Consumer Behaviour

[Literature Review 5](#_8ylwl9svtw9y)

[P T Manivannan 6](#_3tf5jw8uo9h7)

[Paper 1: 6](#_koo2rvmjclka)

[Paper 2: 7](#_wu618cad2zcj)

[Paper 3 : 8](#_kqhwuq4hxnze)

[Paper 4 : 8](#_o602wbc7f0ue)

[Paper 5 : 10](#_vzpvxadqsvn3)

[Paper 6 : 10](#_wf5baqq763rs)

[Satish 11](#_hovz3b1nna1g)

[Paper 1: 11](#_6u6oq8sinqt)

[Paper 2: 13](#_i2uy71gi5fhc)

[Paper 3: 14](#_5nljo4cr9rx)

[Paper 4: 14](#_c6xp4873djjk)

[Paper 5: 15](#_7mtieyx8djoy)

[Paper 6: 16](#_wpq7z38oslx)

[Nishant 17](#_tqsteu337ozf)

[Paper 1: 17](#_6ow3dw3s8x8i)

[Paper 2: 18](#_isyvt9y0q9c3)

[Paper 3: 19](#_4tuepixy0vli)

[Paper 4: 20](#_ke9ch0dsur8)

[Paper 5: 22](#_ml5tg1k35r0)

[Paper 6: 22](#_8m82a9ic6udh)

[Shruti 23](#_wr9mfcx722)

[Paper 1: 23](#_99qgw9u3ybvo)

[Paper 2: 24](#_wptq35gpzebg)

[Paper 3: 25](#_f4oan368oa4p)

[Paper 4: 26](#_jlsijx1p87vh)

[Paper 5: 26](#_1ctuaxkrx882)

[Paper 6: 28](#_hinvszaa6xn6)

[Robin Singh Rathore 29](#_hyal5b2a63cg)

[Paper 1: 29](#_11jaxb26wpfg)

[Paper 2: 30](#_jej5pexp34on)

[Paper 3: 31](#_hyftg9pyymdl)

[Paper 4: 32](#_yjyqciebcq1n)

[Paper 5: 33](#_yi7rrb5goifc)

[Paper 6: 34](#_p8vozv8s4rbn)

[Simran Sharma 36](#_vi9rauawemur)

[Paper 1: 36](#_g25iiax6ya4d)

[Paper 2: 37](#_1luaqkawaeu5)

[Paper 3: 37](#_yvy7w29bu15a)

[Paper 4: 38](#_cs0b1k6sumkt)

[Paper 5: 39](#_p094mfm9qbq2)

[Nishkam Misra 40](#_935b954kc4py)

[Paper 1: 40](#_1xj27ay1qpwp)

[Paper 2: 41](#_pri779z045ka)

[Paper 3: 42](#_2tbuy8anf7wu)

[Paper 4: 43](#_a99hdcko2whl)

[Paper 5: 44](#_qt8lrxhztrcu)

Team 4:

P T Manivannan

V Satish

Nishant sharma

Shruti Kumari

Nishkam Misra

Robin Singh Rathore

Simran Sharma

Topic :

Water Purifier

# Literature Review

Abstracts of 40 Research papers are present here Related to Water Purifiers and Water Purification this extensive Research helps us in understanding the Water purifiers Market and the Consumer Needs and Preference

# P T Manivannan

### Paper 1:

Research on drinking water purification technologies for household use by reducing total dissolved solids (TDS)

Abstract:

The Research is taken place in USA in the city of California where the consumption of tap water is almost normal and the majority of the population. This is a experimental research where the researcher Mr.Bill B. Wang Conducts multiple experiments to analyze and find which of the methods are the best for Purification of Water by reducing the Levels of TDS( Total Dissolved Solids) that includes calcium, magnesium, sodium, potassium, carbonate, chloride, nitrate, and sulfate ions

Methods used in the research

1. Heating/Boiling water for various lengths of time
2. Activated carbon as a water purification additive
3. Baking soda as a water purification additive
4. Electrolysis under low voltages

The result of this experiment was that the Method of heating had to be done in a controlled temperature of 50 C and for a time Period of no more than less than 10mins and so the controlling of these factors depending on the variation of impure water is difficult, the methods of using activated carbon or Baking soda as additive proved to have minimal Effects on the Lowering of TDS. But the Process of Electrolysis had proved to be the Best out of all the methods by lowering the TDS levels .

SO we can conclude that Electrolysis is the best method to purify water and the Experiment was successful,

### 

### Paper 2:

The Effectiveness of Home Water Purification Systems on the Amount of Fluoride in Drinking Water

Abstract:

The research was Based of IRAN in the city of Ahwaz where the weather is warm and the water contains beneficial ions such as fluoride. In us this fluride is being added to the water as it helps the people with their oral hygiene and in the case of IRAN its present naturally.

This was a experimental research where the researchers used the water with the presence of fluoride ion and used multiple filters to check if these filters are reducing the the levels of fluoride from them along with eliminating the toxic ion that are present in the water.

They used 6 frequently used commercial brands of water purifiers in Ahwaz namely:

CCK (Ceramic and Ceramic/Carbon Cartridges ; RTX-TS DLM filters, Korea), Soft Water (Ceramic Candles; Alpine TJ Series filters, W9332420, USA), Alkusar (Special media cartridges filters; PRB50-IN, USA), Puricom (Special media cartridges filters; Watts 4.5" x 10" Dual Housing, Korea), Water Safe (Granular Carbon Cartridges filters; LCV (Lead, Cysts, VOC's) (Carbon Block Filter Cartridges, Australia), and Aquafresh (Sediment String-Wound; Poly Spun and Pleated Washable Cartridges filters, K5520, USA)

By the end of the research they found that these filter were reducing the the fluoride along with the TDS nulling the benefits of Fluoride.

### Paper 3 :

PURIFICATION OF DRINKING WATER WITH THE APPLICATION OF NATURAL EXTRACTS.

Abstract :

This research has been conducted in the city of Gwalior in a particular area of thatipur which has many water resources. The main objective of the research is to promote the usage of natural purifying agents such as Moringa oleifera ( Drumstick leaves), Arachis hypogaea ( peanuts), Vigna unguiculata ( Cow peas) Vigna unguiculata ( Urad), Zea mays (corn).

