well understood, but the acute deficit is in its implementation.

There are number of existing information portals at the national level on water resources and NWRIS does not propose to reinvent them.

Existing information portal

At present, there are six or more information portals run by various agencies of government that focus on different aspects of water resource e.g. Central Ground Water Board (CGWB) on ground water, Central Pollution Control Board (CPCB) focuses on water quality, Central Water Commission (CWC) & Indian Space Research Organization (ISRO) jointly provide water resources data.....so on. These are discussed briefly in the succeeding paragraphs.

- **India Water** – This is a CWC initiative that makes hydrological/hydro-meteorological data available to users. This portal contains information about both surface and ground water in the peninsular regions covered under CWC, CWGB and nine other states. Water quality & precipitation data is not available on this portal.

- **India – WRIS** – This is a CWC and ISRO initiative taking the India Water initiative further by providing comprehensive information of 30 geospatial layers to the end user. Water quality & precipitation data is not available on this portal.

- **ISRO** – Remote Sensing enabled mapping, studying & monitoring of water resources including recharge zones, floods, drought assessment, etc., information is available on the portal. Water quality & precipitation data is not available on this portal.

- **CGWB** – Network of databases and databanks of hydrological data under World Bank aided project. A Ground Water Estimation & Management System is available with information from State and Central Ground Water agencies. Surface water resources, quality & precipitation data is not available on this portal.

- **Indian Meteorological Department (IMD)** – Forecast data for precipitation is made available on this portal. Water resources & quality data is not available on this portal.

- **CPCB** – Water quality data of river basins across India is available on this portal. Water resources & precipitation data is not available on this portal.
Objective of NWRIS

The objective of NWRIS is to integrate various existing information systems to cut across multiple vertical institutions related to Water Resources and offer a platform for interactive and participatory nature of management that is needed. In addition NWRIS proposes a strong transactional layer that can be an effective tool for implementation of policies by the member organizations; this could be as varied as implementing ‘ground water permit’ that Model Ground Water Bill proposes to.... ‘Efficiency and Equity based tariff’ for industries to...... filing of annual ‘Water Returns’ (discussed later in this section). NWRIS can be a useful tool for participatory governance by ‘Water User Associations’.

NWRIS will act as an aggregator and integrator of information available with various agencies of the government. This would play a major role in strategic planning of IWRM + offer a robust implementation vehicle for policies at multiple (National, State and Local) levels. This will aid collaboration and diplomacy between multiple users and stakeholders necessary for effective management of Water Resources.

NWRIS framework

NWRIS will function as an information repository for all the information regarding water resources – quality, quantity, precipitation, storage capacities, etc down to local level. The objective is not to reinvent the wheel but to integrate all the information available at different sources. It will also integrate information from and for organizations that could get newly formed like National Bureau of Water Efficiency (NBWE) and National Water Regulatory Authority (NWRA).

The transaction layer in the framework will be the vehicle through which the member agencies could implement their policies; for example it is suggested that the National Bureau for Water Efficiency create an ecosystem for driving water efficiency. One option to do this is to create a market mechanism of accredited private agencies that can audit and certify for a ‘Water User’ and NWRIS can be used to manage both the information and transactions needed to implement this; Similarly for transactions related to CPCB, NWRIS could be used to file ‘Annual Water Returns’ by major water using Businesses & Industries; it can be the platform on which Water trading can happen within a River Basin. NWRIS framework is envisaged as an overarching network of Information System that will integrate, aggregate and bring the power of information and transaction for collaborative management of Water Resources. This is thematically presented in the Fig 1 below.
Fig 1: NWRIS Framework


The concept articulated here is a straw man and needs to be fleshed out in greater details.

3. Water Management in Industries

3.1 Water usage by Industries

The utilization of the available water resources by the industry is given below based on research done by Centre of Science and Environment, New Delhi taking into consideration the base data from the website of Central Pollution Control Board.

Table 3.1 - Water usage by industry (Source- Estimated by CSE based on the wastewater discharged data published by CPCB in 'Water quality in India(Status and trends) 1990 - 2001'.) – Over next page

<table>
<thead>
<tr>
<th>Industrial Sector</th>
<th>Annual wastewater discharge (million cubic meters)</th>
<th>Annual water consumption (million cubic meters)</th>
<th>Proportion of water consumed in industry (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thermal power plants</td>
<td>27000.9</td>
<td>35157.4</td>
<td>87.87</td>
</tr>
<tr>
<td>Engineering</td>
<td>1551.3</td>
<td>2019.9</td>
<td>5.05</td>
</tr>
<tr>
<td>Pulp and paper</td>
<td>695.7</td>
<td>905.8</td>
<td>2.26</td>
</tr>
<tr>
<td>Textiles</td>
<td>637.3</td>
<td>829.8</td>
<td>2.07</td>
</tr>
<tr>
<td>Sector</td>
<td>Average water consumption in Indian industry</td>
<td>Benchmarks</td>
<td></td>
</tr>
<tr>
<td>-----------------------</td>
<td>---------------------------------------------</td>
<td>---------------------------------</td>
<td></td>
</tr>
<tr>
<td>Thermal power plant</td>
<td>Coal based thermal plants: 2 m$^3$/MWH</td>
<td>International: 2.79 m$^3$/MWH(2)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>CPCB: 3 m$^3$/MWH</td>
<td></td>
</tr>
<tr>
<td>Pulp &amp; Paper</td>
<td>Wood based mills: 65 to 70 m$^3$/MT</td>
<td>National: 18.8 m$^3$/MT(1)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>International: 40 m$^3$/MT (3)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>CPCB: 80 m$^3$/MT (1)</td>
<td></td>
</tr>
<tr>
<td>Integrated Iron &amp;</td>
<td>5 to 7 m$^3$/MT of steel under closed system</td>
<td>National: 2.8 m$^3$/MT(1)</td>
<td></td>
</tr>
<tr>
<td>steel plant</td>
<td></td>
<td>International: 3.8 m$^3$/MT (4)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>CPCB: 8 m$^3$/MT</td>
<td></td>
</tr>
<tr>
<td>Cement</td>
<td>0.30 to 0.35 m$^3$/MT</td>
<td>National: 0.1 m$^3$/MT(1)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>International: 0.08 m$^3$/MT (5)</td>
<td></td>
</tr>
<tr>
<td>Fertilizer industry</td>
<td>Nitrogenous fertiliser plant - 5.0 - 20.0 m$^3$/ tonne(3)</td>
<td>National Benchmark (Nitrogenous fertilizer) 7.3 m$^3$/MT of Urea</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1. Straight phosphatic plants - 1.4 - 2.0 m$^3$/ tonne(3)</td>
<td>CPCB - 10 m$^3$/MT of Urea</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. Complex fertilizer - 0.2 - 5.4 m$^3$/ tonne(3)</td>
<td>Discharge norms nitrogenous fertilizers:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>An effluent discharge of less</td>
<td>CPCB - 5 m$^3$/MT of Urea</td>
<td></td>
</tr>
</tbody>
</table>

3.2 Higher water intensity in the Indian industry compared to global benchmarks

After agriculture, industry is the second largest consumer of water. The Central Pollution Control Board (CPCB) has estimated India’s annual fresh water withdrawals at around 40 bcm (10 bcm as process water & 30 bcm as cooling water) for the industrial water consumption, which is 8% of the total fresh water used in the country. By 2050 the consumption is likely to increase to 161 BCM by BAU projection described in last section.

The water intensity of the Indian industry is much higher than the global benchmarks to the extent of 30 to 50%. The present water intensity in the Indian industry and the corresponding global benchmarks of some of the key industrial sectors are given below:

Table 3.2 Water Usage Pattern
3.3 Improve Water Use Efficiency

From the preceding discussions it is clear that the answers to demand side management in Industries lies in – Reduce, Reuse and Recycle. Few tested ways to achieve this is through promotion of water efficient processes and technology, water tariff structures that incentivize water recycle and reuse and by creating an enabling environment through Policy, Institutions, Technology, Market and Propaganda.

Succeeding paragraphs discuss these and make relevant recommendations towards achieving one of the five goals of the National Water Mission of increasing water use efficiency by 20%.

