

**ACTION PLAN FOR THE REDUCTION OF NRW AT JAUNPUR**



**JAUNPUR NAGAR PALIKA PARISHAD**

**JAUNPUR**

**Action Plan for the Reduction of NRW at Jaunpur**



**Table of Contents**

|  |  |  |
| --- | --- | --- |
| 1. |  About the NPP Jaunpur.................................................................................................................. | 2 |
| 2. | Parameters to measure NRW ............................................................................................................... | 2 |
| 3. | Definition as per International Water Association Water Balance ....................................................... | 3 |
| 4. |  Identified parameters NRW in Jaunpur NPP.................................................................................. | 3 |
| 5. | Calculation of NRW ............................................................................................................................... | 4 |
| 6. | Priority wise action required for reduction of NRW ............................................................................. | 5 |
|  | 6.1 | Periodic water audit to know the accurate calculation of water loss and NRW .......................... | 5 |
|  | 6.2 | Reduce number of households getting water under Minha ........................................................ | 5 |
|  | 6.3 | Legalize illegal water connection .................................................................................................. | 6 |
|  | 6.4 | Installation of metered water connections .................................................................................. | 6 |
|  | 6.5 |  Theft of water in various forms (Registered at least 95% of houses and to provide water |  |
|  | connection to them) ................................................................................................................................. | 6 |
|  | 6.6 | Periodic leakage detection in the existing pipelines and OHTs .................................................... | 6 |



1

**Action Plan for the Reduction of NRW at Jaunpur**



**1. About the NPP Jaunpur**

Impact of government’s schemes like AMRUT & SBM and strategic location of Jaunpur area Urbanization of the city is growing at faster rate than ever. Most of the services in the city are crumbling to the increasing pressure. City is trying to serve its growing population. Limited resources and inefficient man power are the main hurdles in serving population. Along with the other services of the city, water supply is also struggling to maintain adequacy and quality of services provided to the citizens. Major problem faced by water supply sector is water loss and the poor collection of revenue for the supplied water in the city. Nagar Palika is not getting revenue from 22.86% of supplied water. This kind of water handling management is common in most of the cities and has led to insufficient performance of water supply services.

To overcome the challenges and increase the efficiency, city has identified the losses and necessary measures to reduce NRW.

Non-revenue water (NRW) is water which is supplied to citizen and not paid for it. NRW also includes technical losses, unbilled water, illegal connections, theft water, and other accidental losses.

To save the water, central government targeted to reduce the NRW. Under AMRUT scheme same considered as a priority reform.

Within the Nagar Palika Parishad area, the total supply of water is around 30.14 MLD. NRW is calculated as approx. 6.89 MLD which accounts 22.87% of total supplied water. Around 0.41% of supplied water account of unbilled consumption and around 19.46% commercial losses and around 3% technical losses

**2. Parameters to measure NRW**

Non-revenue water (NRW) is defined as the part of produced water which is either lost due to miss-handling or Unbilled authorized consumption. In simplified form NRW-indicator highlights the extent of water produced which does not earn the utility any revenue. This is computed as the difference between the total water produced (ex-treatment plant) and the total water sold expressed as a percentage of the total water produced.

**NRW comprises of:**

1. ***Unbilled Authorized Consumption:***

Consumption which is authorized but not billed, such as public stand posts water used by the utility for operational purposes, water used for firefighting, and water provided for free to certain consumer groups;

1. **Commercial (or apparent) losses:**

Apparent losses such as illegal water connections, metering inaccuracies, customer meter under registration, data handling errors and theft of water in various forms;

1. ***Physical (or real) losses:***

Real losses which are leakages in the transmission and distribution networks from all parts of the system and overflows at the utility’s reservoirs. They are caused by poor operations and maintenance, the lack of active leakage control, and poor quality of underground assets.



2

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**3. Definition as per International Water Association Water Balance**

The following are definitions of principal components of IWA water balance.