The water was collected from different sources in Thatipur and the were collected in a very sterile manner for the experiments they also used agents to measure the contents of TBC (total Bacterial Counts) inorder to see the effects after the purification process then these seeds and leaves were picked from a local farm, powdered and added to these samples and After 5 days the results were analyzed.

According to the experiment all these natural agents reduced the TBC by 95% and these helped the impurities and the TDS matter to settle in the bottom for better filtration and purification. So it was concluded that these natural substances can be used in developing countries and under developed countries to promote a more safer water consumption and reduce the usage of Turbid Water.

### Paper 4 :

Public health benefits of water purification using recycled hemodialyzers in developing countries

Abstract :

This is a research conducted by the EWfE ( Easy water for everyone) and NGO operated by the UN, this organization picked a River in the Country of Ghana the river of Volta and the Villages surrounding which depend on the river for the source of water, the people use this waster for their day to day purpose inspite of them knowing that the water contains many toxic substance and also many Pathogens that can even cause cancer and these substances was creating a epidemic of diarrhea in the villages so the UN had to isntall these filtration systems to control the disease outsperead

The UN obtained Multiple Recycled Hemodialyzers that can be used after basic cleaning and sterilization to filter not all the substances but can stop all these viruses and pathogen passing out only water and dissolved salts through the filter these where obtained from a company based of Israel. Then these Hemodialysers were set up in 8 villages around the river 4 using a gravitational pumping method that could filter upto 250L/hr and the other 4 in a manual pumping method that filtered 500l/hr .

After a extensive research of 10 months the team found that there was a virtual disappearance of Diarrhea in the infants and 72% decline in the rate of infection of diarrhea though this was not a big number there was very significant number of reduction in the population suffering from this disease. So the UN has adviced the villagers to follow certain steps in order to contain the reduction along with the help of the Hemodialyzer filtration system, they were asked to used water in clean containers, store them in sunlight with proper closure and also chlorination of the water to eliminate all the contaminants from the water

So the conclusion of the experiment was that their was a significant reduction in the spread of the disease but still its advised to maintain sanitation in consumption of water by taking neccesary precautionary measures.

### Paper 5 :

A STUDY ON CUSTOMER’S SATISFACTION TOWARDS WATER PURIFIER WITH SPECIAL REFERENCE TO COIMBATORE CITY

Abstract :

This is a descriptive research done by a group of students of coimbatore this research is done in the city of coimbatore in tamil nadu. The research is done through a questionnaire that was circulated and a sample of 120 respondents was taken to evaluate and understand the satisfaction levels of the respondents on purchasing a purifier and the issues that they face in the purifier.

The research doesnt talk about any particular brand or company its talks about the generic purifiers and how these purifiers have been performing a 2nd tier city like coimbatore where the majority of households, companies, factories and hospitals use water from the same source.

The research evaluates all the responses and finds that many people are facing a lot of problems in the purifiers and the research team has also suggested some suggestions for any other water purification company comes ino the market

The suggestions are:

1. Warranty and guarantee may be increased
2. The latest technologies may be implemented in affordable price
3. Low budget water purifier may be developed for urban people

So the descriptive research is concluded by giving out these suggestions .

### Paper 6 :

A Study of consumer behaviour towards Kent RO in Nagpur

Abstract :

This is a research done in the city of Nagpur India, the purpose of the research is to understand the awareness of the public on what are the brands of water purifiers available in the market and how many of them use these named brands.

The research is done based of a questionnaire and a sample size of 100 was taken there researcher had also done face to face interviews and this sample size also includes a number of retailers in them.

Out of this 50 its turns out only 78%(61) of the people use RO systems in their house and out of those 78 only 78%(61) of the people are using Kent RO. so we can say that Kent RO has captured a significant number of customers in the Nagpur Market for RO with further expansion the numbers will increase is the expectation by the researcher.

# Satish

### Paper 1:

Towards high throughput plasma based water purifiers: design considerations and the pathway towards practical application

plasma-based water purification methods as an alternative means to introduce advanced oxidation into liquid water. These methods have the advantage of driving multiple advanced oxidation processes simultaneously, without the need for conventional consumables, making them potentially energy efficient and cost-effective. However, the main challenge lies in scaling up these methods for practical implementation. The paper addresses the scale-up problem, current state of the art, and design considerations from both plasma science and engineering perspectives. The objective is to summarize the key challenges in scale-up and implementation, and to explore approaches for achieving a high throughput plasma-based water treatment system. The paper estimates the plasma dose delivery requirements for specific contaminants using rate equations. It also discusses two scale-up design approaches and presents performance data. Furthermore, the paper elaborates on the pathway from bench-top demonstration to piloting and ultimately implementing plasma-based systems for water treatment.

### 

### **Paper 2:**

**Microbial contamination in distributed drinking water purifiers induced by water stagnation**

small-scale distributed water purifiers (SSDWPs) commonly used in homes and public spaces. The research aims to understand the microbial changes induced by water stagnation in these purifiers, considering bacterial count, microbial size, microbiome, and pathogenic communities. The SSDWP system consists of sand filtration, granular activated carbon, and ultrafiltration processes. The key findings of the study are as follows:

Bacterial counts in SSDWPs increased rapidly during water stagnation, reaching over 500 cfu/mL after 2.5 hours. The proportion of intact cells also increased with stagnation time, indicating microbial growth.

Microbial size decreased with stagnation time, as observed through changes in forward scatter detected by flow cytometry.

Microbiome evolution in SSDWPs followed the isolated island model, while in stagnated drinking water distribution systems (DWDS), it followed the continent island model. SSDWPs had higher biodiversity abundance.

Stagnation caused significant microbiome changes in each unit of the SSDWP system. Spatial differences contributed more to microbiome dissimilarity than temporal differences.

Mycobacterium was the dominant pathogenic genus in the sand filtration and granular activated carbon units, while Acinetobacter was most abundant in the ultrafiltration unit. Pathogenic risks increased with water stagnation time, and lower nutrient levels contributed to the richness of pathogenic communities.

### **Paper 3:**

**A high-performing single-stage invertstructured solar water purifier through enhanced absorption and condensation**

interfacial solar vapor generation as an emerging technology for producing purified water with a reduced carbon footprint. While the evaporation rate has been improved, the rate of water collection has been limited due to inefficient heat transfer during condensation and compromised light absorption in conventional solar still designs.

