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Research Article

Use of sewage water in agricultural practices

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Abstract: The use of urban wastewater in agriculture, which is a centuries old practice, is becoming more important under the increasing scarcity of freshwater resources faced by many arid and semi-arid countries. There are many advantages in using urban wastewater in agriculture and it can be seen as a combined strategy for conservation of water, recycling of nutrients, thereby reducing the need for farmers to invest in chemical fertilizer, and provision of a reliable water supply to farmers particularly in low-income areas. These advantages for farmers, municipalities and society in general have to be weighed against the disadvantages of using wastewater for irrigation.
Keywords: Waste Water, Reuse Agriculture.

INTRODUCTION

Growing water scarcity threatens economic development, sustainable human livelihoods, environmental quality, and a host of other societal goals in countries and regions around the world.

Urban population growth, particularly in developing countries, places immense pressure on water and land resources; it also results in the release of growing volumes of wastewater – most of it untreated. Wastewater is increasingly being used for irrigation in urban and peri-urban agriculture, and even in distant rural areas downstream of the very large cities. The use of urban wastewater in agriculture is a centuries-old practice that is receiving renewed attention with the increasing scarcity of freshwater resources in many arid and semiarid regions. Driven by rapid urbanization and growing wastewater volume s, wastewater is widelyused as a low-cost alternative to conventional irrigation water; it supports livelihoods and generates considerable value in urban and peri-urban agriculture despite the health and environmental risks associated with this practice. It drives significant economic activity, supports countless livelihoods particularly those of poor farmers, and very substantially changes the hydrology and water quality of natural water bodies.

WHAT IS WASTE WATER?

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Wastewater is any water that has been adversely affected in quality by anthropogenic influence. It comprises liquid waste discharged by domestic residences, commercial properties, industry, and/or agriculture and can encompass a wide range of potential contaminants and concentrations. Wastewater or sewage can come from:

- Human waste (faeces, used toilet paper or wipes, urine, or other
- Cesspit leakage;
- Septic tank discharge;
- Sewage treatment plant discharge;
- Washing water (personal, clothes, floors, dishes, etc.), also known as grey water;
- Rainfall collected on roofs, yards, hard-standings, etc;
- Groundwater infiltrated into sewage;
- Surplus manufactured liquids from domestic sources (drinks, cooking oil, pesticides, lubricating oil, paint, cleaning liquids, etc.);
- Urban rainfall runoff from roads, car parks, roofs, sidewalks, or pavements (contains oils, animal faeces, litter, fuel or rubber residues, metals from vehicle exhausts, etc.);
- Seawater ingress (high volumes of salt and micro-biota);
- Direct ingress of river water (high volumes of micro-biota);
- Direct ingress of manmade liquids (illegal disposal of pesticides, used oils, etc.);
- Highway drainage (oil, de-icing agents, rubber reside
- Storm drains (almost anything, including cars, shopping trolleys, trees, cattle, etc.);
- Black water (surface water contaminated by sewage);
- Industrial waste
- Industrial site drainage (silt, sand, alkali, oil, chemical residues);

CONSTITUENTS OF WASTEWATER

The composition of wastewater varies widely. It may contain thefollowing:

- Water (> 95%);
- Pathogens such as bacteria, viruses, prions and parasitic worms;
- Non-pathogenic bacteria (> 100,000 / ml for sewage);
- Organic particles such as faeces, hairs, food, paper fibers, plantmaterial, humus, etc.
- Soluble organic material such as urea, fruit sugars, soluble proteins,drugs, pharmaceuticals, etc.;
- Inorganic particles such as sand, grit, metal particles, ceramics,etc.;
- Soluble inorganic material such as ammonia, road-salt, sea-salt, cyanide, hydrogen sulfide, thiocyanates, thiosulfates, etc.;
- Animals such as protozoa, insects, arthropods, small fish, etc.;
- Macro-solids such as sanitary napkins, nappies/diapers etc.;
- Gases such as hydrogen sulfide, carbon dioxide, methane, etc.;
- Emulsions such as paints, adhesives, mayonnaise, hair colorants,emulsified oils, etc.;
- Toxins such as pesticides, poisons, herbicides, etc.