3.4 Establish Bureau of Water Efficiency

This is the optimum time to set up the **Bureau of Water Efficiency (NBWE)** to review interventions for reducing water intensity in agriculture, industry and domestic segments. NBWE will optimize water demand by increasing water use efficiency in all walks of life. The prime objective of the NBWE would be to identify the water usage across industry, agriculture, domestic and municipality and develop tools to optimize the same in a time bound manner. Promoting efficiency in water would in turn create increased availability of this scarce resource in the long term thus help in mitigating water risks to the nation.

**Conclusion:** The Government should establish the National Bureau of Water Efficiency at the earliest. The functional space as well as the authority for the proposed entity should be well defined and should be entrusted with clear and specific goals to achieve within an agreed timeline. NBWE should work through Centers of Excellence that will work on Processes and Manufacturing technologies and Products that are water efficient. These Centers should work with industry participation for quick market adoption. Government should allocate funds for viability funding of technology projects. The role of NBWE is articulated in **Annexure IV**.

3.5 Create Equity and Efficiency based Water Pricing Regime for Industries.

Water tariff is a powerful and versatile management tool. It is capable of promoting number of objectives, although tradeoffs among them are commonly required. The usual objectives are revenue efficiency, water conservation through less wastage, equitable water distribution etc.
- **Revenue sufficiency**: From the water supplier’s point of view, the main purpose of the tariff is cost recovery.

- **Economic efficiency**: An efficient tariff will create incentives that insure, for a fixed water supply cost, that users obtain the largest possible aggregate benefits.

- **Resource conservation**: Water tariffs are often called upon to discourage “excessive” or “wasteful” uses of water, thus promoting the conservation of critical water sources, or the sustainable use of renewable water sources.

### 3.5.1 Water Tariff in Indian Industry

Water pricing in India suffers from the lack of a clear policy framework based on cost recovery principles. The pricing regime of water providers is undervalued for all segments of users – urban, rural and industrial. Generally States determine the tariff structure thus causing wide variations across the country. All Indian cities operate a mix of measured/metered or unmeasured/unmetered tariffs.

Uniform volumetric charges are by far the most common tariff structure for metered charging, and flat rate charges for unmetered charging. Most of the industrial water needs is met through groundwater and thus remains outside the purview of service provider tariffs.

Only a small portion of the water requirement is met through water utilities, and that too at subsidized rates, with industrial users paying higher than rural consumers, but at rates much lower than the true cost of the water provided.

### 3.5.2 Instruments of Water charging

Typically three instruments are used for charging water, connection fee, water tax and water charge. Besides these, there are other instruments such as meter rent, license fee, water cess, meter maintenance charge, development charge and fixed charge for capital renovation of the water system. Additionally some of the utilities levy wastewater charges on households, such as connection charge, drainage or sewerage charge for discharging wastewater to the sewer network.

#### Table 3.5.2(a) Existing tariff structure in India

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Category</th>
<th>Type of tariff</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Metered</td>
<td>Uniform volumetric tariff</td>
<td>A fixed charge per kilolitre of water consumed. Rate may vary with category of users. Say higher for industry.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Increasing block</td>
<td>IBT is charged by blocks with higher</td>
</tr>
<tr>
<td>tariff (IBT)</td>
<td>charges for higher consumption for the same category of users.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-------------</td>
<td>-------------------------------------------------------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Unmetered</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Flat rate charge</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Annual fixed charge irrespective of the quantum of water used.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ferrule size/Tap based charge</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Based on size of the water connection.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ex: size of inlet pipe.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Annual ratable value (ARV)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>A fixed per cent of the ARV of a property, based on floor wise built up area of the building.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The tariff system in most of the Indian cities is a mix of the above categories. NIUA has done a detail survey of water tariffs in select Indian cities in 1999 which further indicates the same thing. Based on information available in the journal 'Water in India-2008' published by India Infrastructure Research, New Delhi, we have some ideas on existing tariffs in some of the Indian cities as given below (base data 2008):

**Table 3.5.2(b) Existing Tariff in Indian Cities (base data 2008)**

<table>
<thead>
<tr>
<th>City</th>
<th>Type of tariff</th>
<th>Customer based Metered tariff (Rs/KL)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Metered</td>
<td>Unmetered</td>
</tr>
<tr>
<td>Chennai</td>
<td>IBT</td>
<td>Based on per dwelling (Rs50-800 per month)</td>
</tr>
<tr>
<td>Greater Vishakhapatnam</td>
<td>Uniform Volumetric Tariff</td>
<td>Tap based charge (Rs80 per tap per month)</td>
</tr>
<tr>
<td></td>
<td>Uniform Volumetric Tariff</td>
<td>Flat rate charge (12.5% of ARV of the property)</td>
</tr>
<tr>
<td>-----------</td>
<td>---------------------------</td>
<td>-----------------------------------------------</td>
</tr>
<tr>
<td>Mumbai</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nagpur</td>
<td>IBT</td>
<td>Ferrule Sized based charge (Rs75 -2000 per month)</td>
</tr>
</tbody>
</table>

Latest tariff structure for Delhi Jal Board is attached for reference.

3.5.3 **Approach to Water Pricing for Industry**

In the past most cities and utilities in the world has provided water to their customers almost free of charge, because water was considered a basic necessity and because water was a relatively cheap and abundant resource. But now with much larger communities requiring service, the only way to ensure that everyone has access to this basic need is to ration it in some way. And perhaps the best way to utilize water to the best and most valued uses is to put a price on water, and construct appropriate tariff structures to meet different social, political and economic goals in different situations.

The water tariff for industry should be framed with the following objectives in mind:

- Industry should perceive the tariff as fair
- Rates must be equitable across various industry sectors
- The tariff must maximize efficient allocation of the resource
- Should provide net revenue stability
- Promote water resource conservation
- Be easily implemented
- Rate must be forward looking
- The tariff should include the environment cost
- The water price should reflect water quality, supply reliability, frequency of supply etc.
- More sophisticated pricing can be done to take into account daily peak and seasonal variations in water demand
3.5.4 Suitable tariff structure for industry

Broadly there are two systems available which needs consideration in this respect. They are two tier systems of tariff and IBT (increasing block tariff).

A - Two-Tier Tariff System:

Several countries, for example Australia, Austria, Denmark, Finland and the United Kingdom, with successful water pricing schemes use a two part tariff structure. This has fixed and variable elements. The fixed element varies according to some characteristics of the users and the variable element often uses average cost pricing. This method can be further improved using increasing block tariff System (IBT) for the variable part. One of the main advantages of the two part tariff system is the stabilized revenue base it affords the supplier. The fixed element protects the supplier from demand fluctuations and reduces financial risks. The variable element charges the consumer according to his consumption level and therefore encourages conservation of the water resources.

B - IBT Tariff System:

This is a more refined form of the two-part tariff system. IBT provides different prices for two or more pre-specified blocks of water. The price rises with each successive block. The utility must decide on the number of blocks, volume of water use associated with each blocks, and price to be charged with each block while designing the IBT structure. While first of this is more a management decision, the second and third one are political and social decision.

The Maharashtra Water Resources Regulatory Authority (MWRRA) has drafted the following principles for determining the tariff for the Indian industry which is worth noting in the present context:

- The base rate to be fixed at a particular region will be linked to the source of supply.
- Will have separate structure in Rabi and Kharif season.
- The rate during hot weather would be 120% of the base rate.
- For industries using water as raw material, higher rate (500% of base rate) will be charged.
- There should be concession for specific type of industries such as agro based industry.
- A rebate mechanism is to be developed for industry practicing reuse and recycle of wastewater generated in their premises.
3.6 Reuse and Recycle of Wastewater in Industry

Through the natural water cycle, the earth has recycled and reused water for millions of years. Water recycling, though, generally refers to projects that use technology to speed up these natural processes.

The practice of reuse can be grouped under five major kinds:

- Reuse of urban wastewater in agriculture and horticulture from sewers.
- Reuse of urban wastewater from polluted nallahs draining unsewered areas.
- Reuse in industrial and commercial establishments to meet the water shortage.
- Reuse in industry to meet various other objectives besides relief from water shortage such as “zero discharge”.
- Reuse for major urban and community development purposes say for example to augment public water supplies.

3.6.1 Overview of Water Recycling Practices

Water recycling is a growing practice in many regions of the world including USA, Western Europe, Australia, and Israel etc. All evidences suggest that water recycling will play an expanded role in the water management in the 21st century. In US, at a compound annual growth rate of 15%, the volume of recycled water would amount to 45 million m3/d by the year 2015.

