

## **Analysis of Corporate Strategic Marketing Functions for Sustainable Water Resources Management: A Case of Water Resources Commission, Ghana**

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**ABSTRACT:** *Water resource management has been a bane to most nations globally, and Ghana is no exception. However, the case of Ghana is exacerbated to the extent that the few rivers in the nation which supply raw water to users for treatment and then serve homes and offices are seriously being threatened through pollution, and subsequently, destruction. Most rivers in Ghana are not pleasant to the eye, due to the turbid nature of the resource. ‘Galamseyers’, fishing folks and sand winners have been destroying the water resource of Ghana; their activities should be curtailed immediately to protect the commodity. As the saying goes, water is life and once it is destroyed the implications are disastrous, as diseases and death of the populace are the outcome. The Water Resources Commission (WRC) is well positioned by the government of Ghana, according to the Act 522, to make sure the resource is not destroyed, but protected for use by all. Every support needed to fight the destruction currently going on in the river bodies should be mobilized to nib in the bud the activities of the ‘galamseyers’, to protect the resource for future generations. Globally, the environment has been affected through human destructive activities and the climate change being observed currently globally, is a testimony for all to see. COP26, the UN Climate Change Conference held at Glasgow, 2021, issued a final declaration to keep alive the ambition of curtailing global temperature increases to not go beyond 1.5°C by 2100. Governments should therefore, do well to help protect the environment, including rivers and make life comfortable for all.*

**KEY WORDS:** Water resource, management, rivers, environment, human life, ‘galamsey’, pollution and sustainability.

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### **INTRODUCTION**

Globally, water resources management has been a nuisance to nations and Ghana is no exception. The United Nations has therefore, instituted 22 March every year since 1993, as an annual ‘UN Observance’ focusing on the importance of freshwater; during this day the

awareness is raised of tackling water crisis and the 2.2 billion people living without access to safe water (UNWater.org, 2023).

Furthermore, USGS.gov (2019) reported that approximately 97.5 per cent of water on earth is salty with most of this in the oceans, and of the 2.5 per cent of freshwater, about 70 per cent is frozen in polar iceberg; less than 1 per cent (about 0.007%) of the world's freshwater is readily accessible for direct human use. Consequently, it is estimated that 3.4 million people, mostly children, die annually from water-related diseases (Biko & Mwaniki, 2020). The Water Resources Commission (WRC), Ghana, was established in 1996 by Act 522 of the Parliament of Republic of Ghana to manage the water resource of the nation, after assenting by the Government of Ghana; the Act 522 stipulates that ownership and control of all water resources are vested in the President on behalf of the people (WRC, 2023). Business was started by the WRC in 1999, after a presentation of a report by a study group in 1998 on the ways of facilitating the WRC's responsibility of regulating and managing Ghana's water resources on a sustainable basis (WRC, 2023).

There are four (4) main departments which operate at the WRC and the set-up is headed by the executive secretary. The departments are:

- i. Planning – consisting of surface and ground water divisions;
- ii. Finance & Administration;
- iii. Policy & Regulation/Management – consisting of legal and inspectorate divisions, and
- iv. Information Management – made up of information technology and the library.

The heads of these four (4) divisions report to the executive secretary (WRC, 2023).

The mission of the Water Resources Commission (WRC), Ghana, is to 'Regulate and manage the sustainable utilization of water resources of Ghana and to co-ordinate related policies for socio-economic development of the nation'. The WRC operates with the vision 'Sustainable water management by all for all' and a goal to specifically 'Regulate and manage the utilization of water resources, and co-ordinate relevant policies in relation to them' (WRC, 2023).

The WRC has completed a series of pilot-phases, which constituted its initial pilot life cycle, with the setting up of basin-offices to regulate and manage the water resource in the basins of Ghana. A basin is an area of land where rainfall collects and drains off into a common outlet, such as into a river, stream or other body of water. The WRC currently has six (6) Basin offices named Black Volta, Densu, Pra, Ankobra, White Volta and Tano (WRC, 2023; Hornby, 2020). The six (6) Basin offices have staff who regulate water resource activities within the basins. See appendices 1 and 2 for the organization-chart and functions of the WRC (as spelt out in the Act 522 of 1996), respectively.

### **Background and Statement of Problem**

The idea of Ghana having a water resource organization was conceived by the Government of Ghana in the last decade of the 20<sup>th</sup> century to enable the nation to solve its numerous water resource problems (WRC, 2023), including effective marketing of the resource (raw water) to the users, example, Ghana Water Company Limited (GWCL) and Irrigation Development Authority (IDA) to serve the citizenry. The Act 522 that was passed by the Parliament of the

Republic of Ghana contained operational instructions which would enable the WRC to handle/solve any problems (including contamination of the water bodies), that would hinder the supply of clean raw water to users to serve the citizenry. The Act 522 therefore, contains sections, such as:

- i. monitor and evaluate programmes for the operation and maintenance of water resources;
- ii. advise the Government on any matter likely to have an adverse effect on the water resources of Ghana; and
- iii. advise pollution control agencies in Ghana on matters concerning the management and control of pollution of water resources (WRC, 2023).

However, the country has been saddled with numerous problems confronting the maintenance and management of the water resource. The resource is polluted to the extent that marketing the product becomes very difficult; this has led the organization in charge of delivering treated surface water (product) for the citizenry, GWCL, to come out several times to offer strong warning (to the people and government of Ghana) that it may not be possible to furnish homes with clean water in the nearest future. The warning from the GWCL was emphasized/confirmed by a director of the Water Resources Commission in a discussion with City News Room (CNR) anchor (Welsing, 2022).

This is a sad situation and Ghanaians should be concerned about how to stop the pollution of the water resource. Otherwise, life in Ghana would be in danger, as the raw water from the river bodies is being contaminated by ‘galamseyers’. Galamsey (‘gather them and sell’, in the local parlance) is going on unabated in most of the river bodies and the populace/citizenry looks on with trepidation (Bimpeh, 2017). See appendix 3 for the level of destruction of a stream in Ghana.

### **Objectives of the Study**

The main thrust of this study is therefore, to prevent the destruction of the Ghanaian water resource by ‘galamseyers’ and then protect the resource from further damage so that marketing of the raw resource by the Water Resources Commission would be effective to the water users, including Ghana Water Company Limited (GWCL); the GWCL serves treated water to the citizenry for use in homes, offices, etc. The objectives of the study are therefore to:

- i. determine the cause(s) of destruction of the resource,
- ii. suggest ways of revitalizing the resource for allocating clean raw water to water users to serve the populace, and
- iii. effective marketing strategies by the WRC to register all water users.

### **Research Questions**

The research questions that would help collect good data from respondents to achieve the objectives are:

- i. What is the cause(s) of destruction of the resource?
- ii. How to revitalize the raw water resource for allocating clean and acceptable water to water users to serve the populace?

iii. What are the effective strategies to be adopted by the WRC to effectively reach out and enroll all/most raw water users?

### **Significance of the Study**

Water is life and Ghana is endowed with many rivers, but the attitude of some of the citizenry has rendered most of the resource contaminated; especially by the ‘galamseyers’ and the mining companies. This has affected the marketing of the raw resource by the Water Resources Commission to the water users.

