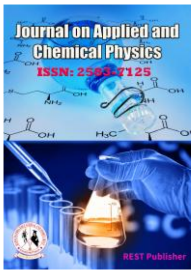
Journal on Applied and Chemical Physics

Vol: 2(3), September 2023
REST Publisher; ISSN: 2583-7125

Website: https://restpublisher.com/journals/jacp/

DOI: https://doi.org/10.46632/jacp/2/3/2



Analyzing of Water Quality Management using SPSS Method

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Abstract.*In order to maintain water quality, it is typically essential to authorise the release of hazardous compounds, for which surface water waste discharge must be monitored. To make sure that the water is safe to consume for people, animals, and other marine life, it is crucial to monitor water quality. It's crucial for ports to measure water quality in order to comprehend environmental effects and protect marine life. Non-point resource pollution, streams of pollution both direct and indirect, management of watersheds, erosion, and sediments, non-point sources of pollution, and integrated management of water resources,contamination of groundwater and waste water management. Depending on whether or not the water is suitable for drinking or swimming, water quality refers to the state of the water, including its chemical, physical, and biological characteristics. The quality of water can be assessed by taking groundwater samples to undergo lab analysis or by utilising probes that can continuously or intermittently record data. Information on water quality is used by the water sector to manage water resources. Understanding what is happening beneath, where and how quickly water is moving, which geochemical processes are taking place, and recognising distinct sources of water are all made easier by the quality of the water. The necessity to upgrade civilization's plumbing has an impact on water quality as well. One of the natural resources that is present in appropriate amounts is water. It is a crucial component of life on Earth. It is frequently used for drinking, cleaning, cooking, bathing, irrigation, and other residential and commercial purposes. For water utilities dealing with rising energy costs, a lack of water supplies, and strict regulatory requirements, water as well as energy resources are crucial.Early in the 1990s, the idea of an interwoven Water and Energy Quality Management Software (EWQMS) was established as a framework for operational optimization for simultaneously addressing issues with water quality, water supply, and energy management. In order to build an EWQMS, about twenty water utilities interfaced existing control systems with external or internal software optimization packages. Due to increased utilisation of cheaper tariff times and improved operating efficiencies, utilities with an installed EWQMS have reported operating cost savings of 8e15%, which has resulted in a decrease in energy consumption of 6e9%. This paper presents the current state of understanding on the usual structural features and operational tactics of EWQMS, and both advantages and disadvantages are considered. The analysis also identifies the gaping holes that should spur new research initiatives and outlines the difficulties faced during the installation and deployment of EWQMS. Ratio studies are statistical analyses of data from appraisals and property valuations. Nearly all states utilize them to produce quantitative measure of the proportion of current market price about which individually estimated taxable property is appraised as well as to offer assessment performance indicators. Energy and water quality management, system, Water utilities, Energy efficiency, Water quality and Demand forecasting. The Cronbach's Alpha Reliability result. The overall Cronbach's Alpha value for the model is .658 which indicates 66% reliability. From the literature review, the above 50% Cronbach's Alpha value model can be considered for analysis. Characteristics of sisal fiber the Cronbach's Alpha Reliability result. The overall Cronbach's Alpha value for the model is .658 which indicates 66% reliability. From the literature review, the above 50% Cronbach's Alpha value model can be considered for analysis.*

Keywords:*Energy and water quality management, system, Water utilities, Energy efficiency, Water quality and Demand forecasting.*

1. INTRODUCTION

Water quality management. Other uses for nanoparticles include nanoscale transporters, synthetic xylem vessels, nanolignocellulosic "compounds, clay nanotubes, photo catalysis, disinfectants, farm waste management, Nano barcode technology, even quantum dots. Latest research patterns, future directions, possibilities, and research needs for nanobiosensors are all well covered [1].Water Quality Control. Dam reservoir and barrages are two types of reservoirs. Characteristics of dam reservoirs and lakes are addressed, qualitative (absolute) and quant (relative) differences are noticed. On the river, many consequences of reservoir development are described. Sampling and mathematical modelling

