



# A review of greywater reuse as a non-conventional source of water

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## Abstract

Population growth, industrial development, potable water sources shortage and Climate change have resulted in increasing pressure on drinking water supplies. Thus it is clear that new and non-conventional sources are needed for water supply to reduce utilization of available water resources. Reuse of grey water as a non-conventional source of water, in one hand reduces wastewater discharged into the receiving environment, and in the other hand, reduces usage of available water resources. Grey water defined as domestic wastewater from showers, dishwasher, laundry and kitchen except toilet wastewater. Grey water is used for irrigation and agricultural uses, toilet flushing, groundwater charges, urban and industrial uses. In this research, grey water resources and their characteristics has studied and compared with domestic waste water, technologies of grey water treatment and environmental observations were considered on reuse process.

**Keywords:** reuse, grey water, water shortage, MENA.

## 1. INTRODUCTION

Water crisis is one of the most important issues in many countries of world. International Water Management Institute (IWMI) predicts that by 2025, one person in three will live in conditions of water scarcity. It is therefore essential to reduce surface and ground water use in all sectors of consumption, to substitute fresh water with alternative water resources and to optimize water use efficiency through recycle and reuse option [1]. Treated and recycled municipal wastewater represents a more reliable and significant source for reclaimed water as compared to wastewaters coming from agricultural return flows, storm water runoff, and industrial discharges [2].

The separation and draining of household waste into grey water and black water is becoming more common in the developed countries, and treated grey water is used for agriculture, irrigation, flushing toilet and non-potable use [3]. Due to the low levels of contaminating pathogens and nitrogen, reuse and recycle of grey water is receiving more and more attention [4].

## 2. WATER SHORTAGE IN MENA

Countries of Middle East and North Africa (MENA<sup>1</sup>) are among the countries with the lowest freshwater availability [2]. The Mena region has 5% of the world's population yet only 1% of the world's fresh water Available water per capita in the region is also expected to halve in forty years due to rapid population increases. The region's climate is arid and semi- arid, characterized by low and erratic rainfall [5, 6].

Various information sources suggest that limited water resources are one of the main constraints to social and economic development and even a source of insecurity. The water shortages in the region are a result of two categories of conditions:

1. Structural conditions related to geographic location, climatic characteristics and population growth. Water policies and management practices can do little to influence these conditions.

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<sup>1</sup>Countries of MENA: Algeria, Bahrain, Djibouti, Egypt, Gaza Strip, Iran, Iraq, Israel, Jordan, Kuwait, Lebanon, Libya, Malta Morocco, Oman, Qatar, Saudi Arabia, Syria, Tunisia, United Arab Emirates, West Bank and Yemen.