According to WRC (2023), the nation is well endowed with water resources, but the amount of water available changes markedly from season to season as well as from year to year. Again, the distribution of water within the nation is not uniform, as the south-western part is better watered than the coastal and northern regions. Nevertheless, availability of water is decreasing owing to rainfall variability (climate change), rapid population growth, increased environmental degradation, pollution of rivers and draining of wetlands (WRC, 2023). Ministry of Works and Housing-MWH cited in Kwadade-Cudjoe (2016) reported that the nation is fairly endowed with water resource, but the present availability of 3000m<sup>3</sup> per capita per annum is decreasing due to rapid population growth. Moreover, the cost of exploiting new water supplies is rising sharply, particularly the cost associated with abstraction and transferring water from rivers and lakes to distant places.

Moreover, USGS.gov (2019) reported that approximately 97.5 per cent of water on earth is salty with most of this in the oceans, and of the 2.5 per cent of freshwater, about 70 per cent is frozen in polar iceberg; less than 1 per cent (about 0.007%) of the world’s freshwater is readily accessible for direct human use. No wonder about 3.4 million people, mostly children, die annually from water-related diseases (Biko & Mwaniki, 2020). In addition, the UNWater.org (2023) reported that there has been water crisis leading to 2.2 billion people living without access to safe water

Furthermore, for Ghana to attain the MDG 6, especially the universal and equitable access to safe and affordable drinking water for all and improving water quality by reducing pollution and minimizing release of hazardous chemicals and materials are worrisome to the author, as these are to be achieved by 2030 (UN, 2018). The nation, certainly, is in a precarious situation and all Ghanaians should arise and fight against the destruction of our scarce water resource by ‘galamseyers’, sand winners and fishermen.

The above facts have heightened the fear, trepidation and consternation of the author and moved him to research into how this diminishing water resource which is, moreover, being subjected to pollution, would be protected and the damage stopped. It is only at this stage that the WRC would have clean raw water and subsequently, be able to enroll more users for the allocation/supply of the resource for sustainable marketing and management of the resource.

### **Scope of the study**

The research entailed analyzing corporate strategic marketing functions for sustainable water resources management. The Water Resources Commission, Ghana, was used for case study, where currently the water resource they market to users is polluted mostly by ‘galamseyers’.

This has been giving a lot of problems to the entities the WRC markets its product to, as the users always complain about the contamination/pollution of the resource from the WRC (Welsing, 2022). In Ghana, the organization responsible for managing water resource is the Water Resources Commission, as enshrined in the Act 522 of the Republic of Ghana and assented by the President of the nation (WRC, 2023). The data collection was, consequently, restricted to respondents from the Water Resources Commission. Optimistically, the conclusions from the findings were generalized to reflect corporate strategic marketing functions for sustainable water resources management, globally.

## LITERATURE REVIEW

The review has been structured to highlight the activities that should take place within the marketing environment of an organization to enhance the achievement of marketing goals and the structure of environmental conditions that would contribute to effective and efficient marketing of organizational products for competitive position of the enterprise.

According to Hornby (2020), marketing is the activity of promoting, advertising, selling and delivery of an organization's products to consumers/customers in the best possible way. The American Marketing Association (2023) also explained marketing as the activity, set of institutions and processes for creating, communicating, delivering and exchanging offerings that have value for customers/consumers, clients and the society at large. The above definitions take care of the marketing tools/mix (5Ps), namely; 'Product, Price, Promotion, Place and People', which are vital for any marketing system to be successful (Kenton, 2023a). These and the other two (2) Marketing Ps are therefore, explained below.

### Marketing Tools/Mix

These would be explained and analyzed to help understand the marketing practices employed by entities for achieving their goals. Marketing mix refers to the combination of communication elements or marketing activities that are used to satisfy customer expectations and position selling of products/services clearly in the mind of the consumer/customer (Kenton, 2023; Oxford College of Marketing, 2020). When a company decides which marketing mix/elements it will use, that particular elements (or marketing mix) become its marketing promotional strategy. The elements are explained below:

**a. Product** - This represents an item/service designed by the organization to satisfy customer needs and wants. It is therefore, the physical item/service that the entity is marketing/selling. The intrinsic characteristics of the product are important, but customers' perceptions of the product, called the brand of the product, can be as important as the actual characteristics of the item/service (Kenton, 2023a).

**b. Price** - This is the amount the customer is willing to pay for the product/service to be obtained. Marketing experts argue that businesses should think of price in a broader sense, to include the total of all financial costs that the customer pays (including transaction costs) to obtain the product. The total cost of the products when subtracted from the benefits derived by the customer yields an estimate of the customer value obtained in the transaction, represented by: **Customer Value = Benefits – Total Cost**. Marketing professionals need to consider costs related to research & development, manufacturing, marketing and distribution



as cost-based pricing; and pricing based solely on consumers' perceived quality/value also known as value-based pricing (Kenton, 2023a).

**c. Place** – This is also known as distribution, and there is the need for the business to have its products/services spread over many different locations to easily reach out to consumers. It is important to consider the products being sold; basic consumer products, example, paper goods are easily available in many stores and premium products, example, watches and pharmaceutical drugs, characteristically, are available in selected stores (Kenton, 2023a).

**d. Promotion** - This includes any means of spreading attractive words about the product and it is an advantageous for the business when the internet is used, as the possibilities abound for communicating with previous, existing and even potential customers. It can be done through emailing such consumers, or even the brand of the products/services being attractive to engage the attention of these consumers and promoting the products/services of the organization. Joint marketing campaigns might include advertising, sales promotion, personal selling and public relations with a considerable budget and crafted messages incorporating details of the other Ps when reaching out to the target audience (Kenton, 2023a). Furthermore, Oxford College of Marketing (2020) mentioned that communicating messages should be beautifully crafted by the vendor during the selling journey to generate awareness, interest, desire and action from the consumers. In addition, there should be awareness for reaching out to new audiences and personal selling with a sales team for building relationships with customers, stakeholders like shareholders, and the wider public for the organization's reputation.

**e. People** - This element of the marketing-mix deals with the skills and expertise of the business needed for effective marketing of its products and services. As an organization, it is important to acquire the right skills and expertise to properly manage the business environment and enable better sales for the enterprise. Moreover, Oxford College of Marketing (2020) complemented that the employees fronting the business should interact with customers by taking and processing their enquiries, orders and complaints physically, and as the face of the business they should be knowledgeable to sell the business products effectively. Furthermore, the employees should also be empowered, motivated and with good attitude to differentiate an offering in a crowded market in order to build valuable relationships with consumers/customers.

The additional two (2) marketing Ps, Processes and Physical evidence are more of service in nature and are explained below.

### **Additional two (2) Marketing Ps**

**f. Processes** – Organizations need to survive and achieve the production of products and services for a smooth, efficient and consumer-friendly voyage, and this can only be achieved through the adoption of right processes in the working environment (Oxford College of Marketing, 2020). The efficient customer-friendly voyage might start from when an online enquiry to request for an information to make a purchase by a consumer is well received. This would ensure the consumer/customer has a positive experience and would come back. Using a technology can help the organization to develop an effective processing system, which should be well-oiled, to work efficiently to entice the customer to always come back to purchase; this creates a good customer experience (Oxford College of Marketing, 2020).

g. **Physical evidence** – Quality of customer experience that an organization has, can provide convincing evidence that the organization is ready to offer and deliver products/services as demanded; this is very useful when a consumer is visiting the company for the first time (Oxford College of Marketing, 2020). With the advent of globalization and the internet championing this crusade, an organization with a well-developed and user-friendly website, where a consumer can easily surf the site for his/her needs is very advantageous to the organization.