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methodology concerns are covered. Reservoir ageing (short-term trophic upwelling) and sorption capacity as a significant element in long-term reservoirs ecosystem evolution are fundamental aspects of reservoir limnology. They also include the location of reserves along the river continuum. The management of reservoirs is thought to be significantly impacted by pulsation effects [2].Every person on Earth has a stake in the maintenance of water quality. Hence, neither domesticated nor wild animals are constituents of the water quality, which also depends on the water's capacity to maintain the systems of the organisms that utilise it for drinking and irrigation. aquatic organisms, typically. Together, the team created Water Quality Management in a record-breaking four months, taking into account the time needed for the inquiry. The book has five chapters, including: Introduction, Conceptual Grundlagen of Water Quality Management, Listing and Elimination of Water Bodies, Modeling to Support the TMDL Process, and Adaptive Activation for Impaired Water [3].In order to give water utilities a framework for an industrial automation management tool to concurrently achieve energy conservation and water quality goals, the integrated energy and water condition management system (EWQMS) idea was established in the early 1990s. A variety of energy cost reduction measures can be implemented using utility software tools, whether they are retrofitted or commercially available [4].strategies to control water quality and lessen non - point sources pollution in Texas. Via the 319(h) programme, BMPs have been in place in this watershed since 2000. These BMPs deal with (1) nutrient management, including waste application methods, nutrient management procedures, and forage harvest management; (2) quality stabilisation systems; (3) brush management and edging; and (4) key area planting and residue management. other methods, such terracing [5].Practices for managing water quality are now employed to guard against the effects of harsh weather. The ADWG and WHO guidelines, for example, play a significant role in providing sound, scientifically supported recommendations with the primary goal of preserving public health. Extreme weather events' recent effects on water quality have brought attention to the need for reforms both in developed and developing nations. Thus, it is advised that future modifications of potable water management rules give mitigation of 681 water quality consequences related to extreme weather occurrences special consideration [6].places for monitoring water quality. According to the initial system, monitoring sites were split into two categories according on how close they were to WWTPs. The sites in the other group were situated downstream from WWTPs, while the sites in the first group were situated upstream from WWTPs. A second system split monitoring locations based on how close they were to urban areas and point sources. Sites in the first group are those that are in or in close proximity to places with a substantial human impact, such as river basins in urban areas [7].managers of water quality. Rapid water quality assessments could be produced using comprehensive water quality climatic data records, resulting in novel and enhanced decision analytic techniques and enhanced temporal/spatial diagnostics. Open and productive communication is required " between scientists, policymakers, environmental managers, and stakeholders at the federal, state, and local levels " in order to effectively exploit the full application potential of these developing technologies. Sentiment concerning The effectiveness of detecting water quality using satellite-based remote sensing was evaluated utilizing the findings of an internal qualitative survey conducted by the US Environmental Protection Agency. Understanding why management choices typically do not rely on water quality products obtained from satellites was the goal of the survey [8].To outline the creation of an optimization method for controlling water quality within a farming systems and the scheduling of associated agricultural tasks. We'll look at how controlling water quality and quantity affects attaining regional economic development goals. In order to reach acceptable compromises, conflicts and interactions between different agricultural operations are methodically investigated. It is possible to reflect complicated system properties using the intermediate parametric water quality administration (IPWM) model, which is provided [9].It seems pertinent and natural to regulate water quality, which calls for reducing computing demands and developing a reliable, quick, and accurate approximation solution. In the current study, we first created a streamlined ANN-based watershed nutrient model to mimic how nutrient loads behave in the reservoir. To anticipate the quality of the water in the reservoir, the model is based on information on nutrient loads (with inflows from one main channel and two tributaries), daily average moisture in the region, and discharge [10].A number of management methods for water quality models have been created in the past to distribute a river system's assimilation capacity. The findings of the modelling assist in estimating the volume of garbage that can be released into the river from different point and non-point origins without breaching water quality criteria. These models' goal is to present technically and economically sound solutions that satisfy both the dischargers and the pollution control agency. Several academics have addressed water quality management issues as multi-objective optimization issues (e.g., Cohen 1978; Lukes et al. 1981; Lukes 1983; Burn and McBean 1985). The weighting approach and the constraint method are frequently used for solutions [11].The three nearby facilities must employ cutting-edge treatment techniques in order to meet the surface water target in the river's upstream sections before it combines the wastewater exiting the Guangzhou WWTP. The Guangzhou WWTP, which has a very large capacity and has a considerable impact on the river's health, must provide sophisticated treatment for the river's middle and lower portions. The Gwangju WWTP makes a significant financial contribution to the overall cost of regional treatment [12].Water Quality Control. According to Singh (1995), the majority of mechanical models must be developed at a level that is accessible to users who are not hydrologists and must be integrated into society, or at the very least have the potential to be integrated. Economics and Management, Volume 1 (Beck, 2005). Moreover, modellers or users among those models must address the issue of models' applicability in data-poor situations, particularly when numerous field characteristics necessary for the calibration of mechanical models are not measured. This study gives an illustration of a straightforward object-oriented modelling strategy for managing surface water quality. The current model's goal is to offer a useful modelling approach

