

Primer:

O3 Revision of Byelaws to Make Rainwater Harvesting Mandatory

Optional Reform under JNNURM

1. The Reform

The main objective of making rainwater harvesting mandatory in all buildings is to recharge groundwater and augment overall water availability. This measure will ensure that the rain falling on all buildings is tapped and directed to recharge groundwater aquifers or stored for direct consumption/ use by occupants of buildings. With increasing population in urban areas, the municipal bodies and other public agencies are increasingly finding it difficult to supply water in adequate quantities to citizens. Often citizens use private tube wells to supplement the municipal supply for their daily needs.

Recharging ground water will raise aquifer levels and will help municipal and other public agencies to have access to larger quantities of groundwater. In alluvial areas, energy saving for 1m rise in ground water level is around 0.40 kilo watt per hour. Recharging aquifers will also reduce the requirement for additional financial resources for augmenting water supply.

2. Rationale for the reform

Rainwater harvesting is required for the following reasons:

1. It helps to meet the ever-increasing demand for water.
2. It helps in tackling acute water shortage during summer.
3. Recharging aquifers enhances the availability of groundwater, including through increase in water levels in wells and bore-wells.
4. Tapping of or reduction in surface runoff checks flooding of roads and other low-lying areas as well as soil erosion.
5. It helps improve the quality of groundwater by diluting groundwater pollutants.
6. In saline and coastal areas, rainwater helps reduce salinity in groundwater.
7. By helping raise the aquifer level, the rate of power consumption for pumping out/ up groundwater is reduced.
8. On islands, due to limited fresh water aquifers, rainwater harvesting provides water for domestic use.
9. In very water-scarce areas and/ or deserts, rainwater harvesting provides the much needed water for people.

3. Steps to effectively implement the reform

In order to make Rainwater Harvesting mandatory in all buildings, including institutional, commercial and industrial complexes, the state governments can take the following steps:

	Steps to be taken by Urban Local Bodies	Years			
		1	2	3	4
a.	Prepare draft changes in Building Rules	■			
	Discuss the draft changes in Building Rules with key stakeholders in a Stakeholders meeting	■			
	Finalise Building Rules based on the feedback from stakeholders	■			
b.	Prepare draft building byelaws to reflect the mandatory clause of Rainwater Harvesting.	■			
c.	Issue G.O./ amend Building Bye-laws to include construction of rainwater harvesting structure in every building	■			
d.	Widely disseminate the new set of Building Byelaws through a website that also provides links to other key resources and via Public Interest advertisements in the mass media.	■			
e.	Based on needs identified, conduct city level workshops to address/ guide queries of the general public.		■		
f.	Start of Approval as per the new building byelaws	■	■		
g.	Give rebate in property tax as incentive.	■	■		
	Set up a Rainwater Harvesting Cell in Municipal Corporation/ Municipality to guide all applicants for plan approval for new buildings and/ or development projects as well as those introducing rainwater harvesting structures in existing buildings.		■		
	Facilitate the decision of applicant on end use for rainwater and design of Rainwater Harvesting System in response to the roof area and the annual rainfall expected		■	■	
	Assist building owners to decide on appropriate options for harvesting rainwater (for ground water recharging or direct use) and on appropriate technologies/ designs for rainwater harvesting		■	■	■
	Rainwater harvesting measure to be executed before issue of Completion Certificate/ Building Use Certificate	■			

4. Milestones to be achieved to implement Reforms

a. Final design of RWH system and decision on end use

Design of RWH systems in each City would be taken by the Municipality at two levels:

Short Term Plan

- As an immediate step, each Municipality would in consultation with State Ground Water Board or an equivalent Authority/Agency make a Conceptual Plan of:
 1. The Groundwater Zones in the City based on existing knowledge of Geology, depth to Ground Water Table and existing Groundwater monitoring data.
 2. Implement Pilot projects in Government and Institutional buildings to finalize design of Rainwater Harvesting structures (based on existing knowledge) most suited to the topography and geological conditions of the City
 3. Identify critical areas and land uses where RWH should be taken up on immediate basis
 4. Extend implementation of RWH to all land uses including industries, green areas and transportation (like footpaths)

Long Term Plan

- Municipal Authority would engage the State Ground Water Board or an equivalent Authority/Agency to conduct detailed surveys at City level (including proposed limits of the city) to:
 1. Clearly divide the city into different Rain water recharge zones
 2. Undertake groundwater explorations through digging of tube wells and undertake monitoring of groundwater in each zone
 3. Prescribe technical design and specifications of RWH structures
 4. Identify critical areas and land uses
 5. Undertake preparation of technical manual on RWH for the city
 6. Cities can maintain a digital database of information regarding Ground Water Scenario and Tube wells in the city. For Example: Mumbai is in the process of digitizing all tube wells and collate them with a GIS based database.