### **Strategic marketing management and plan**

Strategic marketing management as described by Aquino (2017) is the implementation of an organization's marketing mission through focused processes to get the most out of existing marketing plan and to identify target customers/consumers. Strategic marketing management would also help the discovery of other marketing opportunities for the organization to transform plans into reality. Concerning marketing plan, McGuire (2020) described it as a report that outlines the marketing strategy of an organization for the coming year, quarter or month. McGuire (2020) surmised that a typical business marketing plan would include:

- overview of the marketing and advertising goals,
- description of the current marketing position,
- timeline of when tasks within the strategy will be completed,
- key performance indicators (KPIs) to be tracked, and
- description of the target market and customer needs.

### **Strategic marketing practices for effective management**

The strategic marketing practices needed to be deployed by organizations to enable them achieve effective management and in turn rope in appreciable revenues would be discussed under the following areas:

- a. value delivery service/process,
- b. marketing practices (including the marketing mix), and
- c. pricing (indicating details of pricing).

**a. Value Delivery Process** - Kotler (2020) mentioned that the task of any business is to deliver customer value at a profit. The two (2) views of the value delivery process are:

- traditional physical process, and
- value creation and delivery.

The start of most businesses may be associated with the traditional work processes, where the organization might not have associated much value addition to its products. However, as competition becomes keener and consumers face abundant choices, there would be the need to re-look the organizational products/services being sold and more value-addition provided to product development and with enhanced sales promotion to enable better competition with competitors (Kotler, 2020). See appendices 4 and 5 for the diagrams of the traditional and value creation processes of products of an organization.

**b. Marketing practices** - Fontanella (2020) promoted the idea that marketing practices of an organization should present relevant background information on items, such as, product, price, promotion, place, people - (5Ps), market, sales, costs, profits, competitors, suppliers and the forces in the external environment, such as political, economic, socio-cultural, technological, ethical/environment and legal. Highlighting and describing these items very well in the strategic marketing functions of the organization is very important to enable favourably competition with competitors. The marketing mix has already been described under the marketing tools above. However, pricing is further described to illustrate into details the composition of valuing of organizational products and services.

**c. Pricing** - Price is what is paid for the exchange of a product/service. To a buyer, it is the value placed on what is exchanged, usually purchasing power is exchanged for satisfaction. Again, it is the amount the customer pays for the product/service to be obtained (Kenton, 2023a).-Fontanella (2020), argued that organizations should think of price in a broader sense, to include the total of all financial costs that the customer pays (including transaction costs) to obtain the product. The total cost of the products when subtracted from the perceived benefits derived by the customer yields an estimate of the customer value obtained in the transaction. It is expressed mathematically as:

**Customer Value = Perceived Benefits – Total Cost.**

Fontanella (2020) added that the equation involves both tangible and intangible elements and may not look like a typical mathematics equation.

Furthermore, Surbhi (2017) hinted that ‘price’ is important, because it is the only revenue-generating element of the marketing mix; the others consume resources. There are therefore, two (2) basic strategic pricing alternatives, as mentioned by Maximilian (2015; Surbhi, 2017):

- i. skimming, and
- ii. penetration.

**i. Skimming** - a price-skimming strategy sets prices high at the introduction stage of the business and then lowers prices at the latter stages. This approach enables the product to rope in maximum revenues layer by layer from segments willing to pay the high price. Two (2) requirements vital for the success of a price-skimming strategy are that there should be:

- few close substitutes for the product, and
- a sufficient number of people willing to pay a premium price for the product (Maximilian, 2015; Surbhi, 2017)).

**iii. Penetration** - Price-penetration strategy sets prices low at the outset of the product life cycle and uses the approach as a thrust to enter the market, and then raises prices at the latter stages; it is the opposite of price-skimming. Through this approach a large number of buyers and market share are won, but at the expense of profitability. This pricing strategy can be successful when:



- all segments of the market are sensitive to price, even at the early stages of the product life cycle,
- production, distribution and promotion costs decrease rapidly per unit as output increases, and
- competitors are likely to enter the market quickly (Maximilian, 2015; Surbhi, 2017).

### **Strategic marketing management – identification of threats and opportunities**

Aquino (2017) declared that strategic marketing management is about selecting markets to target and developing marketing strategies to reach, serve and satisfy these markets. The forces in the macro and micro-environments would be interspersed with the strategic marketing management, and then the auditing of the organizational activities, especially in the areas of marketing environment, marketing systems and marketing functions. This would help to analyze the problems and opportunities within the organization (Aquino 2017). See appendices 6 and 7 for the diagrams of strategic planning process view and factors influencing an organization's marketing strategy through the external environment.

According to Peterdy (2022), due to the rapidly changing global condition, an organization has to monitor the interactions of the six (6) major external/macro-environment forces. One popular conceptual framework illustrated by Peterdy (2022) for assessing the macro environment of the organization is 'PESTEL', an acronym that enables the business to be explored externally. Peterdy (2022) explained 'PESTEL' as a strategic framework commonly used by the organization to evaluate its external environment in which the firm operates. He also intimated that initially it was referred as 'PEST' analysis, without the 'EL'.

Similarly, Kenton (2022) also mentioned about 'PEST' and defined it as a management tool which an organization uses to assess the major external influences of its operation in order to become more competitive in the market.

Peterdy (2022) stated that the acronym 'PESTEL' stands for:

- a. Political,
- b. Economic,
- c. Socio-Cultural,
- d. Technology,
- e. Environmental/Ethical, and
- f. Legal.

Peterdy (2022) and Kenton (2022), therefore, explained the acronym 'PEST' as follows:

**a. Political** – the factors driven by government actions and policies, changes in legislation, the political structures within the environment the organization operates; example, property-owned democracy, corporate taxation, employment laws, antitrust and anti-competition issues and social democracy;

**b. Economic** – the financial activities and indexes pertaining to the environment under consideration; including, wholesale or retail trading by people, the gross domestic product (GDP), supply and demand, economic growth, recession, inflation and exchange rates of the environment the organization maneuvers;

**c. Socio-Cultural** – the modifications in the ways stakeholders consider life and leisure, the societal cultural practices of the environment under consideration; example, the values, beliefs, behaviour, demographic consideration, cultural attitudes for working conditions, lifestyle trends, mannerism and religion; and

**d. Technology** – the hi-tech practices and its changing rapidity, the impact of technology within the environment under scrutiny and government spending on technology research; including, automation, technology infrastructure, cyber security, scale of technology disruption, communication gadgets and how data/information is manipulated/processed (Peterdy, 2022; Kenton, 2022).