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for surface water quality modelling for management objectives, particularly in settings with limited data [13].Principles of Water Quality Management. The adaptive capacity and exposure associated with economic how quickly water performance criteria recover from failure and, respectively, the level of danger of exceeding water quality standards, while the maintainability indicator describes how likely or frequently water quality goals can be achieved [14].Important BFT water quality indicators In aquaculture, maintaining water quality and monitoring are crucial procedures for the success of growing cycles. Regularly monitored parameters include Temperatures, chemical oxygen demand (DO), pH, salinity, total suspended particles (TSS), settling solids, alkalinity, and orthophosphate particularly in BFT. For the production cycle to be properly developed and maintained, it is essential to comprehend the water quality factors and how they interact in BFT. Safe limits for parameters like pH, DO, total ammonia nitrogen (TAN), solids, and alkalinity, for instance, can result in better health and prevent fatalities. The autotrophic community present in the system will be impacted by the N:P ratio, which is typically calculated using nitrate and pyrophosphate levels [15].Research on water quality management is required to preserve water quality. Water quality characteristics such as hydrogen (pH), chemical oxygen demand (COD), biochemical oxygen demand (BOD), dissolved oxygen (DO), water temperature (WT), free ammonia (AMM), and total Kjeldahl nitrogen influence the quality of the Yamuna River (TKN). " Statistical analysis, time series, autoregressive integrated moving average (ARIMA), standard R-squared, R-squared, root mean square error (RMSE), mean absolute percentage error (MAPE), absolute error (MAE)" and normalized are all used in this article [16].Because it directly depends on the preferences of the decision maker (DM), who may not have well defined preferences, challenges with water quality management demonstrate that traditional optimization decision making does not offer an adequate answer. This paper creates a multi-objective problem solving model of managing water quality in a river basin using a neural network technique to address the DM's preferences problem. A multiobjective programming model models the preferences of the DM using a feedforward networks backpropagation method, thereby assisting academics working on practical applications. Prior to going into the specifics of the multi - objective optimization problem optimization issue, it is suggested that neural networks be utilized to forecast the DM's preference structure [17].Distilled water was prepared daily and put to reservoir containers for water supply systems. At the conclusion of each workday, we emptied the leftover water bottles, flushed the lines to eliminate any remaining water, and refilled the bottles with fresh distilled water before the start of the subsequent clinic session. Disposable filters (ClearLine Ultrafiltration membrane Cartridges, Cytec Dental) were inserted into connectors that were fitted onto designated waterlines (ClearLine Connector C-102, Cytec Dental). In accordance with the manufacturer's recommendations, we changed these filters every day [18].programmer for trading water quality that are expansions of current regulatory procedures. Arguments in favor of the more method as a means of achieving water quality goals are briefly discussed. The article finishes with a thorough examination of useful suggestions for how such competitive policies can be put into practice while still adhering to the current restrictions of the Clean Water Act. The recommendations in some cases correspond to policies and initiatives that both national and state authorities are currently putting into place [19].In 1998, there was a 10% accumulating of TRP on inputs. According to the budget, the significance of water losses varies and is based on the amount of DRP present in the SLM. Also, a comparison between this P budget and the 1995 SLM N budget was conceivable. The contrast clarified why TRP is characterized by a net increase during the initial couple of years, accompanied by a much lesser increase in succeeding years, but nitrate in confined microbiota is characterized by significant, continuous accumulation. This P budget was regarded as an efficient water quality control strategy because to its low CV [20].