Table 3.6.1: Potential for direct reuse in industries in USA (National Association of Manufacturers, USA)

<table>
<thead>
<tr>
<th>Industry</th>
<th>Water reuse potential (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pulp and paper</td>
<td>52%</td>
</tr>
<tr>
<td>Chemicals and drugs</td>
<td>35%</td>
</tr>
<tr>
<td>Automobile</td>
<td>25%</td>
</tr>
<tr>
<td>Industry</td>
<td>Percentage</td>
</tr>
<tr>
<td>------------------------</td>
<td>------------</td>
</tr>
<tr>
<td>Iron and Steel</td>
<td>25%</td>
</tr>
<tr>
<td>Food and beverage</td>
<td>22%</td>
</tr>
<tr>
<td>Non-ferrous metals</td>
<td>18%</td>
</tr>
<tr>
<td>Textiles</td>
<td>15%</td>
</tr>
</tbody>
</table>

In India, presently water recycling in industry is not so common and *is not happening in a substantial scale as required in the present scenario*. However, some of the Industries and Hotels have started to reuse wastewater after suitable treatment. Presently in India, some of the methodologies adopted include (Arcevala and Asolerkar, 2007):

- Plain water conservation
- Reuse without any treatment
- Reuse after treatment using on-site toilet waters and some easily treated industrial wastewaters
- Reuse after treatment using off-site sources of municipal wastewater

A study of the reuse of waste water in India shows that the reuse has achieved in affordable costs and some industries have in fact, saved money by reusing their wastewaters. The typical strategy our industry should follow is as given below:

- Practice as much conservation of water as possible.
- Recycle the fraction of waste water which is in relatively good condition and can be recycled back with little or no treatment.
- Arrange more reuse after some treatment to make the industry’s own wastewater fit for reuse.
- Lastly, if more reuse is needed, get the external sources of wastewater, such as municipal sewage.

### 3.6.2 Promote reuse and recycle of wastewater in Industries

The Government should promote waste water reuse in industries through regulation and incentives. It will be essential to establish proper guidelines for reuse and recycle of industry wastewater for various applications. This should be done through the National Water Regulator and the National Bureau for Water Efficiency; this should be implemented enforcing a system of ‘Water Returns’ discussed later in this document.

Government should create enabling environment for implementation of projects in various industrial sectors. One way to do it is through supporting pilot projects in industry for installation of recycle plants in their premises with best and viable technologies available across the world.

Voluntary ‘Water Reporting’ by Industries and Businesses is an ideal tool that breeds a culture of Water Conservation; while this enhances stake holder confidence in the business promotes the culture of reuse and recycling to bring down ‘net fresh water consumption’.
3.7 Enforce system of ‘Water Return’

Idea of ‘Water Returns’ is about an annual return to be filed by water users on similar lines of tax returns. This is similar to / subset of ‘Water Reporting’ discussed in the preceding paragraph but mandatory for major water using industries and businesses. To begin with, few indicative elements the return would contain are:

a) Water use per unit produce

b) Effluent discharge details

c) Rain water harvested

d) Quantity and Percentage of Water reuse

e) Net fresh water consumption.

.........and others.

Water return could be an effective vehicle to promote water efficiency; mechanism to implement both incentive and penal measures such as:

a) Tariff slabs based on efficiency and equity

b) Consent to operate on consistent performance and committed process efficiency

c) Telescopic tariff

d) ‘Polluter pays’

On a long run the principle of ‘Water Return’ can be applied at all kinds of usage; including domestic water users.

3.8 Create Centers of Excellence for Water Efficient Manufacturing Processes and Equipment.

Central Government should create and fund one or more ‘Centers of Excellence’ that will work on Process and Manufacturing technologies that are ‘water efficient’. These should engage and work in tandem with Centers for Technology for specific industrial sector; some of the examples being – National Centre for Cement and Building Materials (NCCBM) for cement industry, Institute of Paper Technology, Saharanpur for Paper sector, Central Power Research Institute (CPRI) for power sector. Industry participation should be ensured to take newly developed technology quickly to the market. Initial viability funding of select technology initiatives and pilot projects will help subsequent takeover by the market forces.

The Centers should enhance their scope to include Research and Development in the area of –

a) Water efficient equipment, b) Water and Waste Water Treatment technologies, c) Desalination: Brackish-Water and Sea-Water and d) In the area of Water Management: both for Industrial Water and Urban Water.

There is also a need to promote water efficient technologies as well promote entrepreneurship in the water sector. We recommend the creation of a technology fund for promoting and incubating water efficient equipment and technologies. The fund could provide:
a) Support to new entrepreneurs in the form of debt and equity in scaling up their operations

b) Promotion and demonstration of new and innovative technologies

Following are some of the notable technologies available to reuse and recycle wastewater generated from the industry. Centers of Excellence can work on further indigenization and enhancement:

- **Decentralized Wastewater Treatment Systems (DEWATS)**

- **Soil biotechnology (SBT)**

- **Soil aquifer treatment (SAT)**

- **Activated sludge package plants**

- **Up flow anaerobic sludge blanket reactor (UASBR):** The treated water may be used for irrigation purpose, depending on the nature of the waste water. This system is used by many small scale industries in India now.

- **Sequential batch bio reactor (SBBR):** The system treats the effluent to a level specified by authorities for irrigation or discharge into open water sources like rivers.

- **Submerged aerobic fixed film process (SAFF):** The treated water can be used for the makeup water in cooling towers and for horticulture.

- **Fluidized bioreactor (FAB):** The technology is ideal for treating the sewage from municipalities, sewage from small industry, hotels, hospitals, IT parks and commercial complexes.

- **Membrane Processes:** In many countries such as US and European countries, more stringent public water supply requirement make the use of membrane processes, increasingly necessary. Moreover, the membrane technologies are **being increasingly considered where reuse of the treated wastewater is envisaged in India as well.**

A brief description of the technologies is enclosed as Annexure VI.

### 3.9 Enhance Ground Water management and regulation:

Centre should provide technical and financial assistance to all States to encourage adoption of Model Ground water Regulation Bill amended in 2005 and enforce provisions of the Act through greater involvement of local government and communities. Limit ground water extraction for industrial use and increase the charges / cess for ground water extraction to dis-incentivise the same.
3.10 Launch National Program for ‘Awareness, Education and Promotion of Water Conservation’

The Central Government should launch a Nation Wide program that is aimed at – awareness, education and Promotion of Water Conservation in the country. While the program should cover the entire spectrum of users it should have focused modules for each sector. Nothing less than a National Movement will be adequate to address the Water Crisis the country is faced with.

3.11 Promoting rain water harvesting in industry both within and beyond the fence

This should be done through a system of incentives as well through regulation.

3.12 Promote ‘Public Private Community Partnerships’ in Urban Water sector

There has been momentum building for PPP in the urban water supply space over the last couple of years with a number of projects being awarded and more in the pipeline. International experience in developing countries over the last decade seem to suggest that Affermage contracts and Management contracts with the objective of improving access and facilitating efficiency gains have been far more sustainable rather than investment led concessions given to private operators. This is relevant in the Indian context given the low level of tariff and the steep levels of increase in tariff that accompany an investment led concession. Therefore it makes sense in the Indian context to encourage PPPs with focus on service delivery and efficiency gains rather than insisting in investment by the private sector. One could gradually move to substantially investment led concessions in the long term as the gap between full costs and recovery is bridged.

3.13 Focused capacity and skill up gradation programs

Given the current context and capacity issues, water is a sector where there is a need for a significant thrust to enhance knowledge sharing and capability/skill building. In this regard we recommend the following:

➢ Set up zonal level water resources and management institutes on the lines of IISc/IITs to create and nurture talent

➢ Supporting creation of licensed training and skilling programs to address the skill gaps in the sector

➢ Set apart some funds at Central and State Government for training Government employees in the water sector at various levels with respect to infrastructure creation and PPP concepts.

