

A Case Study of Smart Waste Water Management System Technology for Agriculture Implements Manufacturing Industry: Recycle and Reuse in New Holland Plant: India

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ABSTRACT

For completing the hunger of growing rapid rate population more and more agriculture manufacturing machinery established in India after green revolution. The products made by these industries make easiness for a farmer to produce more agriculture yield by their farm. During the product manufacturing processing in these industries required many tons water. By this large amount, water wastage occurs because the water used during processing they are no further used do to buying containing unwanted heavy substances. For the preventing water pollution in industries make a water treatment plant for recycling water.

In this research paper, we have studied about the agricultural machinery manufacturing industries New Holland recycling waste-water released by manufacturing unit as well as the domestic area of industries by adopting new advanced techniques and further used this recycle water for plantation.

Key Words: Reused recycling water, Water pollution, Wastewater management, Water recycling.

I. INTRODUCTION

For administration of human life, water is the main component having two molecules of hydrogen and one molecule of oxygen and the molecular formula is (H_2O). On our earth having 70% water occurs in the form of ocean having salty water not for any kind of use, in this only two percent of fresh water having the use for human being survival and only 30% of land for the survival of human being (Yogita Patil et al. 2014). Water is an essential source for proceeding human life in every activity they need water. Resources for water conservation is today need for secure our future and our coming next generation future. Rainwater is the natural resource of water, present between the atmosphere and earth surface. It became a natural freshener of air, remove dust particle from the air and help to should air fresh. Rain is also a cheap source of water resources available for irrigation of crop. In India, some area is dry not having much more source of water like Rajasthan. In this kind of area, farmer depends upon rain for farming their agriculture land. Showing a number of digits increasing population day by day, it's much more difficult to provide their basic needs in a coming year. According to be United Nation latest estimation of India current population is 1,349,026,608 as, Thursday 1 March 2018, and this population increased in continues manner. According to 2025 agenda one-third population of this growing world facing water-related issue (Seckler et al. 1998).

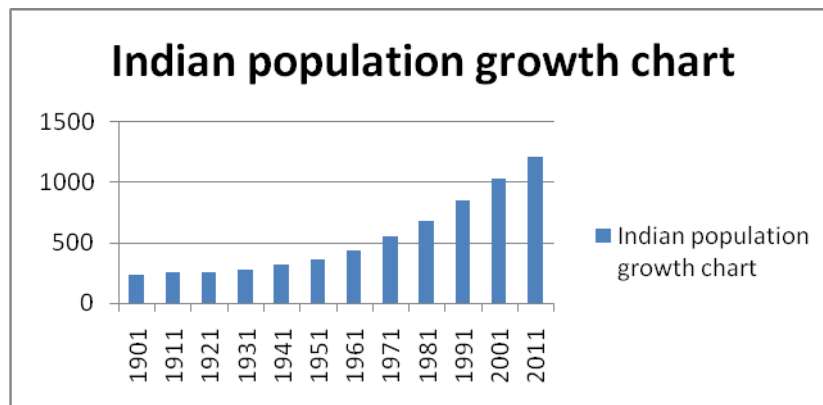


Figure 1. Represent population growth rate of India, population represent in millions with respect to years.

Source: Census 2011 : Provisional Population Total - INDIA

This growth rate of increasing population makes a stress on natural resources to complete their basic need of life. After a post-independence time, a great era has been seen in industrialization. Numbers of SMSE, large-scale and MNCs industries has been established by the Indian government to give an opportunity for employment to youth of India. The main purpose of establishment of these industries to full fill the requirement of Indian growing population.

Every industry required water for their processing in manufacturing unit. An industry takes fresh water for their product manufacturing. The demand for fresh water by industries increased regularly it has been estimated that total freshwater abstraction 8.5 in 2025 and 10.1 in 2050 (FICCI water mission, 2011). The available sources of water for industries surface water is 41 percent, groundwater is 35 percent and municipal water is 24 percent. Municipal water is less because big industries required more space and more water in their processing plant only a few small-scale industries located in high population area. Small-scale industries required less amount of water. A maximum number of industries used surface and groundwater; mainly they located far away from the highly populated area.

