

The Negative And Dangerous Effects of Water Pollution And Storm Water Runoff on The Environment And The Surrounding Community

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Abstract

This paper involves the negative and dangerous effects of water pollution and storm water runoff on the environment and the adjacent community. The most common form of water pollution is residue runoff. It then goes on to explain the research and efficiency of Best Management Practices(BMP) and their positive effects. These practices are security practices that can save or improve the state of the environment. The argument stated in this paper refers to the use of storm water rules in the India. Most rules are too strict to allow for any protection practices because they can be very costly and useless if carried out inappropriately. If the storm water rules are rewritten to allow for Best Management Practices(BMP), then the state of commercial and non-commercial water sources could be significantly improved.

Keywords: Residue runoff, Best Management Practices(BMP), commercial and non-commercial water sources, effluent discharge , storm water rules or regulations.

Introduction: Water resource development has taken place all over the world. There is a remarkable amount of pressure in protecting the water resources available in India. Protecting the surface water resources from wastewater pollution plays a vital role for the development. The disposal of wastewater into the surface water bodies leads to serious problems and affects the people in health aspects. Especially in the urban areas, the pollution of domestic effluent discharges into the nearby surface water bodies created problems for the public. There are many ways of safe disposal of wastewater. But improper management of wastewater generation in the urban areas find its own way of getting into the surface water. So, the effluent discharge affects the surface water bodies. The water quality changes in the surface water bodies created various health problems to the public.

The Importance of Rewriting Storm Water Rules or Regulations

Think about all the bodies of water on our planet. Every stream, river, lake, and is essential to the way our world functions. unluckily, our society has done



very little to protect these water sources and as a result, our streams, rivers, lakes, and oceans are suffering from various type of pollution. Every useless water bottle, oil leak, poly bags and awkward dam continually add to our already-polluted waters, and very little is being done to overturn this problem. The most prominent issue being studied now a days is storm water runoff. The fine sediments, set of chemicals, and garbage, are a serious pollution fear. Many solutions and



technologies have already been developed, but the number one controversy that is holding us back is storm water rules or regulations. Storm water rules or



regulations are the basic guidelines that all states follow when constructing storm drains and other runoff structures as well as controlling the pollutants that are discharged from water treatment plants ,but they limit the actions needed to reduce the storm water runoff. In order to fix the mess our society has made with urbanization and waterway pollution, storm water rules or regulations must be changed to allow for new solutions and technologies that deal with residue pollution and storm water runoff.

In every daily activity we need water, such as we use water for clothing, cooking, drinking, lawns and plants, personal sanitation etc. for this reason, it is very important that the water we use should be of good quality. The contamination of



water sources affects all aspects of life from birth to death . If we use the same water for cooking and drinking as we use for cleaning, then our health would grow weaker quickly, causing a large chain of horrible events. The government puts a lot of stress on maintaining the purity of the commercial water. There are more than hundreds of rules or regulations regarding the use and treatment of commercial water sources, but for some visible reason, water pollution is still an important concern. Almost every daily activity has some problem with hard or soft water. Soft water is the water which give lather with soap easily and Hard water is never give lather with soap. The problem of hardness of water is due to the bicarbonates, sulphates, and chlorides of Mg and Ca mixed with water, excess nutrients and minerals. By this reason, families are using filtered or mineral water, causing a



Different chain of events concerning water pollution. No issue the reason for our consumption of water, it will affect something else, that is why we need to make sure that our water quality should be in the best shape possible. Another reason is that our water sources are vanishing quickly due to the lack of awareness of people. The average Indian citizen can say very little about our issue of water pollution, and even less about ways to prevent water. This makes it more difficult



for the people to practice safe water management habits. When the common people know very little about the pollution of water sources, it will be even harder for them to be corrected.

In the words of Krantz,(1996) ⁽¹⁾ water pollution is **“a body of water that is adversely affected due to the addition of large amounts of materials”**, There are more than hundred ways for water to get polluted. Waste is a direct form of pollution. This is a very clear and unnecessary problem that can stop up waterways and obstruct the plant and animal life. In highly resolute areas like cities, sewer backup can cause major damage to urban developments, national budgets, and our health. Overflows of sewage intake can be caused by increased rainfall or poor



sewage systems, but the most injurious reason is the destruction of sewage laws by us. In the last five years, over 7430 out of 26300 sewage systems have been reported traces of entire human waste, chemicals, and other hazardous materials in our lakes, rivers, and other waterways which can cause severe damage to the environment as well as the health of people lived in nearby communities But not all areas experience the same issues. Different parts of the India are affected with different water problems. The Planes are currently researching the best uses of the limited amount of water sources, while the coastal areas of north India and hill areas are studying storm water management and sediment runoff.