The initiative of dividing the city into rain water recharge zones, devising technical design and publishing RWH manual has already been undertaken for Delhi by the Central Ground Water Board. State Ground Water Board already undertakes such explorations and design of RWH structures for all States but this is done at a district level and would have to be extended to the city level.

Decision on end use would be taken by the Municipality in consultation with the State Ground water Board based on:

- **Consumption pattern:** High end users like Hotels should be made to reuse and recycle water whereas small individual users should be encouraged to recharge.
- **Location and water situation:** Areas where recharging is difficult/expensive (like some areas of Madhya Pradesh) due to hard terrain or existing groundwater contamination (like Arsenic contamination in West Bengal) groundwater reuse and storage would be given preference over recharge.
- **Situational Analysis:** Stringent measures and wider implementation would be required in Critical Zones. In critical zones, drilling of tube wells would have to be completely banned and recharging by public (at building level) as well as Government (Monuments, parks, open spaces, Government Buildings) would have to be taken up.

b. Preparation of draft Building Byelaws to reflect the mandatory clause of Rainwater Harvesting

For preparation of draft Building Byelaws to reflect RWH as mandatory clause, each State would have to:

- Identify the Competitive Authority which would be responsible for RWH. It is proposed that Municipal Corporation (MC) and Development Authority (DA) in each State be selected as the Competent Authorities. These Authorities should be responsible for sanctioning building plans and issuing Completion Certificates only after ensuring implementation of RWH in the buildings in their respective areas of jurisdiction¹.
- The State Government shall issue a notification that the respective State ULBs make amendments to Building Byelaws to introduce a separate section on Rain Water Harvesting in the Bye Laws. This section should:
 1. Make RWH mandatory for all new buildings

¹ For new buildings, Development Authority/MC in each city would be responsible for implementing RWH. Municipal Corporation in each city would be responsible for undertaking measures to promote RWH in existing buildings, government buildings, open spaces and greens. In cities, where Development Authority does not exist yet or is not functional, both these functions would be undertaken by the Municipal Corporation (MC).

2. Specify area limits of buildings (minimum roof top area as well as Plot area) to which this byelaw would be applicable. Eg: Delhi has made RWH mandatory for buildings with roof area of 100 sqm and plots more than 200 sqm.
3. Extend implementation of RWH to all major land uses including Industries, Monuments, Transport (parking areas, road side pavements, dividers) and Greens.
4. Specify a time limit after which date all plans seeking approval for new buildings would not be passed unless adequate RWH systems are provided.
5. Specify that Completion certificate for new buildings shall not be issued unless RWH is completely implemented. A representative of the RWH cell (to be formed under MC as a mandatory measure) shall accompany the inspection team to ensure conformity.
6. Specify stricter guidelines for high end users like hotels, housings, etc., existing and proposed, under which such complexes shall have to meet a percentage of their water requirement through reuse and storage of rain water.
7. Phase out implementation of RWH in existing monuments, Transport Corridors, buildings, Government Offices and buildings, greens; within specified time limits.
8. Clearly specify incentives and penalties for RWH and clearly specify the procedure to claim such incentives/penalties.

A draft version of such amended building byelaws shall be discussed with stakeholders (Government Agencies, Citizen Groups, NGOs, Developers) and be put in public domain to invite comments. The amendment shall be finalized after incorporation of relevant comments by the ULB. The MC and DA websites shall host the amended byelaws.

c. Amendment of the existing legislation to introduce the new Building Byelaws

The State Government shall publish a notification in the State Gazette and notify amendments to the State Municipal Corporation Act and Development Authority Act, applicable to all MCs and DAs in the State, to include RWH. The State Secretariat will also have to publish an amendment to the State Town and Country Planning Act under which the ULBs would be required to make amendments to the Building Byelaws to include RWH as a mandatory prerequisite for Sanction and issue of Completion Certificates to all new buildings. The State Government shall invite

comments on the amendment to State MC Act, State DA Act and State Town Planning Act within a period of 15 days of publication of the Notification and all relevant comments shall be incorporated before finalization of the same.