To address these limitations, the researchers have designed and fabricated an invert-structured, single-stage solar water purifier (ISWP). The ISWP consists of a top selective absorber and a honeycombed bottom water condenser made of hydrophobic nanostructured copper. This inverted structure helps to prevent optical loss caused by vapor condensation and enhances heat transfer and condensation efficiency.

The results show that the ISWP achieves a high water-collection rate of 1.063 kg/m²/h and an overall efficiency of solar collected water of 70% for single-stage solar purification systems. This innovative design and fabrication approach offer improved performance in terms of water collection and overall efficiency, making it a promising solution for solar water purification with a minimized carbon footprint.

In summary, the study presents an elaborately designed and fabricated invert-structured, single-stage solar water purifier that demonstrates enhanced heat transfer, condensation efficiency, and water-collection rate. This technology has the potential to contribute to the production of purified water with reduced energy consumption and environmental impact.

### **Paper 4:**

**Effectiveness of household water purifiers in removing perfluoroalkyl substances from drinking water**

four models of pitcher-type water purifiers (A-D) in removing Perfluoroalkyl substances (PFASs), including PFOS and PFOA, from drinking water. The findings indicate that all of the tested water purifiers were able to remove PFASs, but the efficiency varied depending on the model.

Model C was found to be the most effective, with over 90% removal of all PFASs throughout the recommended lifespan of the filter cartridge. On the other hand, Model D was the least effective, with its removal efficiency dropping below 50% towards the end of the cartridge's lifespan.

When comparing the removal efficiency based on the carbon chain length of PFASs, the order observed in all models was "C12 > C10 > C8 > C6".

Overall, this study demonstrates that household water purifiers, specifically pitcher-type models, can effectively reduce exposure to PFASs in drinking water. However, the efficiency may vary depending on the specific model and the lifespan of the filter cartridge.

### **Paper 5:**

**Local drinking water filters reduce diarrheal disease in Cambodia: a randomized, controlled trial of the ceramic water purifier.**

The study collected four weeks of baseline data on household water quality, diarrheal disease, and other water-related practices. The participating households (totaling 180) were randomly assigned to one of three groups: those receiving a ceramic water purifier (CWP), those receiving a second filter employing an iron-rich ceramic (CWP-Fe), and a control group with no intervention.

Over the 18-week post-baseline period with biweekly follow-ups, households using either filter reported significantly lower prevalence of diarrheal disease compared to the control group without filters. The longitudinal prevalence ratios were 0.51 (95% confidence interval [CI]: 0.41-0.63) for the CWP group and 0.58 (95% CI: 0.47-0.71) for the CWP-Fe group. This reduction in diarrheal disease was observed across all age groups and both sexes, even after accounting for clustering within households and individuals over time.

In summary, the study demonstrated that the use of ceramic water purifiers, both with and without iron-rich ceramic, significantly reduced the prevalence of diarrheal disease in households compared to those without any intervention. These findings highlight the potential of household-scale drinking water filters to improve water quality and reduce the burden of diarrheal disease in rural communities.

### **Paper 6:**

**The Chulli Water Purifier: Acceptability and Effectiveness of an Innovative Strategy for Household Water Treatment in Bangladesh**

The study aimed to understand the reasons for discontinuing the use of the purifier and evaluate its effectiveness.

Out of 101 individuals interviewed, 80 reported discontinuing the use of the purifier. The main reasons cited were mechanical problems (49%), inconvenience (35%), and high cost (10%). Only four households were found to be regularly using the purifier.

In terms of water quality, 19% of the heat-treated samples tested positive for Escherichia coli, indicating post-treatment contamination. Additionally, 56% of the stored water samples tested positive for E. coli, suggesting recontamination.

The study highlights several limitations of the purifier, including poor durability, inconvenience, high cost, and post-treatment contamination. These issues need to be addressed before further implementation of the purifier or similar household water treatment strategies.

Resolving these challenges is crucial for ensuring the effectiveness and usability of household water treatment strategies, as they have implications for the overall success of such interventions in improving water quality and preventing waterborne diseases.

# Nishant

### 

### **Paper 1:**

**Concept of Ideal Water Purifier System to Produce PotableWater and its Realization Opportunities using Nanotechnology**

### 

Abstract :

Identifying the characteristics of an ideal system in nature and comparing it with existing real system in a given area for possible improvement is one of the research methods in research methodology. While comparing the ideal system characteristics with existing/real system characteristics the research gap can be determined and further research can be carried out to improve the real-world system. The four basic problems still existing in the society worldwide are related to nutritious food, drinking water, renewable energy, and comfortable health. In this paper, we have studied the characteristics of the ideal water purifier, a hypothetical system used to convert contaminated water into pure water to solve drinking and irrigation water problems.

The characteristics of the ideal water purifier system are classified and discussed under four categories as input characteristics, system requirements, Output characteristics, and environmental characteristics. Further, the possibilities of realizing such a system using nanotechnology are also discussed. Nanotechnology is emerging as a multi-disciplinary new frontier of Science & Technology expected to solve many major problems/needs of the mankind of the society which include supply of abundant potable drinking water, pure water for agriculture and plantations, availability of nutritious food for everybody, uninterrupted green energy for society, and comfortable health for everybody. The paper discusses the possibility of using nanotechnology to realize the ideal water purifier using nanotechnology and also the advantages, benefits, constraints, and disadvantages of such technology to improve such system towards the ideal system. New Knowledge Created/New Analysis & Interpretation : The paper created new knowledge on the concept and characteristics of ideal water purifier, and analysed and interpreted the possibility of realizing it using nanotechnology.

### **Paper 2:**

PORTABLE WATER PURIFICATION SYSTEM

Abstract:

Access to safe drinking water is a fundamental human right, yet millions of people worldwide lack this essential resource due to contamination, remote locations, or natural disasters. Portable water purification systems have emerged as a vital solution to this global challenge. This report explores the significance, components, operation, benefits, and potential applications of portable water purification systems.

These systems typically consist of intake mechanisms, pre-filtration systems, disinfection units, storage containers, and dispensing mechanisms. They operate by drawing water from the source, removing impurities through filtration and disinfection methods, and storing the purified water. The chosen purification methods vary based on design and purpose, often employing UV sterilization, chemical disinfection, or membrane filtration.