Peterdy (2022) further expounded on ‘EL’ in PESTEL as follows:

**e. Environmental (or Ethical)** – the ecological (green) issues of social responsibility of the inhabitants and especially, corporate organizations’ assistance to the environment (or community); example, eradication of pollution and cleanliness of the environment, fresh water contamination, carbon footprint, climate change impacts, extreme weather events and ethical considerations of the people living within the environment under consideration - in terms of moral laws and ethical issues pertaining to the area; and

**f. Legal** – the legitimate issues from changes to the regulatory and the total environment under consideration; examples, industry regulation, licenses and permits to operate, employment and consumer laws, protection of intellectual property, court system, formation and registration of businesses, enforcement of laws and interventions justified within the various markets in the environment (Peterdy, 2022).

The above explanation analyzes the external environment of the business/organization, and how the various parameters of the conceptual frameworks help in the understanding of the environment that the business/organization operates.

There are also significant micro-environment actors which needs to be monitored. These are:

- a. customers,
- b. suppliers,
- c. competitors, and
- d. distributors.

These macro and micro-environment actors would normally lead the organization to new opportunities and threats within the environment it operates. So, both the macro and micro-environments would greatly help the organization to know the opportunities and threats available and associated, respectively, with the external environment it has to deal with in order to achieve its goals.

The micro-environment actors or simply, micro-environment, is explained by Oxford College of Marketing (2023) as those sectors having a direct working relationship with the organization that affect its ability to engage and serve customers. Three (3) of the actors that would be discussed within this research, are:

- customers/consumers,
- competitors, and
- suppliers.

**a. Customers** - According to Oxford College of Marketing (2023), customers are people/consumers in the environment who acquire goods and services from the organization and, as such, the main purpose for the existence of most organizations. Oxford College of Marketing (2023) added that the reasons that motivated the consumers to buy the products of organizations play a large role in how these businesses approach the marketing of their products and services. As recipients of the organization's output, customers are important because they determine the business' success.

**b. Competitors** - Oxford College of Marketing (2023) explained competitors as other organizations in the same industry or type of business providing the same goods and services to the same set of customers. Scott (2023) argued that the intensity of competition within an industry is largely dependent upon five key forces; threat of supplier power, buyer power, substitutes, intensity/degree of rivalry and barriers to new entrants. In addition, Scott (2023) revealed that the intensity of competition in an industry is neither a matter of coincidence nor bad luck, but something rooted in its underlying structure and goes beyond behaviour of current competitors.

**c. Suppliers** - According to Oxford College of Marketing (2023), suppliers can only control the success of an organization when they hold power by being the largest provider of raw materials used by the organization to make its finished products.

### **Strategic marketing management – identification of strengths and weaknesses**

Kenton (2023b) explains 'internal environment' as the strengths and weaknesses of elements within the organization's boundary. The functional areas within the organization should be considered to know the strengths and weaknesses associated with the organization. Normally, SWOT analysis, a tool for investigating the strength, weaknesses, opportunities and threats of an organization, is conducted by the organization to identify its strengths and weaknesses, in order to position itself very well amongst the competing organizations (Kenton, 2023b).

### **Core organizational marketing strategy**

Once an organization has analyzed its marketing environment, including the external opportunities and threats, and internal strengths and weaknesses, the next task is to develop a core marketing strategy, the overall game plan for reaching perspective consumers and turning them into customers of enjoying its products/services (Barone, 2023). According to Carmicheal (2023) and Barone (2023), the strategy is the organization's strategic marketing planning process, targeting key audience, goal-setting, carefully positioning the organization, brand messages and key performing indicators (KPIs). The core marketing strategy must be customer-centred, visionary, differentiating, sustainable, easily communicated, motivating and flexible.

Barone (2023) further mentioned that the marketing strategy is outlined in the marketing plan and the plan details the specific types of activities to conduct with timetables for rolling out various marketing initiatives; however, the strategy ideally should have a longer life span and contain value propositions and key elements of the organization's brand.

Highlights of the organization's marketing strategies therefore, would include:

**a. Conduct market research** – Before the creation of the marketing strategy, there is the need to first gather useful and enough data in order to develop a good marketing strategy that would provide information to know the consumers (Carmicheal, 2023). This research would help the organization to make data-driven decisions and make it easier to understand the target market, find gaps and effectively utilize the information available; this is essential for understanding the customers and easily adapting to changing trends (Carmicheal, 2023).

**b. Goal Formulation** – Normally sales are the fundamental goal of any organization, but there should be short-term goals, example establishing authority and increasing customer engagement; though the short-term goals offer measurable benchmarks for the progress of the marketing plan, the marketing strategy is the high-level dogma and design to accomplish the goals (Barone, 2023). Carmicheal (2023) added that defining clear ‘SMART’ goals provides direction and clarity which guide marketing efforts towards desired outcomes; this helps with resource allocation, decision-making and the measurement of success marketing initiatives.

**c. Identify target audience/clients** – Barone (2023) intimated that every product/service has an ideal customer, so the organization should know these customers, where to target the communication of its messages and how the product/service would impact their lives. Carmicheal (2023) added that it is incumbent on the organization to know and understand the needs of the clients/audience from the market research conducted earlier, before developing the marketing strategy, Furthermore, the organization should know how the product/service would solve the challenges of the audience/clients.

**d. Creating messages** – After knowing the goals and the target clients, there is the opportunity to show prospective clients how the product/service would promote their needs and the messages should promote the organization as the best to deliver the messages to them (Barone, 2023; Carmicheal, 2023). Carmicheal (2023) added that the crafting of the messages should place the organization above competition, reverberate with the target audience, build brand credibility and influence buying decisions.

**e. Budget definition** – According to Barone (2023), the message sent to woo consumers to patronize the organization’s products/services would depend on the budget. Messages may include purchasing advertisement, social media and press releases to media houses; these would be based on affordability of money. So, the budget should not exaggerate on the costs, but should be meaningful and affordable to the company. The budget for the period would also be subjected to control mechanism to know the deviations from actual and the necessary corrections effected to achieve the goals in the marketing strategies (Barone, 2023).

**f. Create, track and analyze KPIs** – There is the need to measure whether the strategy is working by computing the numbers of clients responding to the messages and analyzing the data to expose the mysteries of marketing performance in order to unravel super perceptions (Carmicheal, 2023). Furthermore, by creating a good system that works for the team, they could collect measurable Key Performance Indicators (KPIs) to track the effectiveness of the strategy, check and analyze performance over time, so that the approach would be refined, based on results and feedback (Carmicheal, 2023).

**g. Implementation of the strategy** – the concluded marketing strategy would comprise the sections and components of the above and also include a concise overview, which would be the executive summary (Carmicheal, 2023). Control mechanisms, including feedback and feedforward would be applied when necessary to make the goals achievable.

### **Impact of Human and Organizational activities on the Environment**

The natural environment which accommodates businesses/organizations is very important. This environment is very broad and consists of both the internal and external segments. The entities which operate within the environment should be kind and co-operative to it by preserving/conserving it, to enable businesses/organizations flourish.

Hornby (2020) described environment as the natural world which provides habitation for human beings, organizations, animals and plants, and the surroundings in which these animate and inanimate objects survive. It is this natural world which provides organizations the opportunity to put their imaginations/ideas together to have successful businesses, and therefore, help human beings to earn their living.