Under the above notifications, each JNNURM city would be required to:

- Incorporate RWH in its mandate which would enable the Authority to make budgetary allocations for RWH, set up RWH cell (only for MC), take up projects to initiate RWH (like MC can promote RWH in public areas)
- MC/DA, as applicable, shall have the powers to amend the existing Building Byelaws to make RWH mandatory in new buildings. The ULB would be under obligation to put the modified Building Byelaws in public domain, invite and incorporate comments on the same before finalizing the Modified Building Byelaws.

The State Government shall also publish a notification in the State Gazette to empower Water Supply Departments in each city to take initiatives on RWH but such initiatives shall be undertaken in close coordination with the MC.

d. Dissemination of the new set of Building Byelaws through a website

The State Government, respective MCs and DAs shall host the new building byelaws on their website to make them accessible to the general public.

RWH Cell under the MCs shall spearhead the process of dissemination of new Building Bye Laws which shall be made available under a separate section on the RWH cell's website. The website shall have provisions for:

- Making the new Building Byelaws available in public domain within a week of their publication.
- Inviting comments on the New Byelaws
- Link to respective MC and DA websites

e. City Level Workshops to address the queries of general public

City level Workshops on RWH shall be hosted by the RWH cell set up under the MC.

Such workshops would:

- Be held in cooperation with Institutes, schools, colleges
- Provide a platform for interaction of citizens with technical experts of the RWH cell on queries regarding need for RWH, awareness, design, implementation, maintenance of RWH structures.
- Such workshops would be held at least once a month such that at least three workshops are held in each zone every year. More workshops shall be held in critical zones.
- Models of RWH structures and posters shall be displayed at the Workshop venue to provide an illustration to the citizens.
- Date of workshop shall be advertised in dailies, through pamphlets, on MC, DA and RWH cell website
- Special workshops should be held prior to monsoons to encourage citizens to take up RWH

f. Start of approval as per the new Building Byelaws

After approval of the new Building Byelaws, the ULB shall take 2 to 6 months to fully operationalize the Building Byelaws. In this duration, the ULB would:

- Engage State Ground Water Board or equivalent to prepare a conceptual map of the City showing groundwater recharge zones and device design of RWH structures suited for the city's environment through implementation of Pilot Projects
- Engage personnel with technical expertise, involve stakeholders to constitute RWH Cell. Maximum duration for setting up the RWH cell shall be 6 months from the date of amendment to MC Act.

Any building plan which comes to the DA for approval after such date shall be approved only if proper RWH systems are provided in the building plan. Completion certificate to such approved plans would only be issued after construction of RWH structure on site has been approved.

5. Develop a Common Platform for each State to implement RWH

In order to make RWH effective, Under the amendments made to the ULB Acts, the ULBs should to:

- Constitute a RWH cell under its jurisdiction which would have representation from major Stakeholders including State Ground Water Board, DA, Citizen Groups and NGOs. The Cell would:
 1. Shall undertake training Programmes to sensitize and train officials in MC and DA towards the need for RWH
 2. RWH Cell should have representatives from public, NGOs, Technical representatives, Development Authority
 3. Provide RWH information on a website.
 4. Host a list of Architects, Contractors, NGOs, etc. qualified in undertaking design and implementation of RWH structures.
- Shall take measures to ensure monitoring of implemented RWH projects
- Extend implementation of RWH to all major land uses including Industries, Monuments, Transport (parking areas, road side pavements, dividers) and Greens.
- Provide Separate budgetary allocation for RWH in the Municipal Budget
- Shall take initiatives to expand the scope of RWH to cover existing buildings.
- The MC shall also identify tube wells in the city where RWH can be taken up.
- MC shall encourage high end users like Hotels to take Wastewater Treatment and reuse on site
- Should ban unauthorized covering/filling up of tube wells
- Should work out a Phase wise Strategy targeting critical areas and high end users in the first phase.
- Impose requisite penalties and incentives to ensure compliance.

Illustrative Amendment to Building Byelaws: Case 1

In order to augment ground water resources, it has been decided to make it mandatory to provide rain water harvesting structure in all buildings with roof area of above 100 sq. mt and plot size above 200 sq. mt. In every such building, rainwater harvesting structure shall be provided by the owner in such manner and within such time as may be prescribed. Where the owner or occupier of the building fails to provide rainwater harvesting structure in the building before the date as may be prescribed, the water supply connection provided to such building shall be disconnected till rainwater harvesting structure is provided. In case they do not provide rainwater harvesting structure within the above said period, the authorities of the local body concerned will provide the rainwater harvesting structure in those buildings and recover the cost of provision of rainwater harvesting structure with the incidental expense from such owner or occupier through property tax.