The benefits of portable water purification systems are manifold. They enhance public health by preventing waterborne diseases and are highly mobile, facilitating deployment to disaster-stricken regions or remote locations. Some systems are designed for sustainability, using renewable energy sources and minimizing environmental impact. Cost-effectiveness makes them an attractive solution, particularly in areas with inadequate infrastructure.

The potential applications of these systems encompass disaster relief efforts, camping and outdoor activities, military operations, humanitarian aid missions, and serving remote communities facing water scarcity. However, challenges persist, including the need for regular maintenance, dependence on power sources, and high initial costs for advanced systems.

In conclusion, portable water purification systems are indispensable tools in addressing the global clean water crisis. Their ability to provide safe drinking water in diverse contexts and their potential for saving lives in emergencies cannot be overstated. Addressing challenges and promoting continued innovation in this field is essential to ensure access to clean water for all, regardless of location or circumstance.

### **Paper 3:**

STUDY OF FILTRATION FOR POINT-OF-USE DRINKING WATER TREATMENT IN NEPAL

Abstract :

Point-of-use drinking water filtration was studied as a possible drinking water treatment alternative in Nepal. Three filter/purifier systems, Nepalese ceramic candle filter, Indian ceramic candle filter and IPI purifier, were tested for turbidity and microbial removal efficiencies.

The test results indicated that the filter systems had very high turbidity removal efficiencies. All systems reduced the turbidity level of water to less than 1 NTU. However, the filtration processes themselves were observed to be not adequate in terms of removing microbial contaminants. IPI purifier when used together with chlorine disinfection eliminated all microbial contamination, however, in all other cases the treated water was still microbiologically contaminated.

In order to improve the microbial removal efficiency of Nepalese ceramic candle filter, colloidal silver coating was applied onto the ceramic filter candle. The experiments were conducted for filter candles with several concentrations of silver. It was observed that the filters with more than 10mg of silver removed all hydrogen sulfide producing bacteria. However, complete removal of total coliform was not achieved. Moreover, it was not tested whether the effectiveness of the silver remains after long term use of the filter, and thus a further study is recommended. Out of all three filter systems tested, the Nepalese ceramic candle filter remained to be the most affordable system of all. It is recommended for the Nepalese households to use Nepalese ceramic candle filters combined with a disinfection process.

### Paper 4:

A STUDY ON CONSUMER PERCEPTION AND SATISFACTION OF WATER PURIFIER IN KUMBAKONAM TOWN

Abstract :

This study investigates consumer perceptions and satisfaction regarding water purifiers in Kumbakonam Town, a region characterized by its unique water quality challenges and consumer preferences. Access to safe and clean drinking water is a crucial aspect of public health, and water purifiers have become essential household appliances to address this concern.

The research methodology included surveys and interviews with a diverse sample of residents in Kumbakonam Town. Data was collected on various aspects, including consumer awareness, preferences, and experiences with water purifiers. Additionally, the study assessed the factors influencing consumer satisfaction and the perceived benefits of water purification systems.

Findings revealed that a significant proportion of residents were aware of the importance of water purification and had invested in water purifiers. Consumer preferences varied, with considerations such as technology, price, brand reputation, and maintenance playing pivotal roles in purchase decisions. The study also highlighted the specific water quality issues faced by residents and how these issues shaped their preferences for particular purification methods.

Consumer satisfaction levels were generally high among those who owned water purifiers, emphasizing the importance of reliable performance, ease of maintenance, and the taste and odor of purified water. Furthermore, the study identified areas where consumer education and awareness programs could enhance the adoption of water purification systems among those not currently using them.

In conclusion, this study sheds light on the complex interplay between consumer perceptions, preferences, and satisfaction regarding water purifiers in Kumbakonam Town. The findings have implications for businesses in the water purification industry, policymakers, and organizations seeking to improve access to safe drinking water. By understanding and addressing the unique challenges and consumer dynamics in this region, it becomes possible to further improve the quality of drinking water and public health outcomes in Kumbakonam Town.

### Paper 5:

Study and design of portable antimicrobial water filter

Abstract :

Objective: This study was conducted to design a portable antimicrobial water filter which is both economic and easy to use.

Methods: A prototype following the designing of the water filter was constructed. Layers of sand, cloth, activated charcoal, and cotton containing compartments were built for carrying out water analysis.

Results: Most probable number index of Vellore Institute of Technology lake water was compared with that of filtered water. Complete water analysis was done, and the sand filter layer was observed to be responsible for a maximum of the antimicrobial action of the filter.

Conclusion: The study demonstrated that the proposed design of water filter is efficient in removal of turbidity, odor, and microbial content of lake water along with decreasing the acidity of water.

### Paper 6:

Biocoagulants for Water and Waste Water Purification: a Review

Abstract :

A survey and inventory of indigenous knowledge and plants used by rural Africans to purify water was carned out vis-à-vis the inherent local water crisis cum challenges in the existing water purification technologies. The findings indicated that from time immemorial indigenous people have had to use rich knowledge base to treat their water. Plants identified were Moringa oleifera, Jatropha curcas, Pleurotus tuberregium, Citruss aurontifolia, Strynos potatorium.A review of the of the potentials of these plants coagulants with respect to turbidity removal and disinfection of water borne diseases vis-a vis the pitfalls of chemical coagulants and disinfectants such as Alum and Chlorine have been presented.Studies conclusively demonstrates that biocoagulants especially Moringa oleifera seeds are as efficient as Alum is purifying water and wastewater at low cost.The need to further develop biocoagulants as green treatment alternative for global water management admist growing global water crises is emphasized.

# Shruti

### Paper 1:

India Water Purifier Market: Industry Trends, Share, Size, Growth, Opportunity and Forecast 2023-2028

Abstract:

The India water purifier market reached US$ 2,780.9 million in 2022, with a projected growth rate of 10.42% (CAGR) to US$ 5,002.3 million by 2028. Key drivers include rising waterborne diseases, government initiatives for safe drinking water, and technological advancements in water purification. Households favor RO purifiers, retail stores dominate distribution, and West/Central India leads in market share due to urbanization and industrialization. Key players invest in R&D and expand distribution networks.