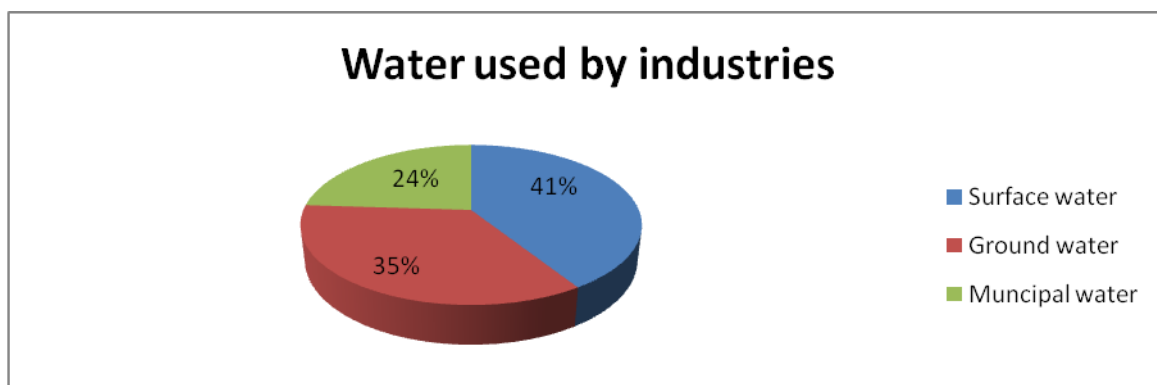


Figure 3. Represents the percentage of water used by industries.

Source: FICCI water mission, 2011.

According to member of association industries identified that business strategy must be dependent upon water availability. This demand of water increasing day by day. It must be required to industries to prevent itself for the given high charge on parch age of water, to make a waste water recycling plant in their manufacturing plant.

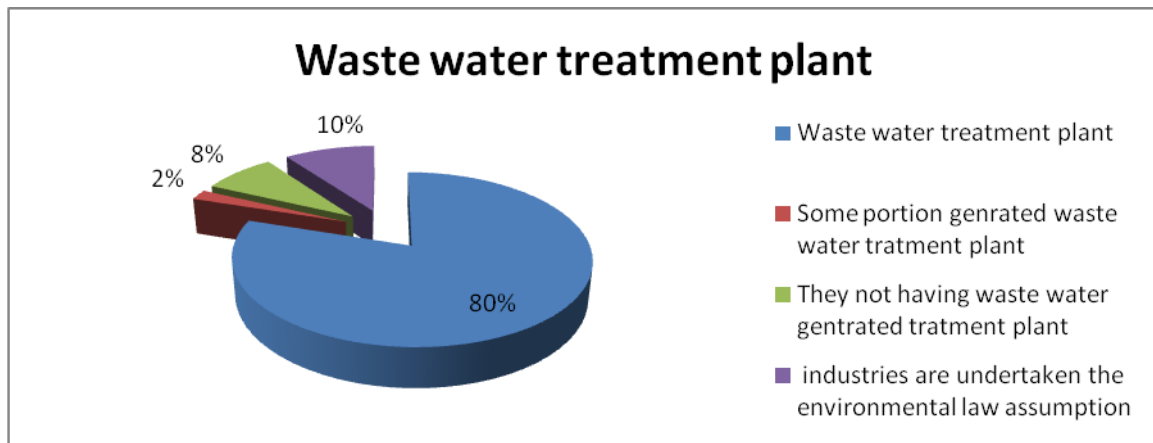


Figure 4. Represent the percentage of industries having waste-water treatment plant.

Source: FICCI water mission, 2011.

It is a more important use of waste-water. Industries used treated waste-water where the quality of water not matter. Like flushing in toilets, gardening, and horticulture, wasting of or in manufacturing industries.