Conclusion

The recommendations made are directional in nature and have to be deliberated upon in greater detail and depth to facilitate implementation. Multi-stakeholder dialogues, learning from the experiences of other countries in initiating similar actions, involvement of national and international experts with the active participation of the Indian government could go a long way in converting these recommendations into actionable policies. The CII along with other industry associations can anchor the activities along with the Planning Commission in creating a platform for these deliberations and develop an ‘actionable plan’ for implementation by the Indian government.
References:

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5. Ref from net on Ashok Chawla Committee Report
6. Research works by Centre for Science and Environment
7. CII-National Water Awards for Excellence in Water management
9. Central Pollution Control Board, www.cpcb.nic.in
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14. Integrated Pollution Prevention and Control (IPPC), Best available techniques ref. document on the production of iron
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17. Gwagyonk steel works S Korea
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21. Water in India 2008 – A report by India Infrastructure Research
22. Water Policy by Peter Rogers
ANNEXURE I

Sub-Groups on Land and Water

1.0 Composition of the Sub-Group on Land

1. Additional Secretary, Deptt. of Land Resources- Chairman
2. JS, Deptt. of Rural Development – Member
3. JS, Ministry of Agriculture – Member
4. JS, Ministry of Tribal Affairs - Member
5. JS, Deptt. of Industrial Policy & Promotion - Member
6. JS, Ministry of Mines - Member
7. Adviser, Rural Development, Planning Commission - Member
8. Adviser, Industry, Planning Commission - Member
9. Director/Nominee, Indian Institute of Management, Ahmedabad - Member
10. Mr. Babu Khan, Confederation of Indian Industry - Member
11. Expert nominee, Federation of Indian Chambers of Commerce & Industry - Member
12. Expert nominee, Associated Chambers of Commerce & Industry - Member
13. Principal Secretary (Industries), Government of Karnataka - Member
14. Secretary (Industries), Government of Jharkhand - Member
15. Secretary(Soil and Water Conservation), Govt of Nagaland - Member
16. Mr. Dhruv M Sawhney, CMD, Triveni Engineering & Industries Ltd - Member
17. Mr. R Seshasayee, Executive Vice Chairman, Ashok Leyland Ltd - Member
18. Mr. Vinayak Chatterjee, Chairman, Feedback Ventures Pvt Ltd - Member
19. Mr. Arun Nanda, Director, Mahindra & Mahindra Ltd - Member
20. Director/nominee Xavier Labour Research Institute, Jamshedpur - Member
21. Director/nominee, IIT, Kanpur - Member
22. Director, Deptt of Land Resources - Member Secretary

23. Terms of Reference

1.0 To evaluate the current position with regard to availability of land for industrial growth.
2.0 To estimate the medium and long term requirements of land for rapid industrial growth.
3.0 To look into the issues relating to land acquisition for industry which will, inter-alia, include
   3.1 Processes for obtaining land.
   3.2 Creation of land banks and development of land clusters in States.
   3.3 Compensation and rehabilitation measures and to suggest strategies to address them.
4.0 To specify the milestones to be achieved within the 12th Plan period in respect of above issues.
5.0 To suggest/recommend programmes which may need to be initiated in the 12th Plan period, together with the broad budgetary implications, if any.
2.0 Composition of the Sub-Group on Water

1. Additional Secretary, Ministry of Water Resources - Chairman
2. JS, Ministry of Environment & Forests - Member
3. JS, Deptt. of Industrial Policy & Promotion - Member
4. JS, Ministry of Agriculture - Member
5. Consultant, Water Resources, Planning Commission - Member
6. Adviser, Industry, Planning Commission - Member
7. Mr. K S Venkatgiri, Confederation of Indian Industry - Member
8. Expert nominee, Federation of Indian Chambers of Commerce & Industry - Member
9. Expert nominee, Associated Chambers of Commerce & Industry - Member
10. Director, Indian Institute of Management, Ahmedabad - Member
11. Mr. Sanjay Kirloskar, CMD, Kirloskar Brothers Ltd - Member
12. Mr. N.K Ranganath, MD, Grundfos Pumps India Pvt Ltd - Member
13. Mr. Hariprasad Hegde, Vice President and Head, Wipro Water - Member
14. Nominee of Chairman, Central Pollution Control Board - Member
15. Representative of Water Planning and Projects wing of Central Water Commission (Not below the rank of Director) - Member
16. Pr Secretary, Industries, Tamil Nadu - Member
17. Pr Secretary, Industries and Commerce, Assam - Member
18. JS, Ministry of Water Resources - Member Secretary

19. Terms of Reference

1.0 To evaluate the current position with regard to availability of water for industrial growth.
2.0 To estimate the medium and long term requirements of water for rapid industrial growth on a sustainable basis.
3.0 To look at the issues pertaining to water, including, inter-alia,
   
   3.1 Water quality, treatment and recycling
   3.2 Availability for industrial use
   3.3 Water-zoning and standardized information system and to suggest strategies to address them.

4.0 To specify the milestones to be achieved within the 12th Plan period in respect of above issues.
5.0 To suggest/recommend programmes which may need to be initiated in the 12th Plan period, together with the broad budgetary implications, if any.
Annexure II

Assessment of Live Storage

Conventional Approach: The NCIWRD has estimated that the total demand of water for various uses, by 2050 would be around 973 Km³ per year (low projection) or 1180 Km³ per year (high projection). Considering average demand scenario, a large surface and groundwater use of about 700 Km³ per year and 380 Km³ per year respectively would be necessary, assuming additional return flows of about 214 Km³ per year (low projection) or 259 Km³ per year (high projection) would be available. This surface water use, in the phase of the large temporal variability would approximately require live storage of around 450 Km³.

Assessment of Live Storage Capacity by CWC: CWC has earlier assessed live storage capacity available in country as 225.14 BCM. The Basin wise breakup of the average annual flow and live storage capacity earlier reported as 225.14 BCM is given in Table B. A reassessment of the live storage capacity has subsequently been made in 2009-10. As per current assessment made by the CWC, the Live Storage Capacity of completed dams in the country is 253.39 BCM comprising of 245.13 BCM for dams with Live Storage Capacity more than 10 MCM and 8.26 BCM for dams with capacity less than 10 MCM. The Live Storage Capacity of the dams under construction is estimated as 50.74 BCM. The state wise position regarding Live Storage Capacity of completed and under construction projects/schemes is given at Table C.

As per a tentative assessment made by the CWC, the status of live storage capacity in the country is as under in Table A:

<table>
<thead>
<tr>
<th>TABLE A</th>
<th>In BCM</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Total live storage capacity of the completed dams</td>
<td>253.388</td>
</tr>
<tr>
<td>2 Total live storage capacity of dams under construction</td>
<td>50.74</td>
</tr>
<tr>
<td>3 Total live storage capacity of dams under consideration</td>
<td>104</td>
</tr>
<tr>
<td>Total</td>
<td>408</td>
</tr>
<tr>
<td>4 Likely loss of reservoir capacity by 2050</td>
<td>53.00</td>
</tr>
<tr>
<td>5 Balance live storage capacity that would be available</td>
<td>355.00</td>
</tr>
</tbody>
</table>

Therefore, to achieve live storage capacity of 450 BCM by 2050, more project proposals for creation of shortage of 95 BCM (450-355) are required to be framed.
## Table B - Basin Wise Storage in the Country