### Paper 2:

Customer Satisfaction with Aquaguard Water Purifier Products in Chennai: A Study

Abstract:

This study conducted by Dr. S. Pandiaraj, an Associate Professor at Presidency College in Chennai, examines customer satisfaction with Aquaguard water purifier products in the Chennai market. Customer satisfaction is a crucial metric for businesses, impacting their success and market share. The study aims to investigate factors influencing customer satisfaction, sources of product awareness, and problems faced by customers. Data was collected through a structured questionnaire from 110 respondents using convenient random sampling. Statistical tools, including Chi-square tests, were applied for data analysis.

Key findings include:

* Majority of respondents were male (59.09%).
* Customers with a monthly income above Rs. 50,001 were the major buyers (38.18%).
* Friends and relatives were the primary source of product awareness (25.45%).
* Statistically significant associations were found between sources of information and gender.
* Significant differences in satisfaction levels were observed among various product features.
* Respondents were highly satisfied with durability (68.18%) and healthy attributes (65.45%) but highly dissatisfied with the cost of annual maintenance contracts (63.64%).
* Common problems faced by customers included poor after-sales services (22.73%) and high annual maintenance contract costs (24.55%).

Suggestions for improvement include reducing annual maintenance contract costs, focusing on after-sales services, offering attractive exchange offers, providing cost-effective post-warranty services, and ensuring the availability of spare parts. Maintaining product quality is essential for long-term customer satisfaction and business success.

### Paper 3:

History of Indian drinking water & wastewater quality standards Parameters

Abstract

In a world full of water only 2.5% is fresh water. Which further divides into 3 sources 70% Ice and snow covered mountain regions, 29.7% groundwater and 0.3% fresh lakes and rivers. There are various sources of water contamination such as Fertilizers, pesticides, or other chemicals that have been applied to land near the water, Concentrated feeding operations (large industrial animal farms), Manufacturing operations, Sewer overflows, Storm water etc.

This paper mainly talks about how after industrialization and globalization our drinking water sources were thrashed, what are the causes of waterborne diseases, how we measure different chemical compounds present in water.

### 

### Paper 4:

Consumer preference and satisfaction on water purifier

Abstract

Purpose of this study is to study the preference of customers towards water purifiers and to study their satisfaction level. In a marketing survey conducted in Jalandhar city, it was found that most people are aware of water purifiers and are satisfied with KENT RO products. Some key findings include:

* 70% of respondents liked the taste of purified water, while 10% did not.
* 60% were happy with after-sales service, but 20% complained about long waiting times.
* 25% considered both price and health important, 35% were concerned only about health, and 20% only about price.
* 50% would buy the products again, while 30% would not due to service issues.
* 70% would recommend the products, but 10% would not.
* 60% bought products due to advertisements, and 20% through friends' references.

The survey recommends flexible pricing, improved service, and tapping into untapped rural markets to enhance KENT RO's market presence. Overall, satisfaction with the product was high, but service improvements are needed.

### Paper 5:

Issues and Problems of Groundwater Resources in Ethiopia: A Case from Dire Dawa Administration

Abstract:

The Dire Dawa Administration, Environmental Protection Authority (DDEPA), was established to ensure the sustainable development of the region while safeguarding human welfare and resource sustainability. This study addresses critical issues related to groundwater management in Dire Dawa, Ethiopia. It identifies seven key problems:

1. \*\*Intense Growth and Development:\*\* Rapid urban growth and development have led to increased demand for groundwater, resulting in declining yields and levels.

2. \*\*Intensive Water Use:\*\* Industries and businesses are using groundwater without considering sustainability, leading to overuse and depletion.

3. \*\*Unknown and Unregulated Groundwater Use:\*\* Lack of monitoring and regulation of groundwater withdrawals hampers resource management.

4. \*\*Institutional Capacity:\*\* Government bodies face challenges in managing groundwater due to limited resources and capacity.

5. \*\*Poor Handling of Boreholes:\*\* Inadequate maintenance and data gaps hinder accurate assessment of groundwater resources.

6. \*\*Loss of Recharge Areas:\*\* Urban development reduces groundwater recharge, emphasizing the need for better management practices.

7. \*\*Contamination of Groundwater:\*\* Human settlements and industrial waste contribute to nitrate contamination, posing risks to public health.

The study recommends various mitigation measures, such as improving waste management, creating buffer zones around well fields, and assessing community willingness to pay for quality water services. However, it emphasizes the need for implementing previous study recommendations and building institutional capacity to address these critical groundwater issues effectively.

### Paper 6:

Concept of Ideal Water Purifier System to Produce Potable Water and its Realization Opportunities using Nanotechnology

Abstract

This paper explores the concept of identifying and comparing the characteristics of an ideal system with existing real systems in order to drive improvements. It focuses on addressing four fundamental global issues: access to nutritious food, clean drinking water, renewable energy, and healthcare. The paper specifically delves into the characteristics of an ideal water purifier, a hypothetical system designed to convert contaminated water into pure water for drinking and irrigation purposes.

The characteristics of this ideal water purifier system are categorized into four groups: input characteristics, system requirements, output characteristics, and environmental considerations. Furthermore, the paper discusses the potential application of nanotechnology to realize this ideal water purifier, highlighting the advantages, benefits, constraints, and disadvantages associated with such technology.

The paper contributes by creating new knowledge on the concept and characteristics of the ideal water purifier and assessing the feasibility of implementing it using nanotechnology. It emphasizes the critical role of nanotechnology in addressing pressing societal needs, including the provision of potable drinking water, pure water for agriculture, sustainable energy, and healthcare. Finally, the paper underscores the importance of identifying and addressing these basic human needs for the betterment of society.

# Robin Singh Rathore

### Paper 1:

CUSTOMERS’ ATTITUDE TOWARDS SERVICE ASPECTS OF DOMESTIC PURIFIERS IN MADURAI

### 

Abstract:

Water is critical for many aspects of life such as economic growth, environmental stability, biodiversity conservation, food security and health care. In most cases there is no substitute for water. An energy resource can be replaced by another but water as a resource is irreplaceable.  
 Customer satisfaction is a key to building profitable relationships with consumers to keep and growing consumers and keeping their customer lifetime value. Satisfied customers talk favorably to others about the product. After sales service satisfies the customer and retains the customer. The subject matter covered under after sales service include instructions at the time of installation, period of warranty, coverage under warranty, free services availed of during the warranty period, annual maintenance contract, services covered in AMC, time taken to attend service, AMC amount per annum, cost of spares for AMC customers, cost of transportation for AMC customers, service charges for non-AMC customers and cost of spares for non-AMC customers.

