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CONSERVING WATER and Water consumption

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97% of the water on planet Earth is in the oceans and can not be used for irrigation, domestic use and dessendentação.

The remaining 3% are approximately a volume of 35 million cubic kilometers.

Much of this volume is in the form of ice in Antarctica or Greenland.

Only 100000 km³, or 0.3% of total freshwater resources are available and can be used by man.

WATER in Brazil

The Brazilian Amazon represents 71.1% of the total generated and therefore generated 36.6% in South America and 8% worldwide, for only 4% of Brazil's population, by across the river Paraná, located in south of Brazil with 32% of the population, has only 6% and the Coastal Region of Eastern Northeast, with 20% of the population has only 2% water.

Considering the total flow of the Amazon seeping through Brazilian territory, the ratio is 81.1% of the national total. Considering this volume, the total flowing to from Brazil represents 77% of total South America and 17% worldwide (TUCCI et al, 2000.)

Brazil is the first in water availability in rivers of the world, but pollution and the inappropriate use commit the resource in various regions.

water availability in Brazil

The Brazil in terms of overall water availability, is highly privileged because it has a water production represents 53% of the production of freshwater South American continent and 12% of the world total (Rebolledo et al., 2006)

Although the Brazil has the largest reserve of fresh water available in the world, even though the holder of approximately 15% of the water on the planet, in 2011 the Brazilian Association of Sanitary Engineering, BIO Magazine, published that in a short time about 55% of their municipalities could have harmed water supplies, even citing that the distribution of water in the country is not fair, and large urban centers may suffer from shortages.

In 2014 the state of São Paulo is a crisis of water shortages never before recorded. Even with the largest reserve of fresh water available in the world, the concern of shortage became reality with the possible use of 'dead volume' of Cantareira system that supplies the greater São Paulo, with a possible breakdown in the supply system of Greater São Paulo . (Sampaio, LUCAS, Folha de São Paulo, 11/03/2014).

According to Peters, et al. al (2006), water scarcity has become one of the major global problems and continues to increase due to factors such as water pollution, the uncontrolled use, waste, demand growth and the gradual reduction of its availability. This coupled with the inordinate use of waste water reflects a lack of management of services linked to the public supply.

With the water shortage on the planet, it is critical to reduce the consumption of water, and use it rationally prioritize sustainable ways. It is used to manage water resources is critical to meet the demands, without causing damage to environmental health

Tucci (2008), pointed out that Brazil is at the stage of disease reduction, but has contaminated rivers, impacts on water supplies and floods, resulting in lack of sewage treatment, transfer of flood drainage and lack of control of solid waste . Thus aggravating the problem of water shortage in Brazil, especially in areas with high population density.

Water consumption

The industries are responsible for 22% all water used.

The main uses of water are:

- ✓ domestic supply,
- ✓ supply industrial,
- ✓ irrigation,
- ✓ watering livestock,
- ✓ preservation of flora and fauna,
- ✓ recreation and leisure,
- ✓ creation of species,
- ✓ power generation,
- ✓ navigation,
- ✓ scenic harmony
- ✓ and dilution and transporting effluents.

With the diversification of human activities and population growth, there is an increased demand for water, accompanied by a decrease in quality, resulting in environmental and social problems.

Brazilian agriculture is the main user of water resources, and is the area within the physical sector that most operations can occur to improve the use of this key resource to production processes (PNRH, 2006)

According to projections by the United Nations (UN) in 2025, two thirds of the global population, or 5.5 billion people will live in places suffering from some kind of problem related to water (Fiori et al., 2006).

The scarcity coupled with inadequate use of water resources represent a growing risk for the development and sustainable protection of the environment, described these facts which demonstrate the need for the preservation of water quality for human consumption.

In several countries, water is split into four main sources: surface, underground, the rain and reuse,

water scarcity is changing the world view regarding the sources water.

Conserving water

Reuse of gray water; Washing effluent, effluent from bathroom sinks machine.

The scenario of water scarcity elevate the importance of developing actions aimed at conserving water. The reuse of greywater used for non-potable domestic purposes underscore the importance of this concept of water conservation. The reuse of greywater, when properly designed, can be used in various sectors of society, such as reuse in homes, to flush toilets, washing floors and patios, wash sidewalks, watering gardens, ornamental uses mirrors as d 'water fountains and, since its use provides no health risks to users.