<table>
<thead>
<tr>
<th>SI.#</th>
<th>BASINS</th>
<th>AVERAGE ANNUAL FLOW</th>
<th>COMPLETED PROJECTS</th>
<th>PROJECTS UNDER CONSTRUCTION</th>
<th>TOTAL</th>
<th>PROJECTS UNDER CONSIDERATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>INDUS</td>
<td>73305</td>
<td>16286</td>
<td>282.53</td>
<td>16568</td>
<td>2576.39</td>
</tr>
<tr>
<td>2(A)</td>
<td>GANGLI</td>
<td>525023</td>
<td>42060</td>
<td>18600</td>
<td>60660</td>
<td>30083.92</td>
</tr>
<tr>
<td>2(B)</td>
<td>BRAHMAPUTRA &amp; BARAK</td>
<td>585597</td>
<td>2326.9</td>
<td>9353.6</td>
<td>11681</td>
<td>41262.88</td>
</tr>
<tr>
<td>3</td>
<td>GODAVARI</td>
<td>110540</td>
<td>25125</td>
<td>6205.8</td>
<td>31330</td>
<td>5841.16</td>
</tr>
<tr>
<td>4</td>
<td>KRISHNA</td>
<td>78124</td>
<td>41804</td>
<td>7743.5</td>
<td>49548</td>
<td>1127.84</td>
</tr>
<tr>
<td>5</td>
<td>CAUVERY</td>
<td>21358</td>
<td>8597.2</td>
<td>269.82</td>
<td>8867</td>
<td>261.99</td>
</tr>
<tr>
<td>6</td>
<td>PENNAR</td>
<td>6316</td>
<td>2649.4</td>
<td>2170.7</td>
<td>4820.1</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>EFR FROM MAHANADI TO GODAVARI AND KRISHNA TO PENNAR</td>
<td>22520</td>
<td>1601.4</td>
<td>1425</td>
<td>3026.4</td>
<td>945.29</td>
</tr>
<tr>
<td>8</td>
<td>EFR B/W PENNAR AND KANYAKUMARI</td>
<td>16458</td>
<td>1838.4</td>
<td>68.49</td>
<td>1906.9</td>
<td>1906.9</td>
</tr>
<tr>
<td>9</td>
<td>MAHANADI</td>
<td>66879</td>
<td>12335</td>
<td>1873</td>
<td>14208</td>
<td>10094.2</td>
</tr>
<tr>
<td>10</td>
<td>BRAHMANI &amp; BAIRANI</td>
<td>28477</td>
<td>4648.1</td>
<td>875.6</td>
<td>5523.7</td>
<td>8721.19</td>
</tr>
<tr>
<td>11</td>
<td>SUBERNAREKHA</td>
<td>12388</td>
<td>672.02</td>
<td>1650.2</td>
<td>2322.2</td>
<td>1380.5</td>
</tr>
<tr>
<td>12</td>
<td>SABARMATI</td>
<td>3809</td>
<td>1306.8</td>
<td>60.77</td>
<td>1367.5</td>
<td>99.33</td>
</tr>
<tr>
<td>13</td>
<td>MAHI</td>
<td>11020</td>
<td>4722.6</td>
<td>261.43</td>
<td>4984</td>
<td>11.81</td>
</tr>
<tr>
<td>14</td>
<td>WFR OF KUTCH, SAURASHTRA INCLUDING LUNI</td>
<td>15098</td>
<td>4726.9</td>
<td>797.23</td>
<td>5524.2</td>
<td>2849.06</td>
</tr>
<tr>
<td>15</td>
<td>NARMADA</td>
<td>45639</td>
<td>16980</td>
<td>6625.1</td>
<td>23605</td>
<td>465.73</td>
</tr>
<tr>
<td>16</td>
<td>TAPI</td>
<td>14879</td>
<td>9408.4</td>
<td>847.42</td>
<td>10256</td>
<td>286.92</td>
</tr>
<tr>
<td>17</td>
<td>WFR FROM TAPI TO TADRI</td>
<td>87411</td>
<td>11268</td>
<td>3464.4</td>
<td>14732</td>
<td>81.69</td>
</tr>
<tr>
<td>18</td>
<td>WFR FROM TADRI TO KANYAKUMARI</td>
<td>113532</td>
<td>10236</td>
<td>1317.5</td>
<td>11554</td>
<td>1453.31</td>
</tr>
<tr>
<td>19</td>
<td>AREA OF INLAND DRAINAGE OF RAJASTHAN</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>0</td>
</tr>
<tr>
<td>20</td>
<td>MINOR RIVER BASINS DRAINING INTO MYANMAR AND BANGLADESH</td>
<td>31000</td>
<td>312</td>
<td>-</td>
<td>312</td>
<td>1.467</td>
</tr>
</tbody>
</table>

**GRAND TOTAL IN MCM**

<table>
<thead>
<tr>
<th></th>
<th>1869353</th>
<th>218903</th>
<th>63892</th>
<th>282796</th>
<th>107544.7</th>
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</thead>
<tbody>
<tr>
<td>IN BCM</td>
<td>1869.35</td>
<td>218.90</td>
<td>63.90</td>
<td>282.80</td>
<td>107.54</td>
</tr>
</tbody>
</table>

**Not:** Projects having a live storage capacity of 10 M.Cum and above only are included. An additional live storage capacity of 6.241 Billion Cubic Metre (BCM) (approx.) is estimated to be created through medium projects each having a capacity of less than 10 M.Cum thus making a total live storage capacity of 225.14 (BCM) in completed Projects.

MCM: MILLION CUBIC METRE

BCM: BILLION CUBIC METRE
<table>
<thead>
<tr>
<th>STATE/ U.T.</th>
<th>Live Storages &gt; 10 MCM</th>
<th>Live Storages &lt; 10 MCM</th>
<th>Total Live Storage capacity (BCM)</th>
<th>Live Storage Completed &amp; U/C Reported by WM &gt; 10 MCM (See *)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Completed</td>
<td>U/C</td>
<td>Total</td>
<td>Completed</td>
</tr>
<tr>
<td>ANDAMAN &amp; NICOBAR</td>
<td>0.01</td>
<td>0.00</td>
<td>0.01</td>
<td>0.00</td>
</tr>
<tr>
<td>ARUNACHAL PRADESH</td>
<td>0.00</td>
<td>0.23</td>
<td>0.23</td>
<td>0.00</td>
</tr>
<tr>
<td>ANDHRA PRADESH</td>
<td>28.21</td>
<td>6.93</td>
<td>35.13</td>
<td>0.51</td>
</tr>
<tr>
<td>ASSAM</td>
<td>0.01</td>
<td>0.44</td>
<td>0.45</td>
<td>0.00</td>
</tr>
<tr>
<td>BIHAR</td>
<td>2.59</td>
<td>0.44</td>
<td>3.02</td>
<td>0.03</td>
</tr>
<tr>
<td>CHATTISGARH</td>
<td>6.41</td>
<td>0.84</td>
<td>7.25</td>
<td>0.32</td>
</tr>
<tr>
<td>GOA</td>
<td>0.27</td>
<td>0.00</td>
<td>0.27</td>
<td>0.02</td>
</tr>
<tr>
<td>GUJARAT</td>
<td>17.11</td>
<td>8.01</td>
<td>25.12</td>
<td>1.25</td>
</tr>
<tr>
<td>HIMACHAL</td>
<td>13.78</td>
<td>0.09</td>
<td>13.87</td>
<td>0.01</td>
</tr>
<tr>
<td>J&amp;K</td>
<td>0.03</td>
<td>0.00</td>
<td>0.03</td>
<td>0.00</td>
</tr>
<tr>
<td>JHARKHAND</td>
<td>2.33</td>
<td>6.00</td>
<td>8.33</td>
<td>0.11</td>
</tr>
<tr>
<td>KARNATAKA</td>
<td>31.38</td>
<td>0.73</td>
<td>32.11</td>
<td>0.51</td>
</tr>
<tr>
<td>KERALA</td>
<td>9.73</td>
<td>1.26</td>
<td>11.00</td>
<td>0.04</td>
</tr>
<tr>
<td>MAHARASHTRA</td>
<td>34.40</td>
<td>10.53</td>
<td>44.93</td>
<td>2.96</td>
</tr>
<tr>
<td>MADHYA PRADESH</td>
<td>31.54</td>
<td>1.66</td>
<td>33.20</td>
<td>1.53</td>
</tr>
<tr>
<td>MANIPUR</td>
<td>0.40</td>
<td>8.51</td>
<td>8.91</td>
<td>0.01</td>
</tr>
<tr>
<td>MEGHALAYA</td>
<td>0.47</td>
<td>1.20</td>
<td>1.67</td>
<td>0.00</td>
</tr>
<tr>
<td>NAGALAND</td>
<td>1.22</td>
<td>1.22</td>
<td>2.44</td>
<td>0.00</td>
</tr>
<tr>
<td>ORISSA</td>
<td>23.75</td>
<td>0.90</td>
<td>24.64</td>
<td>0.19</td>
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<tr>
<td>PUNJAB</td>
<td>2.37</td>
<td>0.00</td>
<td>2.37</td>
<td>0.03</td>
</tr>
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<td>RAJASTHAN</td>
<td>9.38</td>
<td>0.43</td>
<td>9.81</td>
<td>0.33</td>
</tr>
<tr>
<td>SIKKIM</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.01</td>
</tr>
<tr>
<td>TAMIL NADU</td>
<td>0.31</td>
<td>0.00</td>
<td>0.31</td>
<td>0.00</td>
</tr>
<tr>
<td>TRIPURA</td>
<td>5.66</td>
<td>1.60</td>
<td>7.27</td>
<td>0.01</td>
</tr>
<tr>
<td>UTTARAKHAND</td>
<td>14.10</td>
<td>0.70</td>
<td>14.80</td>
<td>0.17</td>
</tr>
<tr>
<td>WEST BENGAL</td>
<td>1.96</td>
<td>0.18</td>
<td>2.14</td>
<td>0.07</td>
</tr>
<tr>
<td>MIZORAM</td>
<td>0.00</td>
<td>0.66</td>
<td>0.66</td>
<td>0.00</td>
</tr>
<tr>
<td>TOTAL</td>
<td>245.13</td>
<td>50.15</td>
<td>295.28</td>
<td>8.26</td>
</tr>
</tbody>
</table>