Illustrative Amendment to Municipality Building Rules: Case 2

Rooftop Rainwater Harvesting Arrangements: Workable rooftop rainwater harvesting arrangements shall be provided as an integral part of all new building constructions for the following occupancies, namely, Residential (with terrace area of 100 sq.m or more/ plot area of 200 sq.m or more), and Offices, Commercial buildings such as malls, shopping centres and cinema halls, Education and Health Institutions and Industry (terrace area above 200 sq.mt or more/ plot area 300 sq. mt).

The components of workable rooftop rainwater harvesting arrangement shall include:

- i) roof's catchment area,
- ii) flat roofs sloped towards edges with rainwater outlet pipes and roof gutters for sloping roofs,
- iii) down pipe for transporting rainwater from roofs to the ground level
- iv) first flush pipe arrangement for diverting debris, dirt and dust on the roofs
- v) a filter unit comprising a container or chamber filled with filter media at the ground level.

The other components depend on how the rain water is to be utilised, that is, for ground water recharging or for direct use.

For storing and reuse of the rainwater,

- vi) a storage tank that has provision for
- vii) drawing water and for spillover of excess water is to be provided. For charging the groundwater aquifers, the water from the filter unit (iv) shall be diverted to suitable structures like dugwells, borewells, recharge trenches or recharge pits for charging the groundwater aquifers.

For ground water recharging, the options are:

- a) Through direct channelling of surface water to abandoned wells or hand-pumps, recharge pits or recharge trenches, or to through recharge shafts...
- b) Directing of harvested rainwater to pumping wells,

Additional arrangements for carrying the spillover water from storage tank to recharge well or percolation pit needs to be provided. The owner(s)/occupier(s) shall maintain the rooftop rainwater harvesting arrangements and artificial ground water recharge arrangements in healthy working condition. The Municipality may, in exceptional cases such as water logged areas or those with impermeable subsoil conditions to considerable depths, exempt construction of mandatory groundwater recharging arrangements.

The municipality shall enforce workable artificial ground water recharging arrangements as an integral part of all new building constructions through collection of roof top rainwater.

In existing buildings, care should be taken in harvesting rainwater from roofs with tar/ bitumen or other coatings and paints containing lead, chromate, fungicides or other toxins that can prevent polluting the water. Similar care should be taken for drains and pipes.

Implementation of the Bye-Laws in different States

KERALA

Reform

- The Kerala Municipality Building Rules, 1999 were amended by a notification dated January 12, 2004 (Local Self Government Department Notification) issued by the Government of Kerala to include rainwater harvesting structures in new constructions.

Exemption from this can be granted for cases where water logging is common or in areas with impermeable subsoil conditions to considerable depths.

Steps Taken/Status

	Administrative Measures	Implementation	Monitoring	Technical	Awareness Generation/ Stakeholder Involvement	Incentives
Mandatory		Implementation of RWH structures was distributed amongst different agencies: Kerala Water Authority (1231 of the 6,000 subsidized structures) and Jananidhi (816 of the 6,000 subsidized structures) Kerala Government plans to take up 8,750 wells for RWH			Multiple ownership has been found to work more effectively in case of RWH. RWH structures in flats with multiple owners are maintained better than those in individual houses.	Kerala Government planned to subsidize the construction of 6,000 water harvesting units in 2007 (distributed amongst Kerala Water Authority and Jananidhi). KWA would grant a subsidy of 90% whereas Jananidhi would grant 75% subsidy.

NEW DELHI

Reform

- Since June 2001, the Ministry of Urban Development has made rainwater harvesting mandatory in all new buildings with a roof area of more than 100 sq. m. and in all plots with an area of more than 1000 sq. m., that are being developed.
- The Central Ground Water Authority (CGWA) has made rainwater harvesting mandatory in all institutions and residential colonies in notified areas (South and South-west Delhi and adjoining areas like Faridabad, Gurgaon and Ghaziabad). This is also applicable to

all the buildings in notified areas that have tube wells. The deadline for this was for March 31, 2002. CGWA has also banned drilling of tube wells in notified areas.