The most common and serious form of pollution, is sediment runoff. It causes a big amount of money in environmental damage per year. In a natural habitat, rainfall is taken in by meadows and forests, with little to no runoff. The nutrients are absorbed by plants and the streams and ponds provide clean, fresh water



sources to wildlife. In an urban setting, fields of grass and groves of trees are replaced by flat pavements, poorly managed watersheds, and obscuring dams. Buildings and roads are built up, and natural habitats are damaged or controlled. Storm water drains are constructed, but can be easily backed up or overwhelmed, causing extra, needless water pollution. After a large rain storm, particles from soil and rock grind down into land surfaces and waterways which is then carried and transported by wind and precipitation. These particles can carry anything from excess nutrients such as phosphorus to endocrine disrupters. There are many factors that cause residue pollution. Rainfall, erosion (Approx. 70% is caused by our activities and 30%

is natural.) There are various factors such as soil content, slope of land, melting snow, and farmland that causes serious problems like endangering fresh water supplies and killing of large fish communities. The residue in the water can limit the amount of sunlight into streams and rivers which



is essential for fish and plant life. This results in changes in feeding habits and decreases the overall efficiency of water sources. Another problem is the runoff of fertilizers and pesticides into our waterways which can also infect our water sources. This form of runoff is a result of agricultural practices. A huge part of India is the type of farm land and the production of natural resources. Farmers use various types of fertilizers, pesticides, and other chemicals to keep their crops



healthy, but during rainfalls and watering cycles, it all runs off into our waterways. This is not confined to rural districts while urban areas have also been known to produce high amounts of water pollution by the fertilizing of lawns and personal gardens. By improving water source management, agricultural practices and construction regulations, the amount of pollution can be decreased significantly.

When a research scholar designs a new conservation practice, this is referred to as a Best Management Practice(BMP). The purpose of a Best Management Practice (BMP) is to reduce or remove the harmful effects of human urbanization on the natural environment. They can range from anything like grassed waterways and rooftops to rain gardens strategically placed in areas of heavy storm water runoff. They can be simple, like choosing a paint color that blends machinery into



an environment, or they can be complex such as monitoring and production technologies. One of the most effective Best Management Practice(BMP) used today are pervious surfaces. This can be applied to parking lots, cul-de-sacs, and turf pavers. When a surface is spongy, it reduces the amount of storm water runoff by absorbing the excess water into the street. It also doesn't allow for the collection



of residues or other hazardous materials because the water does not run along the runway. The field of residue pollution has many innovative solutions and techniques that help reduce or remove the harmful effects of storm water runoff. Some examples include constructing porous asphalt, grass rooftops, riparian forest buffers (a grove of trees and shrubs), storm water wetlands, bio-retention lakes, and dry ponds. Each of those practices can make a impressive change in the amount of pollution in urban and rural areas, but it is important to make sure Best Management Practices(BMP) are properly constructed and maintained. If not, then there could be severe damage to the environment and require great costs to the community.



Rain gardens like this one act like a living sponge to soak up rainwater and filter it after a storm



Best Management Practice(BMP) like to take advantage of abundant energy sources, such as sunlight. By using a renewable resource, the rate of energy can significantly decrease, making environmental conservation practices more eco-friendly. Taking part in the application of Best Management Practice (BMP) helps not only the environment, but businesses, aesthetics and the quality and production of community areas. So, why isn't every city and farm in India taking part in this environmentally friendly movement?

The government states that, "Since 1974, the Water pollution Act⁽²⁾ (According to water pollution act 1974 After the Stockholm conference on Human Environment on June, 1972, it was considered appropriate to have uniform law all over country for broad Environment problems endangering the health and safety of our people as well as of our flora and fauna. The Water (Prevention &Control of Pollution) Act, 1974 is the first enactment by the Parliament in this direction. This is also the first specific and comprehensive legislation



institutionalizing simultaneously the regulatory agencies for controlling water pollution. The Pollution Control Board at the Centre and in the State came into being in terms of this Act. According to the Article 51 A (g) it is the fundamental duty of every citizen of India to protect for living creatures. Water Act is enacted with the aim of prevention and control of Water Pollution in India and improve the natural environment included Forest, Lakes, Rivers and Wildlife and to have compassion. Pollution means contamination of water or such alteration of the Physical, Chemical or Biological properties of water or such discharge of any sewage or trade effluent or of any other liquid, gas and Solid substance into water (whether directly or indirectly) as may bathe case or is likely to create nuisance or render such water harmful injurious to public health or safety or to domestic, commercial, industrial, agricultural or other legitimate uses, or to the life and health of animals or plant or of aquatic organizations. Trade effluent includes any liquid or solid substance which is discharged from any premises used for carrying on any industry operation or process or treatment and disposal system, other domestic sewage.) has prohibited the discharge of any pollutant to waters of India unless the discharge is authorized by a National Pollutant Discharge Elimination System (NPDES) permit." (Storm water Authority, nd). The EPA is the Environmental Protection Agency and its mission is "to protect individual health and the environment" (EPA, nd). Over 40% of Water pollution act have been used by farmers and agriculturalists to control pollution (EPA, 2005)⁽³⁾ . This percentage is amazingly low for the amount of rural land in India and its large amount of residue pollution. It makes one question why there is not a set of requirements that must be