Narveson (n.d.) revealed the effects of human and organizational activities on the natural environment in these contemporary days, and how the decision to a proper sustainable basis of this concern affects businesses quite crucially. Specifically, Narveson (n.d.) distinguished between two (2) theoretical orientations, which are:

**a. Anthropocentric orientation** – this gives the reason why humans should be concerned about the environment, as it is bad if they do not, and good if they are concerned about it. But implications of the decision chosen depend on what human beings want from nature. According to Narveson (n.d.), humans have several distinguishable interests for the environment, including:

- i. exploiting it in various ways; example, as source of raw materials;
- ii. love looking at it;
- iii. enjoy their livelihood in and with it; and
- iv. preserving it from harming them.

**b. Deep Environmentalist orientation** - contrasting the anthropocentric orientation is the concern for the environment in the interest of the environment itself. Human beings should care about trees for the sake of trees - not because they are nice to look at and providing shade and lumber, but because they have some sort of self-esteem and moral status, as their right. The problem with nature is that everything is fundamentally natural; everything is part of the world for dwelling and subject to the laws of nature, including the majestic big trees, harmful swamps, poisonous insects and snakes, volcanoes and oil spills. Unfortunately, garbage, asphalt, etc. that deep environmentalists hate, are just part of the universe (Narveson, n.d.)

Alexander (2020) therefore, mentioned eleven (11) ways humans impact the environment and lamented that human beings have become dependent on indulgences that affect the environment, such as, vehicles, houses and technological machines (example, computer system and electronic phones). He declared, however that humans do not care how their love for these luxuries affect the environment, to the extent that non-degradable objects, such as, metallic, plastic and rubber goods are disposed of any how in the environment, including the ocean. Seven (7) of the eleven (11) impacts Alexander (2020) named on the environment are described as follows:

**a. overpopulation:** survival of humans has led to re-population and the decrease in mortality rate also led to over-population, as medicines/drugs have improved keeping humans



alive for longer period; re-population and over-population have led to severe degradation of the environment. Human beings require a lot of space for farmland, roads and industries, which also take up tons of space.

**b. deforestation:** the explosive population growth has led to the clearing of forest for space to accommodate human beings; this has resulted in damaging the ecosystems. An estimated 18m acres of trees are cut to make way for new development.

**c. overfishing:** high pollution number is a big threat to the aquatic life and the direct cause for reduced biodiversity. The few fish left is also overfished and accompanied by lead poisoning in rivers from ground water, thereby damaging the ocean.

**d. water pollution:** there are about 5.25trillion pieces of plastic, metallic and rubber debris in the ocean. Again, excessive amount of fertilizer finds its way into the ocean through rains, floods, dumping, thereby destroying the largest available oxygen for use.

**e. global warming:** this is the greatest cause of impact on the environment. Generally, this cause originates through CO<sub>2</sub> levels from respiratory to more detrimental causes like burning fossil fuels and deforestation; human beings consistently increase CO<sub>2</sub> levels globally. The CO<sub>2</sub> emissions has therefore, impacted the increasing planet's average temperature by almost a whole degree. The rise in temperature melts the arctic land ice and glaciers, which affects the ocean levels to rise at a rate of 3.42mm annually and permitting water to absorb more heat and triggers the oceans to rise.

**f. climate change:** climate change is closely connected to the development of technology and industry. As global temperature increases, the earth's weather pattern drastically changes. The affected weather pattern brings more extreme hurricanes in both size and regularity with more extreme and persistent droughts. Regarding climate change, COP26, the UN Climate Change Conference at Glasgow in 2021 issued a final declaration to keep alive the ambition of curtailing global temperature increases to not go beyond 1.5°C by 2100 (Penketh, 2021). This is laudable and it is expected the ambition will be achieved to prevent the destruction of the environment.

**g. ozone depletion:** the ozone layer has been removed (through our action and inaction), thereby allowing the absorption of harmful UV rays which is detrimental to the health of all walks of life (Alexander, 2020).

## METHODOLOGY

The water resource in Ghana has been exposed to contamination through the activities of 'galamsey', poor fishing methods and sand winning in most of the river bodies in the nation. This research therefore, is to find cogent ways of preventing and then protecting the destruction of water resources of Ghana. Consequently, the marketing of the raw resource by the Water Resources Commission to water users, who also serve homes and offices with treated water, would be sustainable.

The protection of the water resource in Ghana from further destruction by mineworkers and sand winners, especially the 'galamseyers', is long overdue, and authorities in charge of the resource should begin to be working to safeguard the future of the Ghanaian society from doom. Water is life, as the adage goes and without water, there would be no life. The main thrust of this study is therefore, to prevent the destruction of the Ghanaian water resource by 'galamseyers' and then protecting the resource from further pollution/deterioration; this would

enhance the marketing of the raw resource by the Water Resources Commission to water users, who would equally serve homes and offices with treated water for sustainability of the commodity.

Survey design approach was employed where data was collected solely from some of the staff of WRC; for a sizeable sample, an appreciable number of staff completed the Questionnaire. The study adopted the qualitative research approach, which was the best since it gave the researcher the ability to collect enough primary data from respondents which was converted into frequencies, averages and ranges (Bryman & Bell, 2015).

A stratified random sampling of convenience was used for the research, which enabled the researcher to appreciate certain characteristics of the population to enrich the sample.

Questionnaire was used for the data collection method, which provided an effective way of collecting timeous response from the respondents. This instrument was developed, put into google-form, piloted and tested to verify that the questions were clear and not ambiguous, such that the respondents would be enthused and consistent with the purpose of the study. Questions were reviewed where necessary, based on response from the respondents, during the pilot study. This was purposely done to improve the reliability and validity of the questionnaire.

Secondary data collected from the WRC library in Accra, Ghana, was merged with the primary data collected from the questionnaire, where possible. This was then coded for easy access, keyed into the computer system, qualitatively analyzed and presented in statistical Tables. Findings were arranged in sequential and logical formats, which led to conclusions to be drawn from the analyses. Respondents were aware that their participation was confidential and voluntary, as the bio-data indicated; they were assured of a copy of the results from the study, based on request.

## **ANALYSES AND DISCUSSIONS OF RESULTS**

This section deals with the data gathered from respondents through the questionnaire survey; the data was coded and categorized, and further analyzed for presentation. A total of thirty-five (35) Questionnaires were distributed (using online Google Forms) to a sample size of the WRC staff; national population of the WRC staff, Ghana, is about fifty-two (52). Thirty-one (31) out of the thirty-five (35) Questionnaire sent out were responded to, duly completed and returned. Four (4) of the Questionnaires sent out were not returned. This gave the total Questionnaire for the analysis to be thirty-one (31), which gave a response rate of 89% approximate and that was very good, as it fairly represented the views of the (entire) research population. This was specialized research, as the Questionnaire was limited to be completed only by the employees of the WRC.

### **Bio Data Statistics**

The bio data characteristics of the sample included sex, educational background and position the respondents occupy in the WRC. These characteristics were found to be indicators of the importance of respondents within the WRC and were therefore, very vital for the research.

For sex, the study identified two (2) types – ‘Female’ and ‘Male’. ‘Female’ obtained 52% and ‘Male’ obtained 48%, indicating a fair distribution of respondents between the sexes and with female slightly having an edge over male. See Table 1.