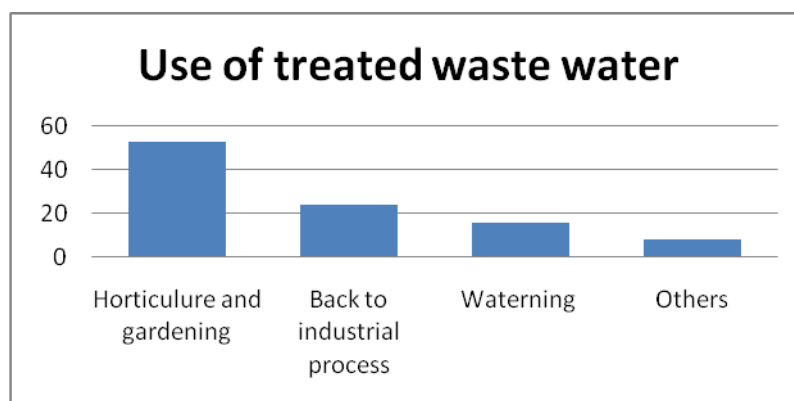


Figure 5. Represents where the treated waste-water used by industries.

Source: FICCI water mission, 2011.

Industries must be work on water conservation sustainability for their long-running business strategy.

Indian ministry makes a law for water conservation:

- Water (prevention and control of pollution) Act1974

Indian ministry of water resources divide their department in three different parts for the essay comfort of work handling:

- Central pollution control board

- Central ground water authority
- Water quality assessment authority

A national law is more mature than international law (Philippe Cullet, 2007). National law work at state as well national level for controlling the water pollution. More percentage of water is required for irrigation purpose. In India, more than 70 percent people belong to agriculture. For the completing the requirements of these people more industries established in India. The industrial policy evolution of India after independence 1948 showing rapid growth rate in Indian economy. This policy work in both public and private sector. The term and condition of policy changes from time to time according to the need of Indian government for the developing of nation.

II. OBJECTIVE

1. To recognize best practices method in waste-water treatment plant.
2. To find out where the recycled water used in manufacturing plant.

III. STUDY AREA

New Holland is agricultural implements manufacturing industries. Its main plant in Italy. New Holland has a first agricultural machinery manufacturing industries comes with advanced technology for profitable crop production. New Holland has the first time established in India in 1998 with high power tractor. After that, it was manufacturing 30 HP to 90 HP tractors for the comfort to farmers. New Holland manufacturing plant located in Greater Noida spreading in 60 acres land has more advanced in tractor manufacturing world. New Holland manufacturing plant 60,000 tractors unit manufacturer in annually with excellent quality. New Holland has won many prizes in national as well as international level in quality and safety (<http://agriculture1.newholland.com>).

3.1 Role of CNH (Case New Holland in waste water treatment):

Water preservation and recycling waste-water treatment is a global scenario. Sustainable development of water to make future secure and also increase the economic value of the country. The government makes necessary policy for all corporate, non-corporate sector to conserve water for our coming generation. For the conservation of water and promoting water sustainable development program CNH (Case New Holland) is one of them. It has started waste-water treatment plant in all their manufacturing plants and offices. This industry used recycled water again and again by this it preserves water amount and also secretes less water wastage. Industries believe in the sustainable growth of business with main the law of the environment. Case New Holland manufacturing plant has tried to reduce the amount of water consumption according to unit of manufacturing capacity of the plant.

Case New Holland has worked for sustainable water development at global level. Scene 2015, they organized a program in manufacturing plant for their employee and nearby people for understanding the importance of

water, how to conserve it and how to use it. This effort of Case New Holland has shown results in their manufacturing plant total reduce the amount taken and discharge is 600,000 and 700,000 m³.

CNH (Case New Holland) water management at global level:

	Target 2018vs 2014	2016	2015	2014
Water withdrawal	-3%	0.10	0.11	0.10

Table1. Represents water withdrawal per production unit (m³/hour of production)

Source: CNH sustainability report 2016

Years →	2016	2015	2014
Plants	56	57	55
Withdrawal			
Groundwater	3,274	3,752	3,512
Municipal water supply	1,766	1,759	2,159
Surface water	19	25	18
of which salt water	-	-	-
Rain water	2	1	3
Other	5	8	-
Total water discharge	5,066	5,545	5,692
Discharge			
Surface water	531	577	836
Of which salt water	-	-	-
Public sewer systems	2,715	2,761	3,146
Other destinations	140	130	131
Total water discharge	3,386	3,468	4,113

Table 2. Represents water withdrawal and discharge CNH in worldwide (thousands of m³)

Source: Sustainability report for Case New Holland 2016.