* **System Input Volume** is the annual volume put into the part of a water supply system thatrelates to water balance calculation.
* **Authorized Consumption** is the annual volume of metered and/or non-metered water takenby registered customers, water suppliers, and others who are implicitly or explicitly authorized to do so for residential, commercial, and industrial purposes. It includes water that is exported.
* **Water Losses** can be identified by calculating the difference between system input volumeand authorized consumption. They consist of apparent losses and real losses.
* **Apparent Losses** result from unauthorized consumption and all types of inaccuraciesassociated with metering.
* **Real Losses** result from losses at mains, service reservoirs, and service connections (up to thepoint of customer metering). The annual volume lost through all types of leaks, bursts, and overflows depends on their individual frequencies, flow rates, and duration.
* **Non-Revenue Water** is the difference between system input volume and billed authorizedconsumption, and it consists of the following:
	+ Unbilled Authorized Consumption (usually a minor component of water balance)
	+ Apparent Losses
	+ Real Losses

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  |  | Billed | Billed Metered Consumption | Revenue |  |
|  |  | Authorized | (including water exported) |  |
|  |  | Water |  |
|  | Authorized | Consumption | Billed Non-metered Consumption |  |
|  |  |  |
|  | Consumption | Unbilled | Unbilled Metered Consumption |  |  |
|  |  | Authorized | Unbilled Non-metered Consumption |  |  |
|  |  | Consumption |  |  |
| System |  |  |  |  |
|  | Apparent | Unauthorized Consumption |  |  |
| Input |  |  |  |
|  | Losses | Metering Inaccuracies | Non- |  |
| Volume |  |  |
|  |  | Leakage on Transmission and/or | Revenue |  |
|  |  |  |  |
|  | Water Losses |  | Distribution Mains | Water |  |
|  | Real Losses | Leakage and Overflows at Utility’s |  |  |
|  |  |  |  |
|  |  | Storage Tanks |  |  |
|  |  |  |  |  |
|  |  |  | Leakage on Service Connections up to |  |  |
|  |  |  | Customers’ Meters |  |  |
|  |  | **IWA Water Balance** |  |  |

**4. Identified parameters NRW in Jaunpur NPP**

Assessment has been done to identify the parameters for water loss and non-revenue water. Based on identified parameters existing measures/steps taken by JNPP has been analyzed. It has been observed that the large amount of water is being provided to citizen at free of cost under “Minha”. Identified parameters and corresponding scenario is provided in the following table.

|  |  |  |
| --- | --- | --- |
|  | **Parameters** | **Scenario at Jaunpur** |
|  |  |  |
| **A** | **Unbilled Authorized Consumption** |  |
|  |  |  |



3

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| --- | --- | --- | --- | --- |
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|  |  |  |  |  |  |
|  |  | **Parameters** | **Scenario at Jaunpur** |  |  |
|  |  |  |  |  |  |
|  | 1 | Public stand posts | Nagar Palika is providing water |  |  |
|  |  |  | through 207 PSP by 8 hours of |  |  |
|  |  |  | operation per day |  |  |
|  | 2 | Water used for fire brigade | Fire brigade has 5 fire brigade vehicles with capacity of 4000 ltr. Each |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  | **B** | **Commercial losses** |  |  |  |
|  |  |  |  |  |  |
|  | 1 | Illegal water connections | Number of illegal connections - 5700, |  |  |
|  |  |  | process of legalization is under process |  |  |
|  | 2 | Metering inaccuracies | Households do not have meter |  |  |
|  |  |  | connection, houses are connected |  |  |
|  | 3 | Customer meter under registration |  |  |
|  |  |  | directly to the main lines |  |  |
|  | 4 | Theft of water in various forms | Unregistered properties are being |  |  |
|  |  |  | Registered |  |  |
|  | **C** | **Physical (or real) losses** |  |  |  |
|  |  |  |  |  |  |
|  | 1 | Leakages in the transmission and distribution networks | Periodic check of pipelines is being |  |  |
|  |  |  | done and after getting complains from |  |  |
|  |  |  | citizen, immediate action is being |  |  |
|  |  |  | taken to repair pipelines/leakages. |  |  |

**5. Calculation of NRW**

Estimated non-revenue water is 6.06 MLD, which accounts around 42.11% of total water supply. Around 5.2 MLD of water is being distributed free of cost under “Minha” which is an extra burden to JNPP. Component wise water consumption or loss has been given in the following table

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  |  | **Components of NRW** | **Quan** | **Percen** | **Calculation steps** |  |
|  |  |  | **tity** | **tage** |  |  |
|  |  | **Total water produced (in MLD)** | 30.14 | 100.00 | 25 tube wells and 31 mini tube wells. |  |
|  |  |  |  | % |  |  |
|  | **A** | **Unbilled Authorized Consumption** |  |  |  |  |
|  |  |  |  |  |  |  |
|  |  | Public stand posts |  103500 | 0.34% | 207 PSP x 500 lpcd |  |
|  |  |  |  |  |  |  |
|  |  | Water used for fire brigade | 20000 | 0.07% | Total capacity of 5 brigades |  |
|  |  |  |  |  |  |  |
|  | **B** | **Commercial losses** |  |  |  |  |
|  |  |  |  |  |  |  |
|  |  | Illegal water connections | 2850000 | 9.46% | Amount of water consumed through |  |
|  |  |  |  |  | 5700 illegal connections |  |
|  |  | Metering inaccuracies | 0 |  | Meters are not available |  |
|  |  |  |  |  |  |  |
|  |  | Customer meter under registration | 0 |  |  |  |
|  |  |  |  |  |  |  |
|  |  | Theft of water in various forms | 3014000 | 10% | Consumption of water by 10% HHs of |  |
|  |  |  |  |  | unregistered houses |  |
|  | **C** | **Physical (or real) losses** |  |  |  |  |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
|  |  |  |  |  | 4 |  |