### Paper 2:

Factors influencing purchase intention of water purifier in Malaysia

ABSTRACT:

Access to clean water is essential for public health, making water purifiers a necessity in Malaysian households. The fiercely competitive water purifier industry requires companies to offer quality products at reasonable prices while prioritizing consumers' needs. To gain better profits, companies must comprehend consumers' purchase intentions. This research investigates the factors influencing the purchase intention of water purifiers in Malaysia, employing the Theory of Planned Behaviour (TPB). Data were collected from 200 respondents via an online survey and analyzed descriptively, followed by hypothesis testing using SPSS-regression analysis. The study reveals that convenience, security, social influence, and speed significantly impact consumers' purchase intentions. To enhance business performance and competitiveness, companies should consider these factors.

Understanding consumer purchase intention is essential for formulating effective marketing strategies. This research focuses on factors influencing the purchase intention of water purifiers in Malaysia and finds that convenience, security, social influence, and speed all positively impact purchase intentions. To remain competitive, companies in this industry should consider these factors when developing their business strategies. However, further research is needed to explore other aspects of consumer purchase intention in the water purifier industry.

### Paper 3:

A COMPARATIVE STUDY OF FACTORS AFFECTING CONSUMER PREFERENCE BETWEEN LOCAL AND BRANDED WATER PURIFIERS WITH SPECIAL REFERENCE TO THIRUVARUR

ABSTRACT:

This comparative study conducted in Thiruvarur, Tamil Nadu, examines the factors influencing consumer preferences between local and branded water purifiers in response to the high demand for clean water in both urban and rural areas of India. Various companies, such as KENT, HUL, Tata, Eureka Forbes, LG, and Bajaj, have entered this market segment. Local players have also joined, offering water purifiers with unique names like Aqua fresh, Aqua plus, Aqua grand, and more. These purifiers differ in size, technology, price, and other attributes. Local companies promote after-sales service as their unique selling proposition (USP), leveraging their proximity to customers. This research aims to analyze the impact of brand preference on local water purifiers and consumer perceptions and awareness of water purifiers, using both primary and secondary data sources. The study reveals that the design and size of local water purifiers significantly influence consumer choices.

In a rapidly evolving technological landscape, consumer perceptions and preferences are subject to frequent changes. Competitors in the water purifier market are adopting innovative marketing strategies to retain market share. The study finds that consumers often favor local brands and highlights the importance of continuous innovation and understanding consumer needs. The implications of this research contribute to existing literature and provide insights for existing and potential producers in the water purifier market.

### Paper 4:

Customer Satisfaction and Expectation Towards Aquaguard of

Eureka Forbes: A Research Conducted in Kolkata

ABSTRACT:

This research conducted in Kolkata focuses on customer satisfaction and expectations towards Aquaguard, a water purifier product by Eureka Forbes Limited (EFL). The study aims to investigate consumer awareness, preferences, satisfaction levels, and competitive analysis in the context of the water purifier market. A total of 200 respondents participated in a descriptive study using a structured questionnaire. The results indicate that customer satisfaction is influenced by product quality, price, and size, with a significant relationship between brand name and customer preference. Recommendations include enhancing brand awareness, improving product supply and distribution, and implementing aggressive marketing strategies. The research highlights the growing importance of the water purifier industry in India, particularly in urban areas where health-consciousness is on the rise.

The research reveals that Aquaguard enjoys a dominant position in the Kolkata market, with high awareness and satisfaction levels among consumers. While there is room for improvement, Aquaguard's strong presence demonstrates its competitive advantage. This research sheds light on consumer perceptions, expectations, and areas for enhancement in the water purifier industry.

### Paper 5:

Characterization of a product-service system: a preliminary

analysis of a water filter

ABSTRACT:

This research paper focuses on the characterization of a product-service system (PSS), with a specific case study on a water filter. The study was conducted by Fernanda Hänsch Beuren, Claiton Emílio do Amaral, and Paulo A. Cauchick Miguel from the Universidade Federal de Santa Catarina in Brazil. The aim of the research is to analyze the PSS, emphasizing its life cycle and potential for improvement.

The paper highlights the growing importance of PSS in the business world, where companies are striving to provide more than just products to increase customer satisfaction and competitiveness. The PSS model combines products and services to offer personalized solutions, with a focus on reducing environmental impact and improving sustainability.

The research identifies various phases in the life cycle of a PSS, including meeting customer demands, parts manufacturing, product assembly, implementation, and customer use. These phases are discussed in relation to the studied water filter PSS, with a particular emphasis on materials, assembly, maintenance, and customer satisfaction.

The findings suggest that the water filter PSS is successful, but there is still room for improvement, such as enhancing component design for easier assembly and disassembly. Additionally, the PSS allows for continuous customer interaction, providing opportunities for ongoing improvements and innovations.

Overall, this research contributes to the understanding of PSS and emphasizes the importance of considering the entire life cycle of a PSS, from development to customer use, for achieving success and sustainability.

### Paper 6:

A STUDY ON CUSTOMER SATISFACTION TOWARDS AQUAGUARD WATER PURIFIER PRODUCTS IN CHENNAI

ABSTRACT:

This research paper investigates customer satisfaction towards Aquaguard water purifier products in Chennai, with a focus on understanding customer awareness, factors influencing satisfaction, and associated problems. The study encompasses a variety of objectives, including examining information sources, assessing customer satisfaction factors, and proposing solutions based on findings. The research reveals that the majority of respondents are male, with high monthly incomes being major buyers of Aquaguard products. Friends and relatives serve as the primary sources of product awareness. Gender has a statistically significant association with information sources. Furthermore, there are significant differences in satisfaction levels across various product features. Respondents are highly satisfied with durability and hygiene attributes but dissatisfied with annual maintenance costs and after-sales services. Common customer problems include high maintenance costs and poor after-sales services. The study suggests reducing post-warranty annual maintenance contract costs, improving after-sales services, offering special exchange rates, providing affordable post-warranty servicing, and ensuring the availability of spare parts. In conclusion, the majority of customers are satisfied with Aquaguard water purifier products, indicating their market potential. Maintaining product quality while addressing customer needs is crucial for sustained success in the competitive market. The company should prioritize customer satisfaction to ensure long-term sales success.