2. MATERIAL AND METHOD

Energy and water quality management:SCADA systems that include energy management programmes. identifies the advantages of an energy management system with water quality control. Future-based benefits are the foundation for a number of energy management options, including deregulation of power use. EPRI CEC is a research partner. Printed in 1997. Managing a sustainable water system now and in the future depends heavily on energy management. There are several economic, environmental, and social advantages to lowering energy use and water expenses, including the following: • Energy cost savings may be applied to other improvements.

System: A system is made up of numerous components that all work together to accomplish a specific goal. Many different components make up a computer system, including input devices, a processing unit, and output devices. A system is a collection of parts or subsystems that cooperate to accomplish a single objective. A disc subsystem, for instance, is a component or element of a software system.

Water utilities: An organization that provides water to the general public for household or drinking purposes is known as a water utility. It might be a governmental body, a municipal nor private corporation, association, partnership, or a person. Telecommunications, electric companies, natural gas, some transportation, and water and waste water treatment services offered by private businesses are all examples of utility services. Water is first and foremost our most valuable living resource because we all utilise it for drinking, washing, cleaning, preparing food, and growing it. Use can be divided into four categories: form usage, location usage, time usage, and possession usage. These programmes have an

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impact on a person's decision to buy something. All of these applications, though, have the potential to make a big difference.

Energy efficiency: Energy efficiency is the ability to produce greater quantities using the identical amount of energy input, use less energy overall, and minimise energy waste. One of the strategic goals of the EU across all economic sectors is to reduce energy use and waste across the energy system, from production to ultimate consumption. Lighting that uses less energy, household equipment, smart appliances, and smart home hubs including Constellation Connected are just a few examples of energy-efficient technology. Reducing the quantity of energy required to deliver goods and services is the process of efficient energy use, often known as energy efficiency. For instance, insulating a building enables it to achieve and sustain thermal comfort while using less energy for heating and cooling.

Water quality: Depending on whether or not the water is suitable for drinking or swimming, the condition of the water, comprising its chemical, morphological, and biological makeup, is referred to as its quality characteristics. A few of the characteristics that are routinely measured or checked for water quality are temperatures, co2 concentration, pH, conductivity, ORP, and turbidity. However, laboratory tests include BOD, titration, or TOC, total plankton, ISEs (ammonia, nitrogen, and chloride), or included in water monitoring.

Demand forecasting: Using prognostic analysis of historical data, demand forecasting is a strategy for evaluating and predicting consumer demand for a commodity or service. Demand forecasting helps the business make more informed supply decisions by estimating total revenues and sales for the upcoming period. This concept is described by the term "demand forecasting". Let's say, for illustration purposes, that we sold 200, 250, number 300 volumes of the Product in March, February, and March, respectively. Assume there's going to be desire for about 250 units. X in April, presuming the same market conditions.Using past sales data, demand forecasting makes predictions about upcoming sales data. It aids in effectively addressing consumer requests and making the best company decisions. It aids the company's analysis of demand projections, inventory levels, stock levels in SKUs, overall sales, and revenue for the next period.

Method: SPSS Statistics is a statistical control Advanced Analytics, Multivariate Analytics, Business enterprise Intelligence and IBM a statistic created by a software program is a package crook research. A set of generated statistics is Crook Research is for a long time SPSS Inc. Produced by, it was acquired by IBM in 2009. Current versions (after 2015) icon Named: IBM SPSS Statistics. The name of the software program is to start with social Became the Statistical Package for Science (SPSS) [3] Reflects the real marketplace, then information SPSS is converted into product and service solutions Widely used for statistical evaluation within the social sciences is an application used. pasted into a syntax statement. Programs are interactive Directed or unsupervised production Through the workflow facility. SPSS Statistics is an internal log Organization, types of information, information processing and on applicable documents imposes regulations, these jointly programming make it easier. SPSS datasets are two-dimensional Have a tabular structure, in which Queues usually form Events (with individuals or families) and Columns (age, gender or family income with) to form measurements. of records Only categories are described: Miscellaneous and Text content (or "string"). All statistics Processing is also sequential through the statement (dataset) going on Files are one-to-one and one-to-one Many can be matched, although many are not in addition to those case-variables form and by processing, there may be a separate matrix session, there you have matrix and linear algebra on matrices using functions Information may be processed.