met by all farmers to help protect our environment. Every state has their own rules and regulations regarding the discharge and control of storm water runoff. This includes obtaining a Storm Water Discharge permit and providing a Consent Special Order. They also have strict guidelines regarding the enforcement and judiciary review of those who break the rules and regulations. Each set of requirements is different for different areas, but they all have a common theme: protect the environment as much as possible without being detrimental to businesses and state budgets. The depressing truth is that most states put the issue of environmental conservation as a low priority, which leads to the reason why storm water regulations are so strict, but dangerous to our environment. This assessment is somewhat contradictory. If storm water regulations are strict, then why there are no encouraging results in the reduction of water pollution? The term strict is being used freely. Yes, the storm water requirements and regulations are being met, but they are the bare minimum. Sadly, they only allow for the minimum. Nothing else. The purpose of this approach is to save money. The practice and application of Best Management Practice (BMP) can be very expensive and if they are not carried out in the correct and planned manner, then they could reduce a local community's budget. No one takes the time to consider the long-term effects of Best Management Practice (BMP) and their ability to decrease the amount of government spending on the treatment of residue pollution and waterway damage (about \$2500 Million annually). This is why states write them off and make sure their storm water rules and regulations don't allow for improvements to urban and rural areas. Making simple changes like, allowing easier access to construction permits of rain gardens in urban areas can make a large difference.

One of the most modern and eco-friendly methods to reducing sediment runoff is a rain garden. Rain gardens are growing increasingly popular in communities all



over the places in India. Many countries are becoming involved in this effective Best Management Practice(BMP), including Europe, which has an entire area in the center of Sheffield, UK, made up of environmentally friendly gardens. This was all in an effort to regenerate the city's heritage: industrialism run on the power



of water (Dunnett, 2007)⁽⁴⁾. Rain gardens capture storm water runoff, and the residues and nutrients are "filtered" by the plants. This leaves clean water to freely flow into the surrounding area. A rain garden can be thought of as a cycle. Everything benefits from each other. The plants grow from the nutrients and residue in the storm water; the runoff is no longer polluted and will not harm the environment or human health; wildlife benefit from a new, natural habitat; and the garden itself can be very aesthetically pleasing to a community area. It doesn't require much maintenance, and is very easy for an average person to build. There are many other effective Best Management Practice(BMP) that do not require a lot of effort, but can have positive impacts on various elements of water pollution and communities' well-being.

Now a days, many universities and government research facilities are studying the causes and harmful effects of water pollution. For example the University of Virginia spend a great deal of funding on research projects annually. Currently, the Environmental Engineering department of University of Virginia is working on a storm water runoff research project to help aid them in the rewriting of Virginia's storm water regulations. The new regulations can allow for best management practices (BMP) that can help reduce residue pollution, and ultimately, many other aspects of life. Some of these changes are already taking effect. The Virginia Storm water Management Program, or VSMP, "was developed to protect citizens, property and natural resources from unmanaged storm water runoff." (VSMP, 2009)⁽⁵⁾. The purpose of this program is to control residue pollution and erosion as a result of storm water runoff. When builders are constructing buildings, they may be required to get a permit from the Development Authorities. A permit may also be required to discharge storm water from a construction site. Because of the Water pollution Act and other national regulations. The regulations' intended purpose is to manage the quality and quantity of

storm water runoff on construction and watershed sites.



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With regard to the quality of storm water runoff, pervious and impervious surfaces collect hundreds of pollutants like bacteria, animal waste, residue, oil and grease, litter, pesticides and deposits from airborne pollutants. All these harmful materials can easily enter to our commercial waterways, making our water sources dangerous for human use. The quantity of storm water is increased when solid structures replace grazing lands and woodlands. Without nature to absorb the rainfall, its runs off on paved sidewalks and concrete rooftops, collecting the said pollutants. The central regulations hope to manage these factors with respect to building permits and government requirements.

Many people do not seem to realize how important water is to our survival and progress. Every community ,country, business, and individual use it, and it affects all aspects of life. When the quality of water decreases, everything it affects fall



behind it. That's why it is essential that people of our country start managing our water consumption and handling. There is no single source we can target, so it will not be an easy issue to tackle. This can not be possible until local, state, and national storm water regulations are altered to allow for changes in our lifestyle. With the interest of money, most storm water rules and regulations are very strict, not authorizing conservation practices or environmentally friendly systems; anything that can reduce a local community's budget. All the researchers in the world can come up with the best management practices(BMP) ever developed, but if they aren't allowed to take effect, what good will they do? Building permits regarding the construction of best management practices(BMP) must be easier to attain. The world is too afraid to change. If there is some chance that something can go in the wrong, most people won't even consider it, but if no one strives for a change, nothing will ever be improved. We need to take a chance on our strive to improve the Earth. Our environment is in danger because of us, and it is up to us to fix it.

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