**For the educational background**, the study identifies types – ‘SHS/Secondary/Technical School’, ‘Diploma’, ‘Graduate’, ‘Masters’, ‘Doctorate’ and ‘Professional’; prominent educational background was ‘Masters’ as it obtained 51% out of the 31 employees who responded to the questionnaire of the survey. This was followed by ‘Graduates’ (39%) and ‘Doctorate’ (10%), indicating a high knowledge-base of the respondents from the WRC; surely such learned respondents would supply enhanced information/knowledge from the organization for this important research. Unfortunately, there was no ‘SHS/Secondary/Technical’ and ‘Professional’ level staff to complete the Questionnaire. See Table 2.

**About position of the respondents within the WRC for the research**, the study identified ‘Technical/Professional’ (58%), ‘Management’ (23%), ‘Directorate’ (6%), ‘CEO’ and ‘Support Services’ (3% each); those in Technical/Professional level was in the majority and again identified the significance of field officers being respondents, and the importance of the information gathered. See Table 3.

## Detailed Findings & Analyses of Results

### Raw Water Resource

To a question whether there has been a **maintenance activity carried out on the Resource**, the highest percentage-score for the survey was ‘Yes’ (62%). This was followed by ‘No’ (38%). This implies that maintenance of the resource has been going on. See Table 4.

**The WRC as the organization in charge of maintaining the water resource** obtained 94 percentage-score from 31 sampled respondents. This was followed by ‘Hydraulic Services’ and ‘District Assemblies’ with 3% each. Unfortunately, ‘Water Research Institute (WRI)’ and ‘Environmental Protection Agency (EPA)’ scored zero. The 94% score of the WRC as the organization in charge of maintaining the resource by the respondents, emphatically indicates the organization that oversees the management of the resource, the WRC. See Table 5.

**The state of the Ghanaian rivers** was found to be ‘Turbid/Murky’ which scored 84%, ‘Contaminated/Poisonous’ - 13%, ‘Destroyed/Dead’ - 1% and ‘Muddy/Dirty’ - 0%. This an indication of a very poor state of the Ghanaian rivers, as the rivers are coloured and with suspended sediments. See Table 6.

**Galamsey as the cause of state of the water resource** scored 60%, ‘Sand Winning’ (24%), ‘Mining’ (14%) and ‘Fishing’ (2%). 60% score of ‘galamsey’ being the cause of destruction of the water resource is quite substantial, compared with the other culprits. See Table 7.

**To the question, has the state of the Resource been like this always**, ‘No’ scored 100% and ‘Yes’ (0%). There is an implication that something has gone wrong along the life of river bodies in Ghana, as they were not so initially. See Table 8.

**Any idea when the state of the water resource deteriorated**, ‘Yes’ scored 68% and ‘No’ had 32%. This was good for the research, as most of the respondents would be able to state when the water resource deteriorated. See Table 9.

**Period when the deterioration of the rivers started**, as given by the respondents were ‘Since 2015’ (75%), ‘Since 2009’ (13%), ‘Since 2018’ and ‘Since illegal mining started’ scored 6% each. This was important to know that the poor state of the Ghanaian rivers has been a problem that various governments in Ghana has not been able to address, and therefore, becoming an albatross on Ghanaians to address this irritating problem. See Table 10.

**Why the state of the water resource** generated interesting answers though worrying. ‘Unsafe mining methods’ scored 51%, ‘Unemployment’ (35%), ‘Wickedness of some Ghanaians to destroy the rivers’ (9%) and ‘Sabotaging the chief/government’ (5%). A lot of problems facing the nation and values assigned to them are illustrated over here. The Ghanaian government must gear itself up and tackle these problems before the nation is torn apart. See Table 11.

### **Re-vitalizing the state of Water Resource**

**Possibility of re-claiming the water resource** had ‘Possible’ scoring 64%, followed by ‘Uncertain’ (23%) and ‘Strongly Possible’ (13%). ‘Strongly Impossible’ and ‘Impossible’ scored 0% each. There is surely hope of reviving the damaged resource, as scored by respondents. See Table 12.

**If the answer to previous question is Possible/Strongly Possible**, what should be the remedy produced ‘enforcement of laws’ scoring 44%, followed by ‘stoppage of illegal mining’ (26%), ‘protection of the water bodies’ (13%) ‘public education’ (9%), ‘protection of the river-banks from sand winning’ and ‘improve employment situation in the hard hit areas scoring’ 4% each. See Table 13.

**Again, if the answer to the Question in Table 12 is Possible/Strongly Possible, suggest ways to go about the Remedy** had ‘Strengthen/empower institutions through enforcement of laws’ scoring 32%. This was followed by ‘Public education’ (20%), ‘Task force to monitor the river bodies’ (16%), ‘Coordination of EPA, WRC & the security task force’ (8%) and ‘Promulgate necessary laws’, ‘Individuals & gov’t should fish out the detractors & make them to face the law’, ‘Intro of technology to manage the resource’, ‘Protection of the buffer zone’, ‘Improvement of employment in hard hit areas’ and ‘Ban all illegal mining’, scoring 4% each. See Table 14.

**Similarly, if the answer to the Question in Table 12 is Possible/Strongly Possible, which organization(s) should carry out the Remedy** had ‘All stakeholders together’ scoring 30%, ‘WRC’ (25%), ‘WRC & DAs’ (15%), ‘WRC, National Security & DAs’ and ‘WRC & National Security’ (10% each), and ‘District Assemblies (DAs)’ and ‘WRC, EPA & DAs’ (5% each). See Table 15.

**However, if the answer to the Question in Table 12 is Strongly Impossible/Impossible who should be blamed for the destruction of the Resource** had ‘General Societal Problem’ scoring 45%; followed by ‘WRC, DAs, Chiefs & Politicians’ (22%), and ‘WRC, EPA & DAs’, ‘WRC & DAs’ and ‘WRC’, 11% each. See Table 16.

### **WRC reaching out and Registering all/most water users in Ghana**

**How many surface water users were registered in Ghana by December 2022** had ‘259’ scoring whopping 84%. This was followed by ‘Over 250’ (8%), and ‘Over 100’ and ‘Over 300’ (4% each). Most of the employees are abreast with the records on the WRC’s website, as 259 is the data recorded on surface water users nationwide for December 2022; this is good for the organization. See Table 17.

**How many groundwater users were registered by December 2022** had ‘93’ scoring 84%; followed by ‘Over 100’ and ‘Over 200’ (8% each). Again, the respondents are aware of the statistics of groundwater users nationwide, as stated on the WRC’s website. See Table 18.

**Can the WRC register other raw water users not covered now** produced ‘Yes’ scoring 100% and ‘No’ (0%). Again, the respondents know the importance of establishment of the organization to regulate users of the resource for accountability and preservation for the future generation. See Table 19.

**If the answer to the Question in Table 19 is Yes, why has the WRC not registered other users** produced ‘Lack of enforcement & Monitoring’ (35%), ‘Inadequate staff’ (28%), ‘Leadership & Logistics’ (25%), and ‘Ongoing process’, ‘How to Reach out & Registering them’ and ‘Enforcement & Public education’ (4% each). See Table 20.