Steps Taken / Status

	Administrative Measures	Implementation	Monitoring	Technical	Awareness Generation / Stakeholder Involvement	Incentives
Mandatory	In accordance with the Ministry of Urban Affairs and Poverty Alleviation Notification, Delhi Development Authority has made it mandatory for all new buildings with a roof area of more than 100 sq. m. and in all plots with an area of more than 1000 sq. m. to have rain water harvesting provision.	Building plans are not sanctioned unless such provision is provided. DDA/MCD representatives undertake a site inspection before issue of Completion Certificate to the building and ensure that the RWH is made as per plan. Central Ground Water Board has undertaken a study of critical groundwater zones in the city All buildings/plots willing to drill boreholes in the premises need prior permission from CGWB Delhi Jal Board (under Ministry of Water Resources) has a dedicated Rain Water Harvesting Cell			Pilot Projects on RWH have been undertaken in several Government Buildings DJB encourages NGO participation in the sector	Delhi Jal Board under Ministry of Water Resources provides financial incentives for construction of RWH pits in the form of 50% of the cost of construction or upto Rs. 2 Lakh cash to registered Resident Welfare Associations which have implemented RWH. DJB gives awards and Incentives to best RWH site.

INDORE (MADHYA PRADESH)

Reform

- Rainwater harvesting has been made mandatory in all new buildings with an area of 250 sq m or more.
- A rebate of 6 per cent on property tax has been offered as an incentive for implementing rainwater harvesting systems.
- Department of Housing and Environment and Urban Administration and Development, Government of Madhya Pradesh have issued Directives to Urban Local Bodies under Government Order no. F 23 (107) 95 XXXII dated 7th July, 2004 for ensuring installation of Rainwater Harvesting Structures.

Steps Taken / Status

Indore is amongst one of the foremost leaders in propagating and implementing RWH on a large scale. The number of RWH structures in Indore is 3,000 compared to 1,000 in Delhi

	Administrative Measures	Implementation	Monitoring	Technical	Awareness Generation/ Stakeholder Participation	Incentives/ Penalties
Measures taken	RWH has been made mandatory for all buildings with an area of 250 sqm or more from 2001/02. RWH has been included as a separate head under the Municipal budget. Under Madhya Pradesh Bhumi Vikas Rules, 1984, Rooftop Rainwater Harvesting has been enforced in Municipalities for buildings more than 250 sq.m. RWH has been	A separate department named Rain water harvesting and Recharging Department was set up under Indore Municipal Corporation (IMC) in 2000 for awareness generation and to help citizens adopt RWH in new and existing buildings. The progress of the Department is monitored regularly by Municipal Commissioner, IMC and Divisional Commissioner. Building		A separate Technical Committee (with representatives from NGOs, Institutes and IMC) has also been formed to guide the RWH Department. RWH cell gives technical inputs on RWH schemes, ensure new buildings have RWH while seeking building permission	IMC has an Information Centre to divulge data on technical aspects of RWH. All Government buildings; Old and new gardens under IMC are being provided with RWH pits as pilot projects RWH cell undertakes activities related to awareness generation, conducts exhibitions, distributes pamphlets	Initial incentive of a one year complete property tax waiver for buildings undertaking RWH helped popularize RWH and ensured high compliance level. Building Department of IMC gives a rebate of 6% in property tax for those implementing the scheme (under Amendment to Article 138 of MP

	Administrative Measures	Implementation	Monitoring	Technical	Awareness Generation/ Stakeholder Participation	Incentives/ Penalties
	made mandatory for G+3 Structures.	Department of IMC sanctions building permissions only after implementation of RWH schemes on site. The department has implemented over 3,000 RWH projects in residential buildings and over 150 in public buildings and gardens.			and coordinates with NGOs	Municipal Corporation Act, 1956 and Article 126 of MP Municipalities Act, 1961 in March, 2001)

KANPUR (UTTAR PRADESH)

- Rainwater harvesting has been made mandatory in all new buildings with an area of 1000 sq m or more.

HYDERABAD (ANDHRA PRADESH)

- Rainwater harvesting has been made mandatory in all new buildings with an area of 300 sq m or more irrespective of the roof area
- Tentative date for enforcing this deadline was June 2001.
- Mandatory to provide RWH in all Group Housing and Commercial Complexes
- Mandatory for all categories of buildings including residential
- All existing buildings in Municipalities/Municipal Corporations shall construct rain water harvesting structures within a period of one year from issue of this GO. Competent authority shall insist on implementation of RWH in all layouts and sub divisions for sanctioning the same

	Administrative Measures	Implementation	Monitoring	Technical	Awareness Generation/ Stakeholder Participation	Incentives/ Penalties
Measures taken	Municipal Corporation of Hyderabad (MCH) has also	Hyderabad Metropolitan Water Supply and Sewerage		Technical experts have questioned		