Note: 1. (*) In addition to storage capacity created by reservoirs having capacity < 10 MCM contributed 6.241 BCM, thus making the Live Storage created being reported as 225.14 BCM. 2. The discrepancy in Live Storage capacities for some major projects as mentioned in NRRL and in WM Dte. has been huge e.g. Srisailam Reservoir Live Storage. as per WM is 8.286 BCM Vis-a-Vis 4.25 BCM mentioned in NRRL. It is adopted as 8.28 BCM being more compatible to the daily status of filling figures of the reservoir reported by project authority. In cases e.g. Tenughat, Mahlton, Panchat Hill Konar etc., L S mentioned in NRRL was far more than capacity at FRL. Though filling higher than FRL have been achieved but the LS available at FRL has been adopted.
Annexure III

Advantage of Basin Level Approach

The following objectives can be achieved through basin level approach to water management:

- Integrated water resources management to conserve water, minimize wastage and ensure more equitable distribution
- Consideration of precipitation as basic water resource and evaporation management as an important strategy
- Setting up of river basin organizations. Integrated water policies to cope with variability in rainfall and river flow at the basin level
- Appropriate entitlement and pricing, appropriate regulatory mechanism.
- Review of State water policy and including guidelines for different users of water, e.g. irrigation, drinking, industrial etc particularly in context of basin wise situations
- Amendment to River Board Act under entry 56 of Union list to make it more effective.
- Expeditious formulation of the projects for utilization of surplus flood water for beneficial use of the society and implementation of projects after evaluating costs and land acquisition problems.
Annexure IV

Role of National Bureau of Water Efficiency

1. Support Government both at Center and State level to draft policy inclined towards practicing water efficiency in all sectors such as industry, agriculture, domestic, municipality etc.

2. Act as an information dissemination centre on all things related to water efficiency.

3. Take up the responsibility of awareness creation across the entire nation.

4. Develop its own research and development wing on water efficiency covering the entire water sectors.

5. It is important to establish accountability of ground water use by domestic and industry consumers. NBWE to come up with methodologies and technologies to ensure accountability of this critical and scarce natural resources.

6. NBWE to develop water conservation codes for buildings, industry, agriculture and municipality.

7. Establishing Standards for water fixtures and gadgets, other equipments used in municipality, agriculture, domestic and industry water sector in terms of their water efficiency.

8. Rating and labeling products, organizations etc on grounds of water efficiency.

9. NBWE to promote water audit in industry, municipality and agriculture.

10. Promote certified training program to develop water auditors.

11. Set up accredited agencies for undertaking water audits to ascertain the improvement in water use by utilities/ consumers/ establishments.

12. Benchmarking in industry, municipality, domestic and agriculture sector. Establish water conservation targets which are fair, realistic and provide clarity in terms of short and long-term actions. Set up reliable and accurate Monitoring and Reporting and Verification measures.

13. Undertake demonstration projects on pilot scale.

14. Handhold willing industries/ institutions to achieve sustainable water management through implementation of identified measures.

15. Promoting and establishing standards for recycle and reuse of domestic wastewater.

16. Promoting rain water harvesting in industry, urban locality etc.

17. Promoting zero water discharge in industry wherever feasible.

18. Identify and promote technologies from abroad in India
19. Promote capacity building program through seminars, workshops, international conferences etc.


21. Organize annual award program to identify and reward pioneers in the field of water management.

22. Seed and establish Centers of Excellence that will work on process and manufacturing technologies that enhance water efficiency.
Role of National Water Regulatory Authority

Some of the various roles envisaged for the National Water Regulatory Authority are detailed below:

- Regulation of the water entitlement of various water user groups.

- The authority to develop customize water market in India in the longer run. Subsequently water trade off is also not ruled out. The authority needs to ensure judicious, equitable and sustainable management and allocation of water resources.

- Establishing the tariff system and regulating the same.

- Creating licensing regime for water service providers – The regulator should be empowered to regulate the procedure and conditions for granting, revocation and amendment of licenses, the terms, conditions and procedure for determination of revenues and tariffs, determine standard of services and ensure reporting on standards from the licensees.

- The regulatory authority also would decide on the entitlements of the ground water. Basically regulating the ground water extraction by various water user groups.

- The authority would also be fully involved in integrated State water planning.

- In order to be accountable to the public, the regulator would ensure that the process followed in its day to day working should be transparent, accountable and participatory.
Annexure VI

Technology details for reuse and recycle of industry wastewater

**Decentralized Wastewater Treatment Systems (DEWATS):** DEWATS is based on different natural treatment techniques, put together in different combinations according to need. In this method, the reed bed system acts as a secondary treatment unit, which is preceded by baffled reactor where most of the treatment takes place. In the DEWATS, both anaerobic and aerobic techniques are applied. Its applications are based on four basic treatment modules, which are combined according to specific requirements. The modules are:

- Pre-treatment and sedimentation in settlement tank or in septic tank;
- Secondary anaerobic treatment in baffled reactors;
- Post treatment aerobic/ anaerobic treatment in reed bed system;
- Post treatment aerobic treatment in ponds.

**Soil biotechnology (SBT):** SBT involves removal of organics by adsorption followed by biological degradation (conversion to CO2) and oxygen supply by natural aeration. The suspended solids are removed by filtration as the wastewater travels in the soil media. Dissolved solids are removed by filtration and biodegradation. The under drain serves as a liquid hold up media and additives provide sites for chemical and biological transformation. The SBT requires low operation and maintenance costs.

**Soil aquifer treatment (SAT):** The process of purifying and reclaiming water by allowing it to pass through the soil and aquifer is referred as SAT. In SAT systems, the soil layer above the aquifer acts as a natural filter that removes the pollutants and other impurities from the wastewater by physical, chemical and biological processes, as it moves down to the groundwater.

**Activated sludge package plants:** These units make use of several processes commonly used in large-scale municipal treatment works and can be applied in select industry waste treatment as well. It involves blowing air bubbles through the incoming sewage. The oxygen is rapidly used to degrade organic matter and this process creates slurry which contains micro organisms in the most rapid phase of growth, and ideal for sewage breakdown.
Modern technologies for treating water and wastewater

**Up flow anaerobic sludge blanket reactor (UASBR):** A sludge blanket cultured in the lower portion of the UASBR very effectively traps suspended and dissolved organic matter. The Rotating Bio disc Contactor (RBC), which is the second unit in the series, takes the atmospheric oxygen. An attached growth anoxic reactor is built into the upper portion of the UASBR for conversion of nitrites and nitrates into nitrogen gas. The entire operation is simple and the system once stabilized, can be left to itself without much human intervention. The treated water may be used for irrigation purpose, depending on the nature of the waste water. This system is used by many small scale industries in India now.

**Sequential batch bio reactor (SBBR):** This is a cyclic activated wastewater treatment process whereby carbon oxidation, nitrification, denitrification and bio-phosphorous removal are carried out simultaneously. This technology ensures that all the effluent processes like equalization, aeration, settling and decanting are carried out in a single tank. Most importantly the system treats the effluent to a level specified by authorities for irrigation or discharge into open water sources like rivers. The treated effluent has the characteristics such as BOD< 30 mg/l, COD<150 mg/l and ammonia nitrate less than 5mg/l etc. The technology is automatic and found to be economical.

**Submerged aerobic fixed film process (SAFF):** The SAFF reactor comprise PVC fill media that facilitate attached fixed film growth of the micro organisms. The aerobic environment in the SAFF reactor is achieved by using fine bubble diffused aeration. After some time, the treated wastewater overflows into a clarifier where the sludge and treated water separate. The clarifier consists of specially designed tubular synthetic media with the property of enhanced settling rate and hence reduced size of the unit over a conventional clarifier. The settled sludge passes on to an aerobic sludge digester-cum-thickener. The clarified water is then let to the chlorinated contact tank.