3. RESULT AND DISCUSSION

TABLE 1. Descriptive Statistics

	N	Range	Minimum	Maximum	Mean	Std. Deviation
Energy and water quality management	25	4	1	5	2.88	1.236
system	25	4	1	5	3.08	1.525
Water utilities	25	4	1	5	2.72	1.458
Energy efficiency	25	4	1	5	3.00	1.528
Water quality	25	4	1	5	3.04	1.428
Demand forecasting	25	4	1	5	2.84	1.491
Valid N (listwise)	25					

Table 1 shows the descriptive statistics values for analysis N, range, minimum, maximum, mean, standard deviationEnergy and water quality management, system, Water utilities, Energy efficiency, Water quality and Demand forecasting this also using.

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TABLE 2. Frequencies Statistics

		Energy and water quality management	system	Water utilities	Energy efficiency	Water quality	Demand forecasting
N	Valid	25	25	25	25	25	25
	Missing	0	0	0	0	0	0
Mean		2.88	3.08	2.72	3.00	3.04	2.84
Median		3.00	3.00	3.00	3.00	3.00	3.00
Mode		3	5	1	5	3	1[a]
Std. Deviation		1.236	1.525	1.458	1.528	1.428	1.491
Sum		72	77	68	75	76	71
Percentiles	25	2.00	2.00	1.00	2.00	2.00	1.00
	50	3.00	3.00	3.00	3.00	3.00	3.00
	75	3.50	5.00	4.00	5.00	5.00	4.00
a. Multiple modes exist. The smallest value is shown							

Table 2 Show the Frequency Statistics inWater Quality Management Energy and water quality management, system, Water utilities, Energy efficiency, Water quality and Demand forecasting curve values are given.

TABLE 3. Reliability Statistics

Cronbach's Alpha Based on Standardized Items	N of Items
.861	6

Table 3 shows the Cronbach's Alpha Reliability result. The overall Cronbach's Alpha value for the model is . 865 which indicates 86% reliability. From the literature review, the above 50% Cronbach's Alpha value model can be considered for analysis.

TABLE 4. Reliability Statistic individual

	Cronbach's Alpha if Item Deleted
Energy and water quality management	.881
system	.840
Water utilities	.817
Energy efficiency	.822
Water quality	.831
Demand forecasting	.851

Table 4 Shows the Reliability Statistic individual parameter Cronbach's Alpha Reliability results. The Cronbach's Alpha value for Energy and water quality management - .881, system- .840, Water utilities-.817, Energy efficiency- .822, Water quality- .831, Demand forecasting-.851This indicates all the parameter can be considered for analysis.

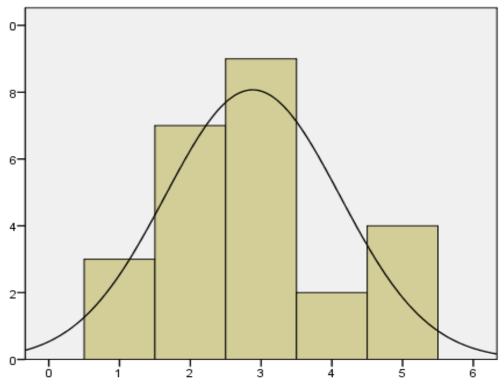

FIGURE 1. Energy and water quality management

Figure 1 shows the histogram plot for Energy and water quality management from the figure it is clearly seen that the data are slightly Right skewed due to more respondent chosen 3 for Energy and water quality management except the 2 value all other values are under the normal curve shows model is significantly following normal distribution.

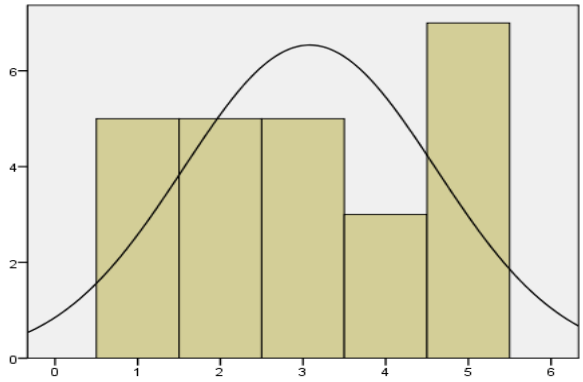

FIGURE 2. System

Figure 2 shows the histogram plot for systemfrom the figure it is clearly seen that the data are slightly Right skewed due to more respondent chosen 5 for systemexcept the 2 value all other values are under the normal curve shows model is significantly following normal distribution.