**What should the WRC do to enable them register other water users not covered** gave out ‘Public education & monitoring’ and ‘Compliance, monitoring & enforcement’ (27% each), ‘Establish more offices nationwide/employ more staff’ and ‘Leadership’ (13% each), ‘Make water use permit a requirement for all water users’ (10%), ‘Proper coordination with relevant stakeholders’ (7%) and ‘Prosecution of offenders’ (3%). See Table 21.

**Is the WRC generating enough revenue to be self-sustaining** generated ‘No’ (83%) and ‘Yes’ (17%). This is an indication that the WRC is under-performing and should the government de-regulates its function to be self-sustaining, there would be chaos. The earlier WRC thinks about performing better to generate more revenue for managing its functions is now. The Organization for Economic Co-operation and Development (OECD) has been championing the privatization of state-own-enterprises since early 1960s, to enable governments concentrate on their core mandate of managing their economics well (OECD, 2015). I hope this research would be a wakeup call to the WRC to sit up and reflect on the principles of the OECD. See Table 22.

**If the answer to the Question in Table 22 is No, what should the WRC do to be self-sustaining** brought out responses ‘Leadership’ (29%), ‘Raise revenue by generating more IGF through increase fee charges’ (26%), ‘Compliance, monitoring & enforcement’ (15%), ‘WRC should be exempted from capping’ and ‘Public education & sensitization’ (7% each), ‘Improve condition of service’, ‘The WRC does not have the capacity to be self-sustaining now or in the near future’, ‘Gov’t charges on WRC’s profit should be reduced’ and ‘Intro of technology into WRC’s operations’ (4% each). Though ‘Leadership’ scored the highest, the response is not clarified, so it could be transformed into the ‘Leadership leading the crusade through Raising revenue by generating more IGF with increase in user fee charges, which would then score (26+29)%, giving 55% to be the preferred highest for that Question.

The WRC leadership should lead the crusade to brainstorm seriously on how to increase revenue for the commission through increasing fee charges of its products for the various users and enrolling most/all users, would have to be seriously considered. See Table 23.

**Any other information to add** produced these responses from the respondents, as stated in Table 24:

- i. WRC can be very viable if its enforcement and monitoring activities are conducted vigorously;
- ii. Need for improvement in visibility through continuous media presence and other social media platforms;
- iii. The state of the WRC is not one of the best in terms of infrastructure. It lacks the ability to employ more technical people;
- iv. Government should not retain 34% on WRC's revenue; and
- v. Good, strong & decisive leadership is needed at the WRC.



### **Discussion of Results**

The findings listed above are evident of the fact that majority of the respondents are well endowed with hard facts/knowledge about the WRC. The 94% score of the WRC as the organization that maintains water resources of Ghana by the respondents, emphatically indicates that the respondents are aware of the functions of the WRC. However, the question that arises is, whether there has really been maintenance carried out on the river bodies these days or not? See Table 5.

The state of most of the rivers in Ghana as scored by the respondents of the WRC is 'Turbid/Murky' (84%), indicating that the rivers in Ghana look cloudy with suspended matter/sediments. The cause of this 'Turbid/Murky' state was found to be the work of the 'Galamseyers' (60%), who are using crude and unsafe methods in mining the Ghanaian rivers. The state of Ghanaian rivers deteriorated 'Since 2015' (75%). The nation has had the two (2) popular governments alternating during this period, but nothing substantial has been done to stop/prevent the menace on the rivers.

There is the possibility - 'Possible' and 'Strongly Possible' (64+13 = 77%), that the destroyed resource could be re-vitalized through 'Enforcement of laws' (44%) and ways of re-vitalization may be through the strengthening of institutions, public education and task force to monitor the resource – 'Strengthen/empower institutions through enforcement of laws', 'Public education' and 'Task force to monitor the river bodies' (32+20+16 = 68%). 'All stakeholders' (30%) and the WRC (25%) are to see to championing the re-claim process of the resource.

The culprit for the mess of the resource was found to be a 'General Societal Problem' (45%), 'WRC, DAs, Chiefs & Politicians' and 'WRC' (22+11 = 33%). Education and monitoring are therefore, needed to erode this societal problem of not caring for the destruction of anything not belonging to you-mentality from the Ghanaian society and rather the citizenry thinking about the good handling of society's properties.

Registered number of surface and ground water users are known by majority of the respondents (both scored 84%), indicating a good knowledge-base of employees of the WRC on the resource; this knowledge is not lost by the respondents, which is very good for the organization's competence.

Overwhelmingly, 100% of the the respondents believed that they could register and enroll all/most water users (both surface and ground water) not covered now, which is laudable. As to why they have not been able to register these water users who are currently not paying for the resource being used, most of the respondents claimed that 'Lack of enforcement & Monitoring' (35%), 'Inadequate staff' (28%) and 'Leadership & Logistics' (25%), which give a total of 35+28+25, i.e. 88%, quite substantial. See Table 20.

To a question of what the WRC should do to enable them register other water users not covered now, various answers like 'Public education & monitoring' and 'Compliance, monitoring & enforcement' scored 27% each; 'Establish more offices nationwide/employ more staff' and

‘Leadership’ also scored 13% each; and ‘Make water user permit a requirement for all water users’ (10%).

The respondents were overwhelmed that they are not currently, generating enough revenue (83%) and that they could generate more revenue by increasing the internally generated funds (IGF) through increasing user fee charges (26%); this could be possible with the leadership of the WRC championing a crusade to brainstorm on how to generate more revenue through compliance, monitoring & enforcement of laws.

The above findings of the research hopefully would enable Ghanaians to extricate themselves from misuse of freshwater and continue to seriously observe the UN world water day on the importance of scarcity of freshwater, which many people do not have access to; also they would seriously ponder on the fact that only 0.007% of freshwater is available for human use (UNWater.org, 2023; USGS.gov (2019)). These are hard statistics for the Ghanaian populace to know. Furthermore, the results of the research would also prompt Ghanaians about the importance of freshwater for life and how to manage it sustainably to prevent the demise of children from water-related deaths (Biko & Mwaniki, 2020).

The findings have also enabled the researcher to be at ease that there is hope for the revival of Ghanaian water resources, maintenance and sustainable management for future generations.

## CONCLUSIONS

The WRC as an organization is saddled with many problems, the foremost being the deplorable water resource of the nation, which is the product from the organization for distribution to water users to feed homes, offices, etc. of the citizenry. 84% of respondents are of the view that the water resource of the nation is turbid/murky, indicating that the rivers in Ghana look cloudy and with suspended matter/sediment.

Furthermore, the cause of this sordid state was found to be mostly the work of ‘galamseyers’, who use crude and unsafe methods in mining in the Ghanaian rivers. Surprisingly, this nefarious activity on the resource has been going on since 2015 in the eyes of various governments; but still no remedy has been found yet, despite the efforts put in by these governments to curb the negative activities on the resource. This is definitely, destroying the environment. The environment is for the preservation of future generation, however, if it is destroyed now, what would be the future of those yet unborn?