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| --- | --- | --- | --- | --- |
|  | **Components of NRW** | **Quan** | **Percen** | **Calculation steps** |
|  |  | **tity** | **tage** |  |
|  | Leakages in the transmission and | 904200 | 3.00% | 3% of total water supply |
|  | distribution networks |  |  |  |
|  | **Total Loss in Ltr** | **6891700** | 22.87% |  |
|  |  |  |  |  |
|  | **Total Loss in MLD** | **6.89** |  |  |
|  |  |  |  |  |
|  | **NRW (%)** | **22.87** |  |  |
|  |  | **%** |  |  |

**6. Priority wise action required for reduction of NRW**

It is necessary to make an action plan to

1. Periodic water audit to know the accurate calculation of water loss and NRW
2. Reduce number of households getting water under Minha,
3. Legalize illegal water connection
4. Installation of metered water connections
5. Registered at least 95% of houses and to provide water connection to them
6. Periodic leakage detection in the existing pipelines and OHTs

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **SN** | **Components of NRW** | **Present** | **Action Required** | **2017-** | **2018-** |
|  |  | **situation** |  | **2018** | **2019** |
|  |  | 14.72% of total | All illegal connections need to |  |  |
| 1 | Illegal water connections | houses | be legalized | 5% | 5% |
|  | Customer meter under | 0% |  |  |  |
| 2 | registration | connection | Metered connection | - | - |
|  | Theft of water in various |  | Unregistered properties need |  |  |
| 3 | forms | 10% total HHs | to be registered | 5% | 5% |
|  | Leakages in the |  | Periodic and immediate action |  |  |
|  | transmission and | 3% of water | required to reduce physical |  |  |
| 4 | distribution networks | supply | loss | 2% | 1% |

***6.1 Periodic water audit to know the accurate calculation of water loss and***

***NRW***

Periodic water audit must be conducted to know the accurate water loss and NRW. Audit shall be conducted for the existing water supply system in Mughalsarai area. this audit report shall be used for the preparation of DPR to strengthening the water supply network and to reduce the NRW.

***6.2*** ***Reduce number of households getting water under Minha***

Under minha, Palika Parishad is wave off the water charges to the certain households. Presently Households under Minha is accounted as 40% of total households of the city. It is proposed to identify these households and levy water charges. These households need to be reduced to 6% during FY 2018-19 from 40%.



5

**Action Plan for the Reduction of NRW at Jaunpur**



***6.3*** ***Legalize illegal water connection***

Presently illegal connections are 5700 14.72%) of total connections. It is proposed to legalise the connection either through identification or organizing camp for connection registration. The Goal is to reduce illegal connection up to 5%.

***6.4 Installation of metered water connections***

At present the households area paying fixed water charges. This results in overdraw of water and thus increased NRW. To reduce water consumption in the city, it is proposed to install meterd water connection. Users must pay water charges as per the consumption, this will further regulate the water consumption and hence reducing the NRW.

***6.5 Theft of water in various forms (Registered at least 95% of houses and to provide water connection to them)***

Presently NRW assumed to 10% of unregistered houses within the Jaunpur NPP area, which accounts approx. 0.5% of NRW. It is necessary to register the unregistered properties and keep an eye for the construction of new houses. It is proposed to registered at least 95% of structures by the end of FY 2018-19.

Jaunpur NPP also needs to do regular monitoring to minimize the theft of water in other form (commercial industrial, coal mafias etc). Citizen must be encouraged to give the information about water theft and regulations should be in place to penalise the water thieves which will result in reduction of NRW.

***6.6*** ***Periodic leakage detection in the existing pipelines and OHTs***

Regular monitoring and a setup a technical team for the detection of leakage in the pipeline network is important to reduce the NRW. It is also advised to encourage citizen to give information about the accidental leakage in pipelines. Regular monitoring of all OHTs is necessary to reduce the NRW as well as unaccounted flow of water.



6