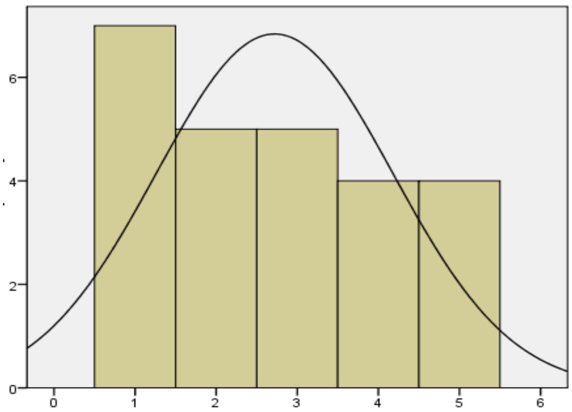

FIGURE 3. Water utilities

Figure 3 shows the histogram plot for Water utilitiesfrom the figure it is clearly seen that the data are slightly Left skewed due to more respondent chosen 1 for Water utilitiesexcept the 3 value all other values are under the normal curve shows model is significantly following normal distribution.

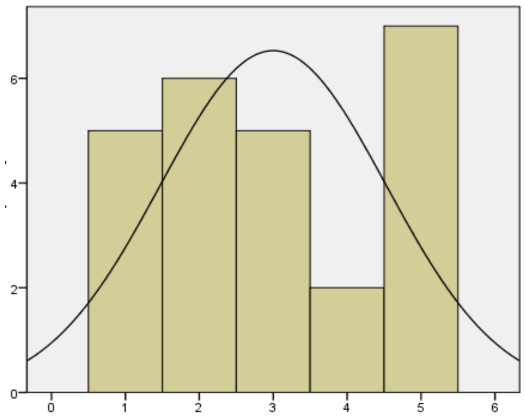

FIGURE 4. Energy efficiency

Figure 4 shows the histogram plot for Energy efficiency from the figure it is clearly seen that the data are slightly Right skewed due to more respondent chosen 5 for Energy efficiency except the 4 value all other values are under the normal curve shows model is significantly following normal distribution.

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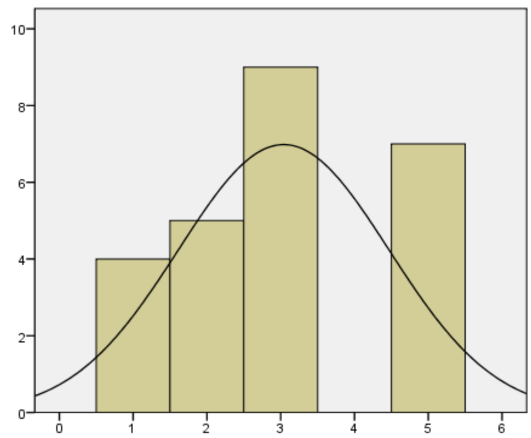

FIGURE 5. Water quality

Figure 5 shows the histogram plot for Water quality from the figure it is clearly seen that the data are slightly Right skewed due to more respondent chosen 3 for Water quality except the 3 value all other values are under the normal curve shows model is significantly following normal distribution.

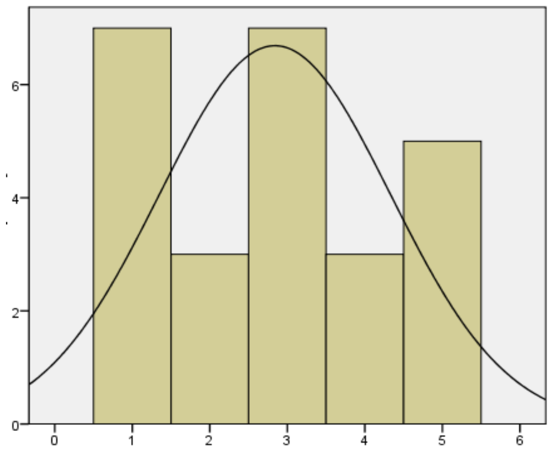

FIGURE 6. Demand forecasting

Figure 6 shows the histogram plot for Demand forecastingfrom the figure it is clearly seen that the data are slightly Right skewed due to more respondent chosen 1,3 for Demand forecastingexcept the 2 value all other values are under the normal curve shows model is significantly following normal distribution.