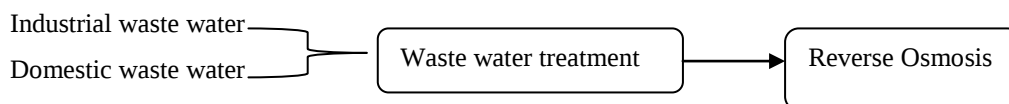
Year	2016	2015	2014
Plants	56	57	55
Total water requirement	6,9897	7,574	7,858
Of which covered by recycling	1,923	2,029	2,166
Of which water withdrawal	5,066	5,545	5,692
Recycling Index	27.5%	26.8%	27.6%

Table 3. Represent water recycling index Case New Holland worldwide (thousands of m³)

Source: Sustainability report CASE NEW HOLLAND 2016.

IV. METHDOLOGY

The waste treatment of water depends upon various parameters like pH, BOD (biochemical oxygen demand), nutrients, oxygen dissolved (Ute S. Enderlein et al, 1997). The technology used for waste-water treatment it depends upon the nature of waste-water. In New Holland agricultural tractor manufacturing plant, Noida having 2000 sq feet area for the waste water treatment plant. Waste-water treatment process depends upon the characteristics of water. In New Holland, Plant source water is groundwater. During manufacturing water is used for washing purpose for implements and some domestic used. For water treatment plant they take manufacturing unit waste water, kitchen area washbasin water, and rain harvesting water. By the treatment of this area, water reverse osmosis process is used for waste-water treatment.



Reverse osmosis: reverse osmosis is such type of technique removal of impurities from contaminated water by pushing pressure on water pass through semi-permeable membrane by this water molecules pass through the membrane and impurities particle left behind it. Reverse osmosis techniques mainly used for removal of grit from the water. It also controls the BOD level (Barbara et al, 2005).

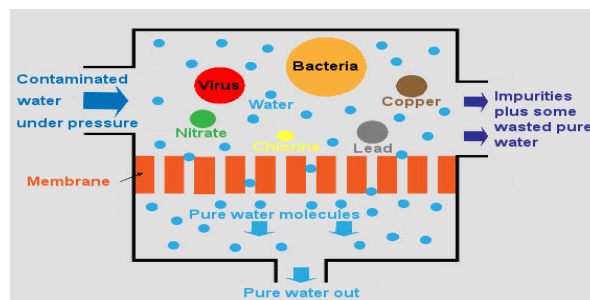
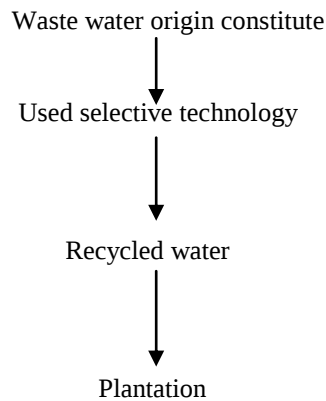


Figure 6. Shows the reverse osmosis process.

Source: <http://www.mankysanke.co.uk/assets/images>.

In reverse osmosis process water containing impurities having under pressure in a tank passing through a semi-permeable membrane, this membrane does not allow to pass impurities molecule through it, passes only pure water. Impurities and waste-water separate through it and discharge by the same chamber containing contaminated water.

In New Holland, waste water treated plant containing only water from kitchen hand washbasin and manufacturing unit waste water which was mainly used for implements washing purpose. And after treated this water by reverse osmosis techniques they are used for water the plantation.



In New Holland has plant waste water and rain harvesting water collected and passes through small drain for easily go through to waste water treatment plant.



Image 1. These small drains spread in all over in plant help for passing waste and harvesting water.

Source: Self-clicked by an author.



Image 2. Represents four big well to collecting waste-water for treated.