Alternative sources of water are associated the use of rainwater and / or reuse of wastewater generated and treated in residences for less noble purposes such as watering gardens, washing of sidewalks and discharges toilet. PETERS et al (2006)

REUSE Drawbacks

The presence of E. coli total coliforms and high amount of heterotrophic bacteria actions disinfection prior to reuse, Standards for reuse in the discharge of sanitary vessels recommending limits proposed by FIESP (2005) NBR

Residential wastewater are classified as follows:

- black water : Effluent from toilets, as urine, feces and toilet paper
- greywater: wastewater, excluding effluent of toilets;
- Yellow waters: effluent represented only by urine;
- brown waters: effluent represented only by feces.

Tundisi et al. (2008) emphasize that, in the broad social, economic and environment of the XXI century, the following issues and processes are the main causes of "Water crisis":

- Intense urbanization, increasing demand for water, increasing the discharge of contaminated water resources and greater demands for water supply and economic and social development (TUCCI, 2008).
- Stress and water scarcity in many regions of the planet because of changes availability and increased demand.
- poor infrastructure and in critical condition, in many urban areas with up to 30% network losses after treatment of águas
- Problems of stress and scarcity due to global changes with events hydrological extremes increasing the vulnerability of the human population and compromising food safety (heavy rains and intense drought).
- Problems with lack of coordination and lack of consistent actions in governance water resources and environmental sustainability.

According to FIESP, (2005), the Brazil consider all alternative water sources those that are not under concession or public agencies that do not suffer from charging for their use. According to the Brazilian standard for capturing rainwater (ABNT NBR 15527: 2007), in effect since September 2007, this is a new reality, a change mentality, which is increasingly gaining strength, especially on the European continent and in North America

Carvalho et al (2014), indicates that the use of alternative energy sources is a form of reduce the problems of availability of drinking water and decrease your demand.

Among these strategies can mention the use of rainwater, reuse water ash and the installation of water-saving components (ABNT NBR 15527: 2007).

Fiori et al (2006), notes that the use of rainwater is an inexpensive way font substitution and even for drinking consumption if properly handled.

Already the reuse of gray water is an alternative to meet the demands not potable.

The story points out that the ancient civilizations performed uptake of water rain. Many industries, shopping malls, supermarkets and buildings are already using the water rain for non-potable purposes. Cities like Curitiba, São Paulo, Santo André, Recife and Foz do Iguaçu already have laws regarding. Therefore it is necessary at present to spread of rational water use, especially the use of rainwater that can be so enjoyed by all of us (BRAZIL, 2012).

GREYWATER

The greywater reuse involves the reuse after proper treatment, the greywater composed of effluent from tanks, bathtubs, showers, sinks and washing machines. The use of treated greywater for uses with non-potable purposes is a promising alternative, and that should be developed and encouraged (ABNT NBR 15527: 2007).

Even the collection system and rainwater harvesting have to be used while in some regions of Brazil, only in September 2007 entered into force NBR 15527/2007 - "Utilization of rainwater from roofs in areas urban non-potable purposes. "This standard aims to provide guidelines for rainwater harvesting in non-potable use in buildings.

REUSE

Water used to wash clothes and rinse the washing machine,
Research indicates that even for non-potable uses related characterization results, appropriate treatment before its final use.

UTILIZATION AND REUSE

The employment of alternative sources such as capturing rainwater, reusing wastewater as water for showers, sinks and washing through a system of treatment and their subsequent channeling machine for use with non-potable or less noble purposes are actions that help reduce water consumption in homes and contribute to sustainability.

The reuse of wastewater can represent a savings of 60% on your water bill (RAPOPORT, 2004)

The reuse of water produced from greywater in toilet flushing, should have low turbidity, low color and no unpleasant odor. Whatever the possible uses of wastewater should always follow the technical standards imposed.

The increase in water consumption is higher in developing countries, mainly because of population growth.

The increased demand for water for agricultural and industrial uses, caused increased global water consumption of approximately 1,000 km³ / year to approximately 4,100 km³ / year the last 50 years (Telles, et al., 2013).

Clearly and with alarming statistics form, the book of American researchers, Robin Clarke and Jannet King (2005), speaks of the scarcity of water on the planet and the ways in which the liquid is being used in 169 countries, with a special chapter for Brazil. They warn: the wars in the twenty-first century will be about water

Table 1 - Evolution and projection of the world's total annual water consumption (cubic kilometers).

Year	Consumption(km ³).
1900	579
1950	1.382
2000	3.973
2025 (projection)	5.235

The standard NBR 15527/2007 aborts concepts as:

rain water: water from atmospheric precipitation collected in roofing, roofs where there is movement of people, vehicles and animals; water not Drinking: water does not erode the Ordinance No. 518 of the Ministry of Health; catchment area:

area, in square meters, designed in the horizontal impermeable surface coverage where water is abstracted; runoff coefficient: coefficient is the ratio between the total volume of runoff and the total volume precipitate varying according to surface

References

ABNT. Associação Brasileira de Normas Técnicas. NBR 15527 dispõe: Água de chuva, Aproveitamento de coberturas em áreas urbanas para fins não potáveis. 2007.