# Simran Sharma

### Paper 1:

A Study on Factors Affecting Consumer Purchase Decision of Water Purifier

Abstract:

Water is the most essential element in human life without which the existence of life is not possible. Consumers know more about their choices when they have product information and benefit from knowing their rights, hearing about alerts and warnings and finding out about safety issues. In India nearly 80% people die due to water related diseases. Both urban and rural areas in India are suffering from scarcity of clean water for domestic use. Although access to drinking water has improved, the World Bank estimates that 21% of communicable diseases in India are related to unsafe water. Diarrhea, cholera, malaria etc water related diseases are mostly found in India and due to these diseases approximately 1,600 people from 7,00,000 Indians estimated in 1999 died each day. Consumer behavior in India is always unexpected and dynamic. This study is all about consumer behavior, and the factors that motivate them to purchase water purifiers for their own health. This study is conducted in an urban area named Bhubaneswar, capital city of Odisha. This research has taken 100 samples and tried to find out how much customers are aware about water purifiers while purchasing and using them. This research is based on both primary data and secondary data. Samples are randomly selected. All the samples include user and nonuser of the water purifier. In order to analyze the data, descriptive statistics were employed.

### Paper 2:

AN EMPIRICAL STUDY OF 'IMPACT OF INFLUENCER MARKETING ON CONSUMER PURCHASE DECISION OF WATER PURIFIER’

Abstract:

Marketing strategies evolved over the period of time. Marketers have seen sea change in their approach towards marketing of their products and services. Customer Relationship Marketing, Holistic Marketing, Social Marketing etc. are some of the strategies used by the companies over the last two decades. Influencer Marketing is a decade old phenomenon. Influencer Marketing is a type of Social Media Marketing, which uses endorsements of the customers of products or services to influence the potential buyers. It has been seen that influencer marketing has a higher success ratio as compared to the traditional advertisement. This paper tries to explore the role of influencer marketing on the consumer buying decision.

### Paper 3:

Consumer Attitude and Purchase intention Towards HouseHold Water Purifier in Myanmar

Abstract:

The quality of drinking water is one of the major concerns for Myanmar households today. This study aims to examine the influencing factors on consumer attitude towards using purified drinking water and to analyze the effect of consumer attitude towards purchase intention of household water purifier. Theory of planned behavior (TPB) model is used to examine factors that influence Myanmar households' purchase intention of water purifiers. The study conducts a questionnaire survey method on 210 respondents from three largest Myanmar health care public groups on Facebook. The study applies analytical methods, including multiple linear regression and simple linear regression. Based on the data analysis, the variables of health consciousness, environmental concern, consumer knowledge, personal norms, subjective norms and consumer attitudes were found to have a positive relationship. Environmental concerns, personal norms and subjective norms have a positive effect on consumer attitude. Finally, it is found that attitude has a positive effect of consumer attitude on purchase intention. These results confirm that household water purifiers are most potential products for home appliances especially for targeting the family who live in Urban. However, the marketers should increase the social awareness of their products by distributing the products into various markets, to increase consumer’s knowledge of household water purifier technologies, classes, types, cost and effectiveness. Important fact is that the marketers have to support before and after sales services properly, consumers should be satisfied and think that using a water purifier is a wise decision for health.

### Paper 4:

Study on Below-the-Line Factors Influencing the Brand-equity Formation–With Water Purifier Company Outlook

ABSTRACT :

This research paper investigates the influence of below-the-line factors on brand-equity formation, specifically focusing on the outlook of a water purifier company. The study emphasizes the significance of brand awareness in recognizing and identifying a brand's product and its impact on brand loyalty among customers. The research explores the interconnectedness of brand awareness, customer loyalty, and perceived product quality in the Western Delhi region with respect to water purifiers. The findings suggest that there is a correlation between awareness and loyalty, as well as between loyalty and quality, as perceived by customers. To enhance brand management and marketing strategies, it is crucial for companies to enhance customer awareness of their brand's reputation, particularly for products with irregular purchasing behavior and low customer affiliation. The paper concludes by highlighting the importance of strengthening these aspects to increase brand value, loyalty, and market share in the competitive consumer goods industry.

### Paper 5:

A study on Consumer Attitude towards Households

durables with special reference to water purifier in

Coimbatore

ABSTRACT:

This research paper explores consumer attitudes towards household water purifiers in Coimbatore, with a focus on the factors influencing their preferences and the challenges faced. Clean, safe water is essential for daily life, and water purifiers play a vital role in ensuring its quality. The study reveals that electricity charges pose a significant concern for many users, while the quality of the water purifier brand heavily influences their choices. The paper reviews existing literature on consumer behavior related to water purifiers, highlighting factors like price, technology, health, and brand reputation. In today's dynamic consumer environment, understanding these preferences is crucial for marketers seeking to retain market share and offer solutions that provide clean and great-tasting water while addressing affordability and usability concerns.

# Nishkam Misra

### Paper 1:

A case study of comparative techno-economic and life cycle assessment of tap water versus household reverse osmosis-based drinking water systems in a North Indian city.

Abstract:

Home reverse osmosis (RO) based water purifiers have gained popularity in India due to concerns about tap water quality. However, the widespread adoption of these systems has significant implications for water prices and the environment. The objective of this study was to evaluate the techno-economic performance and life cycle of domestic RO-based water purifiers in the city of Srinagar, North India. Our results show that domestic ROs reduce the concentration of important dietary minerals such as fluoride and magnesium in drinking water by 50%. In addition, the average total cost of domestic RO water is three to four times higher than the cost of tap water. Two different scenarios were compared in the LCA. The first scenario was safe drinking water from a conventional drinking water treatment plant (scenario 1), while the second scenario was water from a household RO system and number 40;scenario 2 and number 41. The results showed that the environmental effects of abiotic depletion, water acidification , eutrophication, global warming and ozone depletion were greater in scenario 2 than in scenario 1. The results show that water companies should encourage citizens to use traditional tap water. a cheaper and environmentally friendly alternative to domestic ROs.