TYPES OF WASTEWATER USE

The following three types of wastewater use are the most relevant –

I. Direct use of untreated wastewater is the application to land of wastewater directly from a sewerage system or other purpose built wastewater conveyance system.
II. Direct use of treated wastewater is the use of treated wastewater where control exists over the conveyance of

the wastewater from the point of discharge from a treatment works to a controlled area where it is used for irrigation.

III. Indirect use of wastewater is the planned application to land of wastewater from a receiving water body. Municipal and industrial wastewater is discharged without treatment or monitoring into the watercourses draining an urban area. Irrigation water is drawn from rivers or other natural water bodies that receive wastewater flows. The use of wastewater in agriculture is growing due to water scarcity, population growth, and urbanization, which all lead to the generation of yet more wastewater in urban areas. Wastewater can be used to substitute for other better-quality water sources, especially in agriculture the single largest user of freshwater and wastewater worldwide. However, the uncontrolled use of wastewater in agriculture has important health implications for produce consumers, farmers and their families produce vendors, and communities in wastewater-irrigated areas.

WASTEWATER USE IN INDIA

The incorporation of wastewater use planning into national water resource and agricultural planning is important, especially where dilution water in the receiving water bodies are in shortages. This is not only to protect sources of high quality waters but also to minimize wastewater treatment costs, safeguard public health and to obtain the maximum agricultural and aquaculture benefit from the nutrients that wastewater contains. Since in most of the urban centers, treatment plants either do not exist or not adequate. Wastewater use may well help reduce costs, especially if it is envisaged before new treatment works are built, because the standards of effluents required for various types of use may result in costs lower than those for normal environmental protection. The use of wastewater has been practiced in many parts of the country for centuries. Unfortunately, this form of unplanned and, in many instances unconscious, reuse is performed without any consideration of adequate health safeguards, environmentally sound practices or basic agronomic and on-farm principles.

Worldwide, it is estimated that 18% of cropland is irrigated, producing 40% of all food. A significant portion of irrigation water is wastewater. Nearly almost 75,000 ha area irrigated with wastewater in India. Most wastewater irrigation in India occurs along rivers, which flow through such rapidly growing cities as Delhi, Kolkata, Coimbatore, Hyderabad, Indore, Kanpur, Patna, Vadodara, and Allahabad. Many of the Indian peninsular rivers would not have much or any flow during most of the year if they were not used to funnel wastewater away from cities to periurban and rural areas. In such cases this can hardly be considered disposal in surface waters as it is, in fact, disposal in a natural conveyance channel. Along often to tanks and then channeled to the fields for irrigation.

Conclusion: There are of course rather serious drawbacks for human health and the environment that result from using wastewater without adequate safeguards. The challenge is to identify practical, affordable safeguards that do not threaten the substantial livelihoods dependent on wastewater, or diminish the important role this resource plays in achieving household food security and supplying low-cost produce to growing cities. Authorities, particularly the Ministries of Health and Agriculture, should investigate current wastewater reuse practices and take gradual

steps for upgrading health and agronomic practices. The implementation of an intersectoral institutional framework is the next step that should be taken. This entity should be able to deal with technological, health and environmental, economic and financial, and socio-cultural issues. It should also assign responsibilities and should create capacity for operation and maintenance of treatment, distribution and irrigation systems, as well as for monitoring, surveillance and the enforcement of effluent standards and codes of practice. In places with little or no experience on planned reuse, it is advisable to implement and to operate a pilot project.

In the foreseeable future, many towns in developing countries will continue or expand the direct or indirect irrigation of crops with untreated wastewater. Current government policies focus on regulation of wastewater use and wastewater treatment and are unable to offer practical solutions to the users. An important input into more realistic policies on wastewater use is information on the area irrigated with urban wastewater at national and global levels. Such macro-level estimates can only be obtained when there is a common understanding of the different types of wastewater use.

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