Source: Self-clicked by an author.



Image 3. Represents treated water collect here for plantation used.

Source: Self -clicked by an author.



Image 4. Represent the control room for controlling the all process water waste treatment.

Source: Self-clicked by an author.

At a day New Holland manufacturing waste-water treatment plant having the capacity to have treated 72,000-litre waste water. However, normally it works on daily routine waste-water.

New Holland Waste-water treated plant having some variables:

Variables	Percentage of efficiency of variable
Biochemical oxygen demand (BOD)	>50
Chemical oxygen demand (COD)	>50
Total suspended solution (TSS)	>50
NH ₃ ⁻	>50

Table 4. Represents the percentage efficiency of the variable present in waste-water in New Holland manufacturing plant.

Source: self-created by author

In New Holland manufacturing plant not having heavy metals like: Arsenic (As), Barium (Ba), Cadmium (Cd), Chromium (Cr), Copper (Cu), Fluoride (F), Iron (Fe), Lead (Pb), Manganese (Mn), Mercury (Mg), Selenium (Se), Silver (Ag), Zinc (Zn) etc. in their waste-water.

V. CONCLUSION

Water pollution is the major problem for growing world. The amount of usable water is defined for all, water is much precious due to lack operating system of waste-water recycled (Harminder Kaur et al, 2012). This paper mainly highlights the water demand by industries and the need of waste-water treatment for the aspect of present and future need. New Holland has waste-water treatment plant manufacturing processing is simple and cheap (Thenkabail et al, 2011). It having the capacity for recycling 72,000 ltr water in a day. Treated water used for the plantation to make the environmental friendly atmosphere to work.

REFERENCES

- [1.] Patil yogita and Singh Ramandeep, 2014. "Smart Water Tank Management System for Residential Colonies Using Atmega128A Microcontroller", Electrical, Electronics and Communication Department of the ITM University, Gurgaon. International Journal of Scientific & Engineering Research, Volume 5, Issue 6, June-2014 355 ISSN 2229-5518.
- [2.] Seckler, David; David Molden; and Randolph Barker. 1998. Water scarcity in the twenty-first century. IWMI Water Brief 1. Colombo, Sri Lanka: International Water Management Institute.
- [3.] Water Use in Indian Industry Survey, FICCI Water Mission. New Delhi September, 2011.
- [4.] Philippe Cullet, 2007. "WATER LAW IN INDIA OVERVIEW OF EXISTING FRAMEWORK AND PROPOSED REFORMS", International Environmental Law Research Centre International Environment House Chemin de Balexert 7, 1219 Châtelaine Geneva, Switzerland. 2007.
<http://www.ielrc.org/content/w0701.pdf>.
- [5.] <http://www.agriculture1.newholland.com>.
- [6.] Harminder Kaur, Ravinder Singh Sawhney, Navita Komal, "Wireless Sensor g Networks for Disaster Management". International Journal of Advanced Research in Computer Engineering & Technology Volume 1, Issue 5, July 2012.
- [7.] Thenkabail, P.S., "Improving Water Productivity for Agriculture - Predicting and Preventing Crisis in Irrigated Water Use in a Changing Climate". Publisher IEEE Global Humanitarian Technology Conference (GHTC), 2011 Date of Conference: Oct. 30 2011-Nov. 1 2011 Page(s): 176.
- [8.] Water management, our sustainable company. Sergio Marchionne Chairman, sustainability report Case New Holland 2016.
- [9.] Ute S. Enderlein, Rainer E. Enderlein and W. Peter Williams, 1997. Water Pollution Control - A Guide to the Use of Water Quality Management Principle Published on behalf of the United Nations Environment Programme, the Water Supply & Sanitation Collaborative Council and the World Health Organization by E. & F. Spon © 1997 WHO/UNEP ISBN 0 419 22910 8. 23-51.
- [10.] Barbra Kneen, Ann Lemley and Linda Wagenet, 2005. "Reverse Osmosis treatment of Drinking Water", Cornell Cooperative Extension, College of Human Ecology. Fact Sheet 4, December 1995 (Update November 2005).