	Administrative Measures	Implementation	Monitoring	Technical	Awareness Generation/ Stakeholder Participation	Incentives/ Penalties
	<p>made it mandatory to provide RWH to any additional buildings/multi stories in plots over 300 sqm</p> <p>All existing Municipal building were made to undertake RWH within 1 year from the issue of Notification</p>	<p>Board (HMWS&SB) has special Cells at their office where people can get information regarding RWH</p> <p>In critical areas, HMWS&SB has constructed nearly 14,000 RWH structures</p>		<p>HUDA norms for RWH structures and believe that injection wells can be made 5ft deep instead of 6.5ft deep as prescribed by HUDA</p>		
Shortfall	<p>Applications submitted for RWH by citizens to Municipal Corporation of Hyderabad (MCH), HMWS & SB and Hyderabad Urban Development Authority (HUDA) met with no or little response</p> <p>RWH has not spread widely due to non cooperation of concerned departments</p>	<p>Government departments ask residents to contact listed contractors who claim very high rates</p> <p>Lack of coordination between different Government Departments dealing with RWH</p> <p>Out of 5,000 applications submitted, only 500 are implemented</p>				<p>50% subsidy announced on RWH structures was lifted due to poor response.</p>

TAMIL NADU

Reform

- Through an ordinance titled Tamil Nadu Municipal Laws Ordinance, 2003, dated July 19, 2003, the Government of Tamil Nadu has made rainwater harvesting mandatory for all the buildings, both public and private, in the state. The deadline to construct rainwater harvesting structures was August 31, 2003.

- Municipal Administration and Water Supply (WS1) Department through a Government Order dated Nov. 2002, assigned Municipal Administration and Water Supply Department as the Nodal Departments for RWH, proposed setting up of State level and District Level Coordination Committees and propagated RWH in Government Buildings. It made it mandatory for Chennai Metropolitan Development Authority, all MCs, Municipalities, etc to sanction building plans only after implementation of RWH. Water and sewer connection would not be given to new buildings without RWH.
- Notification to Municipal Administration and Water Supply Department dated October 2002 for Provision of Water Conservation Measures, Amendments to Chennai city Corporation Building Rules, 1972 and Special Rules for the Multi storeyed and Public Buildings, 1974, Tamil Nadu Municipal Corporation of Madurai, Madurai Municipal Corporation Building (Water Conservation) Rules, 2002.
- Government of Tamil Nadu published a notification in the Tamil Nadu Gazette to make amendments to Chennai City Municipal Corporation Act 1919, Tamil Nadu District Municipalities Act 1920, Madurai City Municipal Corporation 1971 and Coimbatore City Municipal Corporation Act 1981 to make RWH mandatory. Under these amendments RWH was also made mandatory for all Government buildings
- RWH has been made mandatory in three storied buildings irrespective of the size of rooftop area

Steps taken / Status

	Administrative Measures	Implementation	Monitoring	Technical	Awareness Generation/ Stakeholder Participation	Incentives/ Penalties
Measures taken	RWH was given a boost in the State when it was given importance in CM's State budget speech where the State recognized the need for RWH, proposed changes in Town planning laws and proposed massive awareness campaigns. The CM took the initiative to meet	State Government proposed phase wise implementation of RWH. Under Phase I the Tamil Nadu Municipal and Panchayat Laws Ordinance was issued in July, 2003 which made RWH mandatory for all buildings in the State by Aug. 2008. Under Phase II, the scope of		TWAD and Chennai Metropolitan Water Supply and Sewerage Board (CMWSSB) provides technical guidance RWH website hosted by TWAD provides users with a technical manual and Rainfall	Tamil Nadu Water Supply and Drainage Board (TWAD) hosts a dedicated website for RWH which has full information regarding techniques, legislations, success stories, technical information, manual and RWH calculator. The	In case, the deadline for implementation of RWH structures (Aug. 2003) was not met, the Executive Authorities were to provide the structure and recover the cost from the owner in a manner similar to Property Tax Prizes have been given to