### Paper 2:

The challenge of improving the efficiency of drinking water treatment systems in rural areas facing changes in the raw water quality.

Abstract:

Safely managed drinking water for all is a UN Sustainable Development Goal. Achieving this goal is a challenge in rural areas. A strong partnership between users of the water treatment system was critical to the success of the community-wide technological change. This study evaluated the efficiency of a water treatment system after implementing technological change in a rural area. This study was conducted in an Ecuadorian community that had a treatment system consisting of gravel pre-filtration and slow filtration before the technological change. This system does not ensure adequate water quality due to a significant increase in raw water color and turbidity; in addition to the increased demand for water in recent years. A new traditional purification system was introduced, consisting of coagulation, flocculation, sedimentation, rapid filtration and disinfection. All the modernization works were carried out on the same infrastructure that until now served as gravel pre-filters. Before the modernization, samples of raw water and treated water were collected for six months. After the changes, samples were also collected from raw and treated water for an additional six months. The parameters analyzed were: turbidity, color, pH, total dissolved solids, residual chlorine, nitrates, sulfates, phosphates, chlorides, alkalinity, total hardness and iron. The values ​​of all analyzed parameters improved after the modernization, which indicates the success of the changes made in the treatment plant. As a result, traditional drinking water treatment in rural areas has become a robust process that can operate over a wide range of water quality and improve the quality and quantity of drinking water.

### Paper 3:

Household water treatment systems: A solution to the production of safe drinking water by the low-income communities of Southern Africa.

Abstract:

One of the United Nations Millennium Development Goals is to halve the number of people in the world without access to clean water by 2015. Due to the high number of deaths and illnesses caused by waterborne pathogens, various household water purification devices and safe storage techniques have been developed to clean and manage water on the household. New approaches, which are constantly being researched, must be sustainable, with lower total costs and more effective in removing pollutants. This study conducted a comprehensive literature review to regroup different types of home water treatment equipment suitable for low-cost home water treatment. As a result of the survey, four household cleaning devices were selected: biosand filter (BSF), bucket filter (BF), ceramic candle filter (CCF) and silver impregnated porous pot filter (SIPP). The first three filters were manufactured in the Tshwane University of Technology workshop using modified designs described in the literature. The SIPP filter is a product of the Tshwane University of Technology. The performance of the four filters was evaluated according to flow rate, removal of physicochemical contaminants (turbidity, fluorides, phosphates, chlorophyll a, magnesium, calcium and nitrates) and microbial contaminants (Escherichia coli, Vibrio cholerae, Salmonella typhimurium, Shigella dysenteria). . The flow rates obtained during the study period were within the recommended limits (171 L/h, 167 L/h, 6.4 L/h and 3.5 L/h for BSF, BF, CCF and SIPP). Results of preliminary laboratory and field studies using standard methods with reference and environmental water samples indicated that all filters reduced contaminant concentrations in test water sources. The chemical pollutant fluoride was most effectively removed by silica water (99.9%) and magnesium removal efficiency was the lowest (26-56%). BF was found to have better efficiency in removing chemical pollutants. The percentage of removal of pathogenic bacteria averaged 97-100%. Although the concentrations of most chemical parameters were within the recommended limits in raw surface water, the removal efficiency of all filters was poor, with the least reduction for fluorides (16-48%). Average turbidity removal from surface water was between 90 and 95% for all filters. The highest bacterial removal efficiency was recorded for SIPP (99–100%) and the lowest for BF (20–45%) and BSF (20–60%). Extensive experimental studies with different types of raw surface water continue to

determine the long-term performance of each filter, as well as filters that can be recommended to communities for domestic drinking water treatment.

### Paper 4:

Drinking Water Treatment Technology—Comparative Analysis

Abstract:

Water treatment technologies have evolved in recent centuries to protect public health from pathogens and chemicals. Since more than a billion people on Earth do not have access to pathogen-free drinking water, cost-effective technologies suitable for developing countries must be considered. Consideration should be given to the sustainable operation of these processing processes, taking into account locally available materials and ease of maintenance. In this chapter, we discuss natural filtering of communities of different sizes. Natural filtration includes slow sand filtration and riparian filtration. Slow sand filtration is suitable for small to medium-sized communities, while bank filtration may be suitable for small to very large communities depending on location and river conditions. Membrane filtration is another method that can be applied to individual households and moderately sized communities. Both pressure and gravity operated systems are considered. Small membrane systems have the most applications in developing regions of the world. Solar distillation is an inexpensive technology for sunny regions of the world. In particular, it is most often used in tropical and semi-tropical desert regions. It can use low-quality brackish water or groundwater to produce drinking water. These systems can only run on solar energy. The application applies to individual households in very small communities. Solar pasteurization, like solar distillation, relies on solar energy to purify small amounts of water for personal or family use. It is best suited to remote, sunny, high mountain regions such as the Andes, Central Africa or the High Himalayas where electricity is not available. Also, the use of firewood is not possible due to the desert landscape of many of these areas. In addition, case studies of natural (river and lakeshore) filtration, membrane filtration, solar distillation and solar pasteurization are presented.

### Paper 5:

Comparative study of disinfectants for use in low-cost gravity driven household water purifiers

Abstract:

Gravity-powered household water purifiers (POUs) have proven to be a simple, inexpensive and effective measure to reduce the incidence of waterborne diseases in developing countries. The aim of this study was to compare commonly used water disinfectants for their application in low-cost POU water purifiers. The effectiveness of each disinfectant candidate was evaluated using a batch disinfection study to estimate the disinfectant concentration required to inactivate a given concentration of Escherichia coli ATCC 11229. Based on the required concentration of the disinfectant, the size, weight and price of the disinfectant were estimated for a model cleaner using the relevant disinfectant. Model cleaners based on different disinfectants were compared and the disinfectants that resulted in the safest, most compact and cheapest cleaners were identified. Cleaners based on bromine, tincture of iodine, calcium hypochlorite and sodium dichloroisocyanurate have been found to be the most effective, cost effective and compact. Reserves cost between $3.60 and $6.00 per 3,000 liters of treated water, so are expected to be the most attractive value proposition. to end users.

This concludes the 40 research paper or team had gone through for the purpose of literature review