The chlorinated water is further filtered in pressure filter to remove suspended matter. This ensures complete and safe effluent having zero BOD and suspended solids less than 5mg/l. The treated water can be used for the make up water in cooling towers and for horticulture.

**Fluidized bioreactor (FAB):** The FAB reactor is based on the concept of suspended growth as well as attached growth processes. The media has a specific gravity less than that of water. Hydraulic currents set by aeration facilitate fluidization of the media. The advantages of the system include: no moving parts, wide treatment range (25 – 20,000 cub.m/ day), no sludge recycling required and totally closed system for small capacities.
The technology is ideal for treating the sewage from municipalities, sewage from small industry, hotels, hospitals, IT parks and commercial complexes.

**Membrane Processes:** Membrane systems are generally all pressure systems and for wastewater treatment, they are divided into four classifications depending on their pore size and molecular weight cut-off as: Microfiltration, Ultra filtration, Nan filtration and Reverse Osmosis. Membranes are semi-permeable materials designed to separate particulate, colloidal and dissolved substances from liquid solutes. Essentially, they allow substances smaller than the membrane pores to flow through, while holding back substances larger than the pores. The use of membrane technologies in wastewater was earlier mainly limited to reverse osmosis. Due to the development in polymer chemistry in the last few years, a variety of membranes are now available including "membrane bioreactors". In many countries such as US and European countries, more stringent public water supply requirement make the use of membrane processes, increasingly necessary. Moreover, the membrane technologies are being increasingly considered where reuse of the treated wastewater is envisaged.

Membranes are produced from a wide variety of materials such as cellulose acetate, polyamides, polysulfones, polypropylene, nylon, polyvinyl alcohol etc. They are manufactured to remove down to the smallest desired material which is normally stated as molecular weight cut-off. The four most common configurations are: tubular, plate and frame, spiral wound and hollow fibre. Of these, the hollow membranes are the most commonly used in water recycling, because they have the highest membrane surface area for a given footprint. Membrane replacement is generally required every 3-5 years. Membrane systems are generally all pressure systems and for wastewater treatment, they are divided into four classifications depending on their pore size and molecular weight cut-off as: Microfiltration, Ultra filtration, Nan filtration and Reverse Osmosis.

**Microfiltration (MF):** MF membranes (pores > 50 nm (nanometer)) are the least expensive membranes and have been used in wastewater treatment for turbidity removal, solids separation after biological treatment, as in Membrane Bioreactors (MBRs), removal of helminth ova, other organisms etc. Operation pressures are generally below 350 kPa. Their flux rates average between 400-1600 L/m2/d. They are often used in MBRs for producing recycled water for non-potable purposes.

**Ultra filtration (UF):** UF membranes (pore sizes 2-50 nm) have been used in wastewater treatment for many of the same applications as MF membranes except that UF systems give a better separation of finer colloids, bacteria, viruses etc.
They are also used in MBRs to separate bio solids after activated sludge process. Operating pressures vary from 350-690 kPa and flux rates vary from 400-600 L/m²/d.

**Nano filtration (NF):** In NF membranes, the pores should be less than 2 nm. The pressures vary between 520-1400 kPa and flux rates vary from 200-800 L/m²/d. They are used in water purification for potable purpose and can remove viruses. They are often used to treat waters pre-treated by micro infiltration or ultra infiltration to produce waters for indirect potable reuse applications such as groundwater injection.

**Reverse Osmosis (RO):** In RO systems, the membranes have pores < 2nm and have the lowest molecular weight cut-off. They require a relatively high operating pressures of >1400 kPa and flux rates vary from 300 – 500 L/m²/d. They are used in desalination operations to remove ionic species from solution. They also remove sodium, nitrates, sulphates, heavy metals etc. RO can be used in further treating of waters pre-treated by MF and UF to produce waters of high quality for indirect reuse applications.
Subject:- Notification of New Water Tariff in Delhi

It is hereby notified for information of all concerned that the Delhi Jal Board in exercise of powers conferred under the Section 55 of the Delhi Water Board Act, 1998, took a decision to revise the existing tariff in its Board meeting held on 30.11.2009 and fixed as under the new tariff of water / sewerage charge to be implemented from 01.01.2010 and applicable over the territorial jurisdiction in accordance with Section 1 (2) of the above said Act.

NEW WATER TARIFF

I. CONSUMER CLASSIFICATION:-

In the new water tariff, there will be four categories of consumers:- I.

Domestic (Category –I):

There will be domestic category which will be mainly applicable to the residential and such other uses as mentioned in the Annexure-I.

II. Commercial / Industrial Category (Category –II)):

Industrial category has been merged with commercial category to make both categories come under one broad category known as Commercial / Industrial.

All other category of consumers which are not covered either in DOMESTIC CATEGORY (CATEGORY-I) OR MIXED USE CATEGORY (CATEGORY-IA) will be treated in this category
III. **Mixed use category (Category -I A):**
A new category has been introduced which will be applicable to such premises where a part of the premises under residential use is also used for commercial purposes provided the water use is for non-intensive purposes. For example, residences having some portion under uses such as kiriyana shop, stationery shop, barbar shop etc will be covered under the mixed use category. However, such uses as dhaba, tea shop, sweetmeat shop etc where water use by nature of trade activity is intensive, commercial / industrial category (Category-II) will be applicable.

IV. **Govt Institutions (Category - II A):**
Government offices / Institutions, Govt schools, Govt aided schools, etc fall under this special category under the broad classification of Commercial / Industrial Category and they will be eligible for remission on there total monthly bills provided they adopt the water harvesting and waste water recycling.
The detailed classification of consumers under the above mentioned categories is mentioned in Annexure-I.

2. **Service charge:**
Service charge under the domestic category which is presently linked with the built up area of the property, that is, whether the covered area is more than or less than 200 Sq.meters, and this has been now delinked from the area concept. Instead, under the new tariff it will be linked with the consumption slab for all categories of consumers including the domestic category.

3. **Sewerage maintenance charge:**
This charge is levied for the maintenance of sewerage system and is charged according to volumetric consumption of water. Sewerage maintenance charge under new tariff will now be 60% of the volumetric charge instead of 50% under the existing tariff.
4. Additonal Sewerage Charge:

There will be a component of additional sewerage charge in the new water tariff which will be applicable to such non-Govt owned units as mentioned in Annexure-II, which use alternate source of water such as ground water, tanker water supply etc and are also using the DJB’s sewerage system for discharge of the effluent. The name of such units and the rate of additional sewerage maintenance charge for those units is mentioned in Annexure –II.

5. There will be following four components of water / sewerage bill:-

(i) Service charge
(ii) Water Volumetric consumption charge
(iii) Sewerage maintenance charge
(iv) Additional sewerage maintenance charge: Applicable to the units mentioned in Annexure –II.

6. RATES UNDER NEW TARIFF

The new tariff for different categories of consumers is as under:-

6.1 DOMESTIC (CATEGORY-1)

<table>
<thead>
<tr>
<th>Monthly Consumption (Kilotitre)</th>
<th>Service Charge</th>
<th>Volumetric charge (per kilolitre)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-10</td>
<td>50/-</td>
<td>2/-</td>
</tr>
<tr>
<td>10-20</td>
<td>100/-</td>
<td>3/-</td>
</tr>
<tr>
<td>20-30</td>
<td>150/-</td>
<td>15/-</td>
</tr>
<tr>
<td>&gt;30</td>
<td>200/-</td>
<td>25/-</td>
</tr>
</tbody>
</table>

Plus sewerage maintenance charge: 60% of water volumetric charge
6.2 COMMERCIAL / INDUSTRIAL CATEGORY (CATEGORY –II)

Rates for water charges

<table>
<thead>
<tr>
<th>Monthly Consumption (Kilolitre)</th>
<th>Service Charge</th>
<th>Volumetric charge (per kilolitre)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-10</td>
<td>400/-</td>
<td>10/-</td>
</tr>
<tr>
<td>10-25</td>
<td>600/-</td>
<td>20/-</td>
</tr>
<tr>
<td>25-50</td>
<td>700/-</td>
<td>50/-</td>
</tr>
<tr>
<td>50-100</td>
<td>800/-</td>
<td>80/-</td>
</tr>
<tr>
<td>&gt;100</td>
<td>900/-</td>
<td>100/-</td>
</tr>
</tbody>
</table>

Plus sewerage maintenance charge : 60% of water volumetric charge

6.2.1 In addition to above, additional sewerage charges as mentioned in Annexure – II for the specified units will be charged. This charge will also be applicable irrespective of existence of DJB water connection provided the sewage generated is disposed through the DJB’s sewerage system.