	Administrative Measures	Implementation	Monitoring	Technical	Awareness Generation/ Stakeholder Participation	Incentives/ Penalties
	<p>all Local Body leaders and Elective Representatives to press the issue RWH is being taken up as a tool to combat droughts in the State</p>	<p>RWH was expanded from buildings to roads, ponds, streets, National and State Highways, road margins and open areas By end of October 2003, more than 48 lakh Non Government buildings in urban areas had installed RWH More than 1.72 lakh Government sector buildings have been provided with RWH Building assessment for tax computation is done only for buildings with RWH structures.</p>		<p>Calculator Technical Information Centers are set up at TWAD Board Head Office and District Offices to provide free technical guidance.</p>	<p>website is hosted in English and Tamil TWAD spearheads the RWH campaign in the State and has started implementing RWH in all its buildings CMWSSB website also has a section on RWH Multimodal communication techniques have been adopted and measures to spread awareness have been taken through involvement of several sections of society including NGOs, school and college students. Street plays, Road shows, advertisements in TV, cinemas, print Media are conducted Students, Government Officials are invited to RWH Workshops Seminars have been held for Government Officials, Students, Women and Self Help</p>	<p>students who motivate their parents to implement RWH and to schools, teachers in each district who implement RWH Water and sewer connections to new buildings are provided only after implementation of RWH</p>

	Administrative Measures	Implementation	Monitoring	Technical	Awareness Generation/ Stakeholder Participation	Incentives/ Penalties
					<p>Groups. CMWSSB field staff and 55,000 students were involved in one day door to door campaign on RWH</p> <p>More than 25,000 youngsters were trained in implementation of RWH techniques by TWAD Board all over the State to promote and implement RWH</p> <p>Information centers have been set up in all District Collectrates to provide information on RWH</p> <p>RWH projects implemented in State Level Government buildings including CM's residence</p>	
Chennai		<p>Chennai Municipal Corporation has implemented RWH at 29 flyovers, 242 structures in open areas, 945 road margins, 1698 structures on Corporation streets and corporation and temple ponds.</p> <p>Chennai Municipal Corporation</p>	<p>Tamil Nadu State Government has created a Department only for the maintenance of RWH structures in Chennai.</p>	<p>Corporation of Chennai provided RWH friendly storm water drains without a concrete base which allowed for infiltration of water</p>	<p>Rain centers with working models and awareness generation material have been set up in Chennai</p> <p>Chennai Corporation implemented RWH in 14 temple complexes</p>	<p>If the owner/ occupier of the building fails to provide RWH structure before the said date, in Chennai, Water supply to such a building can be disconnected under legislation till the structure is provided.</p>

	Administrative Measures	Implementation	Monitoring	Technical	Awareness Generation/ Stakeholder Participation	Incentives/ Penalties
		sanctions new building plans only if they are provided with RWH structures. Chennai Municipal Corporation has provided RWH structures in over 3.29lakh residential/ commercial/ institutional buildings				

RAJASTHAN

- The State Government has made rainwater harvesting mandatory for all public establishments and all properties in plots covering more than 500 sq m in urban areas.

	Administrative Measures	Implementation	Monitoring	Technical	Awareness Generation/ Stakeholder Participation	Incentives/ Penalties
Measures taken	RWH made mandatory for all buildings (under any land use) with a plot area of over approx. 300 sqm Plots upto 500sqm are granted sanction by Zonal Offices and those above 500 sqm are granted sanction by the JMC Planning Cell after ensuring compliance with RWH norms. JMC (Jaipur Municipal	A period of 6 months was given after the issue of notification for implementation of RWH structures in houses. After implementation of RWH structure, owners are required to obtain certification from Municipal body and submit it to PHED Completion Certificate is not issued until RWH is implemented				If completion certificate for RWH is not submitted to PHED, water supply connection can be terminated

	Administrative Measures	Implementation	Monitoring	Technical	Awareness Generation/ Stakeholder Participation	Incentives/ Penalties
	<p>Corporation) sanctions plans for new buildings in areas under JMC. In areas under the jurisdiction of Development Authority, the JDA is the Competent Authority.</p> <p>State Ground Water Board is also taking several measures to promote RWH</p>					

MUMBAI

Reform

- The State Government has made rainwater harvesting mandatory for all buildings that are being constructed on plots that are more than 1,000 sq m in size. The deadline set for this was October, 2002.
- By 2007, the same provision became mandatory to buildings with plot area of 3,000 square meters and above and now it is 5,000 square meters.

