Guidelines
for
Utilisation of Treated Effluent in Irrigation

CENTRAL POLLUTION CONTROL BOARD
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1.0 Background

The Hon'ble National Green Tribunal (NGT), Principal Bench, New Delhi, vide order dated 24.05.2019 in the matter of O.A. No. 348/2017, Shailesh Singh Vs Al-Dua Food Processing Pvt. Ltd., issued the following directions to CPCB:

"*..We may add that no industry can be permitted to dispose treated effluents on land for irrigation, plantation or horticulture/gardening by prescribing standards applicable without assessment of adequate availability of land and impacts of such disposal on agricultural / crops /plants and the recipient ground water. Impact of precipitation levels also needs consideration while granting such approvals. ZLD needs to be considered with respect to use of effluents in the industrial processes not in terms of its disposal on land or farm. Therefore, the CPCB needs to look into this aspect with the help of experts and issue appropriate guidelines in this regard. This aspect may also be covered in the report to be submitted in the present case...*"

CPCB, constituted an Expert Group, comprising of members from Indian Institute of Technology (IIT), Delhi, National Environmental Engineering Research Institute (NEERI), Delhi and Central Pollution Control Board (CPCB), Delhi, to lay down guidelines as directed by the Hon'ble NGT. The Expert Group in its two meetings held on 7.8.2019 and 23.09.2019, discussed the issues thoroughly and finalised the **"Guidelines for Utilisation of Treated Effluent in Irrigation"** as given in the following paragraphs/sections.

2.0 Introduction

Zero Liquid Discharge (ZLD) implies that the industries are not discharging any effluent, either on the land or in the water body or at any other place i.e. recycling the same in the process entirely without releasing any effluent.

ZLD accomplishment may need physical & chemical treatment, followed by biological system to remove organic load. The treated effluents can be then subjected for concentration and evaporation. The concentration method quite often involves the adoption of Reverse Osmosis (RO) and Nano Filtration (NF) methods. The evaporation methods involve drying/evaporation of effluent in multi effect evaporators (MEE).

Adopting ZLD practices may not be feasible in many cases in view of techno-economical reasons. However, the industries should still to be encouraged for

recycling and reuse of waste water as far as practicable in order to minimize the fresh water consumption and discharge of waste water into the environment. The treated waste water of an industry may also be utilised for irrigation. This type of utilisation/application is considered an efficient approach for managing/conserving water resources, compensating water shortages caused by seasonality or the irregular availability of water sources for irrigation throughout the year.

The possible risks of wastewater usage in agriculture may range from changes to physico-chemical and micro-biological properties of soils to impact on human health. In unfavorable economic conditions, the search for alternative irrigation sources, such as the use of untreated or inadequately treated wastewater may result in risk factors. Thus, it is necessary to ensure the beneficial aspects of this practice before application of treated wastewater in irrigation.

3.0 Guidelines for Utilisation of Effluent in Irrigation

(i) The industry should engage an agricultural scientist or tie-up with an agricultural university or institute for advice on the utilization or the rate of application of the effluent for irrigation considering the agro-climatic conditions.

(ii) As seasons and the sowing periods of the crops put restrictions on the utilisation of effluent for irrigation, the industry should prepare a comprehensive Irrigation Management Plan (IMP), which should include the following, in consultation with the agricultural scientist or agriculture university/institute and submit to SPCBs/PCCs which should verify the same while issuing Consent to the industry:

a. Areas to be covered under irrigation.
b. Survey/plot (khasra) numbers of land and their area covered in the scheme.
c. Written agreement with the farmers to bring their land under the scheme.
d. The quantity of effluent to be used in different periods of the year and crop-wise.
e. The treated effluent distribution system and arrangement for low/no demand period.
f. Agronomic plan for effective utilisation of land.

iii. The treated effluent should meet the norms prescribed for irrigation under Environment (Protection) Rules, 1986/Consent. The effluent should also conform to Total Dissolved Solid (TDS)- 2100 mg/l and Sodium Adsorption Ratio (SAR)- preferably less than 18 but not more than 26, depending on soil/crop type, besides meeting any other parameters suggested by agricultural scientist or agricultural university/institute in the IMP.

iv. Meeting the prescribed norms shall not be the only criteria for use of treated waste water in irrigation, the requirement of water for irrigation will also be a limiting condition and this depends upon various factors, as follow:

   a. **Crop:** This is the main subject determining the water requirement, such as, paddy crops (in general) need more water than trees.
   b. **Climate:** In tropical and subtropical climate especially in arid regions, irrigation frequency is higher. However, in slightly moist conditions the frequency decreases.
   c. **Irrigation type:** There are various irrigation types, namely, flood irrigation, sprinkler, rain gun, drip irrigation, etc., which influences the water requirement for irrigation.
   d. **Soil condition:** The various soil types, such as loam, clay, sandy, clay loam, sandy loam etc., determine the crop types and also alters the irrigation system thus determining the water requirement.
   e. **Soil permeability:** The soil permeability, which is also known as water conductivity of the soil, determines the water retention capacity. This determines the cultivable crops, which in turn determines the water requirement for irrigation.
   f. **Total Salt Concentration:** Total salt concentration (for all practical purposes, the total dissolved solids) is one of the most important agricultural water quality parameters. The plant growth, crop yield and quality of produce are affected by the total dissolved salts in the irrigation water.

v. The command area for effluent utilisation should be as near as feasible to the industry in order to facilitate easy monitoring and effective control. The industry should construct a distribution network of impervious conduits to cover the irrigated area.

vi. The industry should construct impervious lined storage tank of minimum 15 days capacity for storage of treated effluent during low/no demand, based on the Irrigation Management Plan.

vii. The treated effluent should be analysed regularly, say after every 15 days. The effluent samples should be taken at the point from where the effluent is discharged for irrigation.

viii. The physico-chemical characteristics of the soil under irrigation with treated effluent, should be monitored twice in a year to assess conditions in summer and post monsoon seasons, in order to determine the deterioration of soil quality.

ix. Similarly, the groundwater quality should also be monitored twice in a year. Samples should be collected from the first water bearing strata from existing hand pumps or by installing the same for sampling purpose only. The sampling points should be uniformly spread in the command area and near effluent storage area.

x. The industry should carry out the analysis of various prescribed effluent/soil/ground water quality parameters from the NABL/EPA/ SPCBs/PCCs recognised/accredited laboratories.

xi. Reports regarding compliance of effluent quality standards and status of soil and ground water quality shall be submitted to SPCBs/PCCs twice in a year, in first week of January and July.

xii. In case of observation of any deterioration of the soil and groundwater quality parameters in the assessment by agricultural scientist or agricultural university/institute, the application of effluent should be stopped immediately and the industry should inform the SPCB, accordingly. The industry shall be solely responsible for reclaiming the soil and water quality at their cost in the affected area.

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