6.3 MIXED USE CATEGORY (CATEGORY –IA)

Service charge - This will remain same as applicable under the Domestic Category (Category-I).

Volumetric charge- The rates will be twice the rates as applicable under Domestic Category(Category-I)

Plus sewerage maintenance charge : 60% of water volumetric charge

6.4 GOVT INSTITUTIONS / OFFICE (CATEGORY –II A)

Tariff applicable will be the same as applicable to the commercial / industrial category (Category-II) with a provision of 15 % rebate on total bill amount to these units which provide certificate of adopting measures for water harvesting and /or recycling of waste water.

7. The new tariff will come into effect from 1st Jan.2010 and will be automatically enhanced at the rate of 10% every year from 1st January.

8. All other fees, charges, penalties, concession or procedures etc. not specified in the new tariff shall remain unchanged till any modification is made in these matters.

(S.B.Shashank)
Director(Revenue)
CLASSIFICATION OF CONSUMER CATEGORIES

1. DOMESTIC CATEGORY (CATEGORY-I)
   1. Premises used for residence.
   3. Govt. recognized destitute homes, orphanage, charitable homes, blind schools, schools for physically handicapped persons, spastic children.
   4. Piaos meant for drinking purposes.
   5. Place of worship, cremation grounds, cemetery.

2. MIXED USE CATEGORY (CATEGORY-IA)
   1. Applicable to the residential premises where commercial use co-exists in the part of premises and the water use is non-intensive such as in case of kiryana shop, stationery shop, telephone booth etc.
   2. Not applicable in case of residential premises where water use is intensive like in case of sweet meat shop, dhaba etc being run in the part of the residence.

3. COMMERCIAL / INDUSTRIAL CATEGORY (CATEGORY-II)
   1. All other category of consumers who are not covered either in DOMESTIC CATEGORY (CATEGORY-I) OR MIXED USE CATEGORY (CATEGORY-IA)

4. GOVERNMENT INSTITUTIONS (CATEGORY-II A)
   1. Govt offices / Institutions, Govt schools, Govt aided schools, fall under this special category under the broad classification of Commercial / Industrial Category will be eligible for 15% rebate on their total monthly bills provided they adopt the water harvesting and waste water recycling.

*****
**ADDITIONAL SEWERAGE CHARGE FOR INTENSIVE WATER USE**

Applicable to the units using alternate source of water such as ground water, tanker water supply etc. in addition to the DJB piped water / using DJB’s sewerage system:-

1. **Hotels / Guest Houses**
   - 0-50 rooms : Rs. 2,000/- per month
   - 51-100 rooms : Rs 10,000/- per month
   - >100 rooms : over 100 rooms, for every additional block of 50 rooms or its part : Rs. 2,500/- per block (over Rs. 10,000/-)

2. **Banquet** : Rs. 10,000/-per month per Banquet function site

3. **Hospital, Nursing home**
   - 0-25 beds : Rs. 1,500/- per month
   - 26-50 beds : Rs. 2,000/- per month
   - 51-100 beds : Rs. 10,000/- per month
   - > 100 beds : over 100 beds, for every additional block of 50 beds or its part : Rs. 2500/- per block (over Rs. 10000/-)

4. **Malls, Cineplex** : Rs. 10,000/- per month

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OFFICE MEMORANDUM

Subject: Constitution of Working Group on "Land and Water" for the Twelfth Five Year Plan (2012-2017)

In the context of preparation of Twelfth Five Year Plan (2012-2017), it has been decided to set up a Working Group on Land and Water. The Composition and Terms of Reference of the Working Group would be as follows:

1. **Composition:**

<table>
<thead>
<tr>
<th>No.</th>
<th>Name and Position</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Shri B. Muthuraman, Vice-Chairman, Tata Steel Ltd.</td>
</tr>
<tr>
<td>2.</td>
<td>Secretary/Nominee, JS Level, Ministry of Water Resources</td>
</tr>
<tr>
<td>3.</td>
<td>Secretary/Nominee, JS Level, Deptt. of Land Resources</td>
</tr>
<tr>
<td>4.</td>
<td>Secretary/Nominee, JS Level, Ministry of Environment &amp; Forests</td>
</tr>
<tr>
<td>5.</td>
<td>Secretary/Nominee, JS Level, Deptt. of Industrial Policy &amp; Promotion</td>
</tr>
<tr>
<td>6.</td>
<td>Secretary/Nominee, JS Level, Deptt. of Rural Development</td>
</tr>
<tr>
<td>7.</td>
<td>Secretary/Nominee, JS Level, Ministry of Agriculture</td>
</tr>
<tr>
<td>8.</td>
<td>Secretary/Nominee, JS Level, Ministry of Tribal Affairs</td>
</tr>
<tr>
<td>9.</td>
<td>Secretary/Nominee, JS Level, Ministry of Mines</td>
</tr>
<tr>
<td>10.</td>
<td>Adviser, Rural Development, Planning Commission</td>
</tr>
<tr>
<td>11.</td>
<td>Adviser, Water Resources, Planning Commission</td>
</tr>
<tr>
<td>12.</td>
<td>Principal Secretary (Industries), Jharkhand</td>
</tr>
<tr>
<td>13.</td>
<td>Principal Secretary (Industries), Orissa</td>
</tr>
<tr>
<td>14.</td>
<td>Principal Secretary (Industries), Karnataka</td>
</tr>
<tr>
<td>15.</td>
<td>Shri Rajesh Menon, Sr. Director, Confederation of Indian Industry</td>
</tr>
<tr>
<td>16.</td>
<td>Shri S. Raghupathy, Sr. Director, Confederation of Indian Industry</td>
</tr>
<tr>
<td>17.</td>
<td>President, Federation of Indian Chambers of Commerce &amp; Industry</td>
</tr>
<tr>
<td>18.</td>
<td>President, Associated Chambers of Commerce &amp; Industry</td>
</tr>
<tr>
<td>19.</td>
<td>President, Federation of Association of Small Industries of India (FASII), New Delhi</td>
</tr>
<tr>
<td>20.</td>
<td>Director, Indian Institute of Management, Ahmedabad</td>
</tr>
<tr>
<td>21.</td>
<td>Adviser (I&amp;VSE), Planning Commission</td>
</tr>
</tbody>
</table>

**Chairman**

**Member**
II. Terms of Reference:

(i) To evaluate the current position with regard to availability of land and water for industrial growth.

(ii) To estimate the long and medium term requirements of land and water for rapid industrial growth.

(iii) To look into the issues relating to land acquisition for industry which will, interalia, include

- Processes for obtaining land.
- Creation of land banks in States.
- Compensation and rehabilitation measures

and to suggest strategies to address them.

(iv) To look at the issues pertaining to water, including, inter-alia,

- Water quality & treatment
- Availability for industrial use
- Water-zoning and standardized information system

and to suggest strategies to address them.

(v) To specify the milestones to be achieved within the 12th Plan period in respect of above issues.

(vi) To suggest/recommend programmes which may need to be initiated in the 12th Plan period, together with the broad budgetary implications, if any.

2. The Chairman may constitute Sub-Groups/Task Forces as considered necessary and co-opt other members to the Working Group for specific inputs.

3. The expenditure towards Travelling Allowance (TA)/DA in connection with the meetings of the Working Group/Steering Committee in respect of the official Members will be borne by their respective Ministry/Department. In case of non-official Members of the Working Group, expenditure towards their TA/DA would be met by the Planning Commission as admissible to the class I officers of the Government of India. As per extant guidelines, air travel required for attending the meeting may be undertaken only by Air India.

4. The Working Group will be serviced by the Industries Division, Planning Commission.

5. The Working Group would submit its report to the Chairman of the Steering Committee on Industry by 31st August, 2011.

6. Shri A.K. Khullar, Joint Adviser (VSI), Room NO.346, Yojana Bhawan, New Delhi, Tel No.23753166, e-mail: akkhullar@nic.in will act as a Nodal Officer for this Working Group.

(Shri Renu S. Parmar)
Adviser (Industry & VSE)
Telefax: 2309 6605
Email: rsparmar@nic.in

To

The Chairman and all Members of the Working Group