Steps Taken / Status

	Administrative Measures	Implementation	Monitoring	Technical	Awareness Generation/ Stakeholder Participation	Incentives/ Penalties
Measures taken	<p>MCGM is the first MC in Maharashtra to make RWH mandatory.</p> <p>From Nov. 2002, new</p>	<p>RWH has been imposed as an IOD (Intimation of Disapproval) condition and Completion certificate to buildings is</p>	<p>BMC undertook several RWH pilot projects (all civic buildings and gardens) and monitored these before going ahead</p>	<p>MCGM has a Technical cell called RWH cell, which was established in 2002 (headed by</p>	<p>RWH cell has conducted citizen essay competitions in different languages, published an Information</p>	

	Administrative Measures	Implementation	Monitoring	Technical	Awareness Generation/ Stakeholder Participation	Incentives/ Penalties
	<p>buildings within MCGM (Municipal Corporation of Greater Mumbai) area are granted water connections only @90lpcd (compared to 135lpcd as supplied earlier) and these new buildings are required to meet the remainder of demand through RWH or recycling.</p> <p>RWH was made mandatory for all new buildings with plot area more than 1000 sqm.(this was later extended to 5000 sqm in 2007)</p> <p>RWH was also made mandatory for properties which had come for sanction before Oct. 02 but were coming for Completion certificate from Nov. 03.</p> <p>RWH is also being made mandatory for buildings coming to</p>	<p>granted only after installation of RWH structure(s).</p> <p>More than 440 properties have been issued Completion Certificates after implementation of RWH since 2002.</p> <p>MCGM would undertake RWH in a phase wise manner. For the first phase, they have identified high end users where RWH would be implemented.</p> <p>BMC has sent notices to over 45 buildings to undertake RWH</p> <p>Since new buildings only account for 4 to 5% of the total buildings, MCGM plans to extend RWH to existing buildings</p>	<p>with city level RWH implementation</p>	<p>Asst. Engineer)</p> <p>RWH cell hosts technical seminars with leading organizations in the field to enhance know how on RWH.</p> <p>MCGM has taken the initiative of protecting the existing wells in the city and is getting the wells digitized with available subsoil details to build a database on existing groundwater status in each locality and identify critical areas.</p>	<p>booklet on RWH, advertised hoardings, conducted Drawing Competitions with Municipal school children and involved NSS students in awareness generation.</p> <p>RWH cell has also hosted 'Jal Melas' in each administrative ward and trained Ward staff for dispersing basic information</p> <p>RWH cell is involving NGOs in RWH implementation and awareness generation</p> <p>RWH cell has undertaken pilot RWH projects in areas including industrial areas and housing complexes to increase the coverage of RWH</p> <p>RWH cell has implemented at least one RWH project in each Municipal Ward.</p> <p>RWH cell is</p>	

	Administrative Measures	Implementation	Monitoring	Technical	Awareness Generation/ Stakeholder Participation	Incentives/ Penalties
	<p>MCGM for additions/ alterations/ FSI TDR use</p> <p>A Government Directive was issued in March 2005 making RWH mandatory for all developers</p> <p>Recycling has been made mandatory for centrally AC buildings to meet the chilling water requirements</p> <p>Installation of wastewater treatment plants had been made mandatory for new buildings having a plot area of more than 2,000 square meters.</p>				<p>setting up 2 RWH centers which would comprise of a pilot project, a working model, library, information on completed RWH projects, recommended materials for construction and list of people dealing with RWH.</p>	

GUJARAT

Reform

- The state Roads and Buildings Department has made rainwater harvesting mandatory for all government buildings.
- Under the Gujarat Development Control Regulations, buildings with area between 500 and 1500 sq.m.; the owner or developer shall have to undertake Rainwater Harvesting as per the Authority Specifications. For buildings with area between 1500 to 4000 sqm., owner/developer has to provide percolation wells with rain water harvesting system @ one percolating well for every 4000 sqm or part thereof of building unit.

Steps Taken / Status

	Administrative Measures	Implementation	Monitoring	Technical	Awareness Generation	Incentives/ Penalties
Measures taken	<p>State Roads and Buildings Department has asked District Authorities to implement RWH in 118 Government buildings</p> <p>Provision of RWH systems has been made mandatory for all new State Government buildings constructed after 2003.</p> <p>Under GDCR (Gujarat Development Control Regulations), different Municipalities are taking initiatives towards making RWH mandatory for private buildings</p>	<p>State Roads and Buildings Department has sanctioned Rs. 25,000 for implementation of RWH in 18 buildings.</p> <p>All existing State Government buildings under R&D Department have been provided with RWH systems</p> <p>Surat Municipal Corporation has taken initiatives to undertake RWH in open plots and gardens</p>			<p>MCs like Surat Municipal Corporation are taking initiatives towards spreading awareness on RWH by organizing Programmes, displaying hoardings, pamphlets.</p>	