TABLE 5. Correlations

	Energy and water quality management	**System**	**Water utilities**	**Energy efficiency**	**Water quality**	**Demand forecasting**
Energy and water quality management	1	.271	.351	.353	.263	.419*
system	.271	1	.629**	.662**	.553**	.464*
Water utilities	.351	.629**	1	.729**	.726**	.553**
Energy efficiency	.353	.662**	.729**	1	.688**	.457*
Water quality	.263	.553**	.726**	.688**	1	.512**
Demand forecasting	.419*	.464*	.553**	.457*	.512**	1

Table 5 shows the correlation between motivation parameters for Energy and water quality management for Demand forecastingis having highest correlation with systemand having lowest correlation. Next correlation between motivation parameters for systemfor Energy efficiency is having highest correlation with Energy and water quality management and having lowest correlation.Next correlation between motivation parameters for Water utilitiesfor Energy efficiency is having highest correlation with Energy and water quality management and having lowest correlation. Next correlation between motivation parameters for Energy efficiency use for Water utilitiesis having highest correlation with Energy and water quality management and having lowest correlation. Next correlation between motivation parameters for Water qualityfor Water utilitiesis having highest correlation with Energy and water quality management and having lowest correlation. Next correlation between motivation parameters for Demand forecasting for Water utilitiesis having highest correlation with Energy and water quality management and having lowest correlation.

4. CONCLUSION

In order to maintain water quality, it is typically essential to authorize the release of hazardous compounds, for which surface water waste discharge must be monitored. To make sure that the water is safe to consume for people, animals, and other marine life, it is crucial to monitor water quality. It's crucial for ports to measure water quality in order to comprehend environmental effects and protect marine life. Non-point resource pollution, streams of pollution both direct and indirect, management of watersheds, erosion, and sediments, non-point sources of pollution, and integrated management of water resources, contamination of groundwater and waste water management. Understanding what is happening beneath, where and how quickly water is moving, which geochemical processes are taking place, and recognizing distinct sources of water are all made easier by the quality of the water. The necessity to upgrade civilization's plumbing has an impact on water quality as well. One of the natural resources that is present in appropriate amounts is water. It is a crucial component of life on Earth. It is frequently used for drinking, cleaning, cooking, bathing, irrigation, and other residential and commercial purposes. For water utilities dealing with rising energy costs, a lack of water supplies, and strict regulatory requirements, water as well as energy resources are crucial. Water quality management. Other uses for nanoparticles include nanoscale transporters, synthetic xylem vessels, nanolignocellulosic "compounds, clay nanotubes, photo catalysis, disinfectants, farm waste management, Nano barcode technology, even quantum dots. Latest research patterns, future directions, possibilities, and research needs for Nano bio sensors are all well covered. Water Quality Control. Dam reservoir and barrages are two types of reservoirs. SCADA systems that include energy management programmers. identifies the advantages of an energy management system with water quality control. Future-based benefits are the foundation for a number of energy management options, including deregulation of power use. EPRI CEC is a research partner. Printed in 1997. Managing a sustainable water system now and in the future depends heavily on energy management. An organization that provides water to the general public for household or drinking purposes is known as a water utility. It might be a governmental body, a municipal nor private corporation, association, partnership, or a person. Telecommunications, electric companies, natural gas, some transportation, and water and waste water treatment services offered by private businesses are all examples of utility services. Energy efficiency is the ability to produce greater quantities using the identical amount of energy input, use less energy overall, and minimize energy waste. One of the strategic goals of the EU across all economic sectors is to reduce energy use and waste across the energy system, from production to ultimate consumption. Ratio studies are statistical analyses of data from appraisals and property valuations. Nearly all states utilize them to produce quantitative measure of the proportion of current market price about which individually estimated taxable property is appraised as well as to offer assessment performance indicators. Energy and water quality management, system, Water utilities, Energy efficiency, Water quality and Demand forecasting.The overall Cronbach's Alpha value for the model is .658 which indicates 66% reliability. From the literature review, the above 50% Cronbach's Alpha value model can be considered for analysis.

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