ASSOCIAÇÃO BRASILEIRA DE ENGENHARIA SANITÁRIA E AMBIENTAL - ABES. Água de viver - A luta para preservar os mananciais em tempo de escassez mundial. Revista BIO. Abril/junho de 2011.

BRASIL. Ministério do Planejamento, Orçamento e Gestão. Instituto Brasileiro de Geografia e Estatística. Cidades. 2007. Disponível em: <<http://www.ibge.gov.br/cidadesat/topwindow.htm?1>>. Acesso em: 07 de maio de 2014.

BRASÍLIA. Ministério do Meio Ambiente e Secretaria de Recursos Hídricos. (Org.). Plano Nacional de Recursos Hídricos: Panorama e estado dos recursos hídricos do Brasil. Brasília: Dupligráfica, 2006. 280 p.

FIESP; ANA; SINDUSCON-SP. 2005. Federação das Indústrias do Estado de São Paulo / Agência Nacional de Águas / Sindicato da Indústria da Construção do Estado de São Paulo. Conservação e reúso da água em edificações. São Paulo: Prol Editora Gráfica.

FIORI, S. Avaliação qualitativa e quantitativa do potencial de reúso de água cinza em edifícios residenciais multifamiliares. Passo Fundo, 2005. Dissertação de mestrado-Faculdade de Engenharia e Arquitetura-Universidade de Passo Fundo, 2005.

FIORI, Simone; FERNANDES, Vera Maria Cartana; PIZZO, Henrique. Avaliação qualitativa e quantitativa do reúso de águas cinza em edificações. Ambiente Construído: Sistemas Prediais, Porto Alegre, v. 6, n. 1, p.19-30, jan./mar. 2006. Disponível em: <<http://seer.ufrgs.br/ambienteconstruido/article/download/3676/2042>>.

Acesso em: 15 de Junho de 2014.

HESPANHOL, Ivanildo. Água e saneamento básico – uma visão realista. In: REBOUÇAS, A. C.; BRAGA, B.; TUNDISI, J. B. (Coord.) Águas doces do Brasil: capital ecológico, uso e conservação. São Paulo: Escrituras. 1999.

HESPANHOL, I. Potencial de reúso de água no Brasil: agricultura, indústria, município e recarga de aquíferos. In: MANCUSO, P. C. S.; SANTOS, H. F. (Ed.). Reuso de Água. Barueri, SP: Manole, 2003. Cap. 3, p. 37-95.

HESPANHOL, I. Um novo paradigma para a gestão de recursos hídricos. Revista de Estudos Avançados, São Paulo, v. 22, n. 63, 2008. Disponível em: <<http://www.revistas.usp.br/eav/article/view/10297/11947>>. Acesso em: 12 jun. 2014.

RAPOPORT, B. Águas cinza: caracterização, avaliação financeira e tratamento para reuso domiciliar e condominial. 2004. 85 f. Monografia. Escola Nacional de Saúde Pública, Fundação Oswaldo Cruz, Rio de Janeiro, 2004.

REBOUÇAS, A. C.; BRAGA, B.; TUNDISI, J. G.. Águas doces no Brasil: Capital ecológico, uso e conservação, 3. ed. São Paulo: Editora Escrituras, 2006.

SABESP - COMPANHIA DE SANEAMENTO BÁSICO DO ESTADO DE SÃO PAULO. Uso racional da água. SABESP, 2013. Disponível em: <http://www.sabesp.com.br/CalandraWeb/CalandraRedirect/?temp=2&temp2=3&proj=sabesp&pub=T&nome=Uso_Racional_Agua_Generico&db=&docid=0559F0B0B4127513832570D1006527A2>. Acesso em 22 maio 2014.

TUNDISI, J. G. et al. Conservação e uso sustentável de recursos hídricos. In: BARBOSA, F. A. (Org.) Ângulos da água: desafios da integração. Belo Horizonte: Editora UFMG, 2008. p.157-83.

WORLD HEALTH ORGANIZATION. Reuse of effluents: Methods of wastewater treatment and public health safeguards. Geneva, 1973.

WORLD HEALTH ORGANIZATION. Guidelines for the Safe use of wastewater, Excreta and greywater; Volume I – Policy and Regulatory Aspects. Geneva, 2006

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