Overwhelmingly, there is the possibility and hope by the respondents that the destroyed resource could be re-vitalized/re-activated through enforcement of laws, public education and setting up of a task force to monitor the resource; this could be done by strengthening the institutions in charge of managing the water resource. In addition, all stakeholders of the resource would have to come together to champion the reclamation of the resource.

Regarding the low numbers of both surface and ground water users registered so far by the WRC, ‘259’ and ‘93’, respectively, the research brought to the fore that these figures could be increased. This could be achieved by enrolling all/most water users through public education,

monitoring; sensitizing and enforcement; establishment of more offices nationwide to employ new staff, making water use permit a requirement for all water users' and the leadership of the commission being re-oriented on the goals of the commission.

The respondents were overwhelmed that they are not generating enough revenue and so the leadership of the WRC should lead a crusade to generate more revenue. The research revealed that more revenue could be generated through the leadership leading a crusade to increase user fee charges and enrolling all/most of the raw water users; then making sure all water users adhere to compliance, monitoring and enforcement of the commission's laws, which would grow the internally generated funds (IGF) of the WRC.

The researcher strongly believes that the findings of the study, globally, would help all national institutions in charge of managing water resources, including the WRC, to have clean raw water and subsequently, be able to enroll all/most users for the supply of the resource for sustainable marketing of products to the users; then, the users would equally serve the public with good water for drinking, cooking, bathing, etc. and the water resources would be preserved for sustainable use of current and the future generation.

### **Recommendations**

It is unfortunate that the WRC is facing a crisis of having its products (surface and ground water) polluted since '2015' by 'galamseyers', sand winners and fishermen using wrong methods; however, the commission is of the view that this problem could be solved. The state of most rivers in Ghana is turbid/murky, indicating that the rivers in Ghana have been polluted and therefore, are suspended with matter/sediments. The cause of this turbid/mulky state of the resource was found mostly to be the work of 'galamseyers', who are using crude and unsafe methods in mining in the Ghanaian rivers.

It is therefore, recommended that the WRC should:

- i. enforce laws on illegal mining and make sure the buffer zone policy is strictly adhered to in order to protect the water bodies. This could be achieved through a planned public education for all nook and cranny of towns/cities within districts where a river flows;
- ii. protect the river-banks from sand winning, which is another important area needing attention, as most sand winning businesses normally encroach into rivers and even dig for sand from the river beds.
- iii. institutions which carry out the enforcement of laws on illegal mining should also be strengthened and empowered with the formation of task force, where necessary, so as to ward off the hard-core encroachers on river-banks.
- iv. where there is the need to promulgate new laws to strengthen these institutions that should also be considered. There should be coordination of water management activities amongst the EPA, WRC, DAs & security task force.
- v. It is a fact that the youth is the target group who indulge in this nefarious illegal mining, mostly. So, the youth in areas where unemployment is an issue, normally find themselves engaged in the 'galamsey' business. The youth in these areas should, therefore, be helped through establishment of other gainful businesses.
- vi. The WRC should also be mandated to establish more offices and employ new staff to augment their current staff strength and subsequently, control pollution in troubled areas,

through constant monitoring, enforcement of laws and coordination with all relevant stakeholders. Offenders should be promptly prosecuted to discourage prospective ones.

vii. For the WRC to be self-sustaining, there is the need to generate enough IGF to manage the functions of the WRC. The WRC should step up efforts and reach out to the unregistered users of the resource and enroll all/most of them. The government should therefore, exempt the WRC from contributing to the consolidated fund to enable the commission generate enough revenue to handle all issues of expenditure needed for managing the river bodies continuously.

viii. Where technology could also be introduced to enhance the activities of the commission, there should be no hesitation at all to procure the machines. The leadership of the commission should be sensitized on the huge task they are to perform, by planning, directing, organizing and controlling the staff for delivery of results to achieve the commission's goals.

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## TABLES

### Bio Data

Table 1: Sex			
Sex Type	Frequency	Valid Percent	Cumulative Percent
Female	16	52	52
Male	15	48	100



<b>Table 2: Educational background</b>			
<b>Educational background</b>	<b>Frequency</b>	<b>Valid Percent</b>	<b>Cumulative Percent</b>
SHS/Secondary/Technical	0	0	0
Graduate	12	39	39
Master's	16	51	90
Doctorate	3	10	100
<b>Table 3: Position</b>	0	0	100
<b>Professional</b>			
<b>Position in Organization</b>	<b>Frequency</b>	<b>Valid Percent</b>	<b>Cumulative Percent</b>
CEO	1	3	3
Directorate	2	6	9
Management	7	23	32
Technical/Professional	18	58	90
Support Services	3	10	100

### Raw Water Resource

<b>Table 4: Is Maintenance activity carried out on the Resource?</b>			
<b>Any Maintenance Activity?</b>	<b>Frequency</b>	<b>Valid Percent</b>	<b>Cumulative Percent</b>
Yes	18	62	62
No	11	38	100

<b>Table 5: Which organization(s) is in charge of Maintaining the Resource?</b>			
<b>Maintaining Organization</b>	<b>Frequency</b>	<b>Valid Percent</b>	<b>Cumulative Percent</b>
WRC	27	94	94
Hydraulic Services	1	3	97
WRI	0	0	97
EPA	0	0	97
District Assemblies	1	3	100

Ghanaian Rivers' State	Frequency	Valid Percent	Cumulative Percent
Turbid/Murky	26	84	0
Muddy/Dirty	0	84	84
Contaminated/Poisonous	4	13	97
Destroyed/Dead	1	3	100

Cause of state of Water	Frequency	Valid Percent	Cumulative Percent
Mining	7	14	14
Galamsey	30	60	74
Fishing	1	2	76
Sand Winning	12	24	100

Has this been the state always?	Frequency	Valid Percent	Cumulative Percent
Yes	0	0	0
No	31	100	100

Any idea of state of Water?	Frequency	Valid Percent	Cumulative Percent
Yes	21	68	68
No	10	32	100

Period of deterioration	Frequency	Valid Percent	Cumulative Percent
When illegal mining started	1	6	6
Since 2009	2	13	19
Since 2018	1	6	25
Since 2015	12	75	100

Why the state of the Resource?	Frequency	Valid Percent	Cumulative Percent
Unemployment	20	35	35
Wickedness	5	9	44
Sabotaging the chief/government	3	5	49
Unsafe mining methods	29	51	100

### Re-vitalizing the state of Water Resource

**Table 12: Possibility of Re-claiming the Water Resource**

Possibility of Re-claiming	Frequency	Valid Percent	Cumulative Percent
a. Strongly Impossible	0	0	0
b. Impossible	0	0	0
c. Uncertain	7	23	23
d. Possible	20	64	87
e. Strongly Possible	4	13	13

**Table 13: If Table 12 is d/e, what should be the remedy?**

Remedy	Frequency	Valid Percent	Cumulative Percent
Enforcement of laws	10	44	44
Stoppage of illegal mining	6	26	70
Protection of the water bodies	3	13	83
Public education	2	9	92
Protection of the river-banks from sand winning	1	4	96
Improve employment situation in the hard hit areas	1	4	100

**Table 14: If Table 12 is d/e, suggest ways to go about the Remedy**

Approach for Maintenance Activity	Frequency	Valid Percent	Cumulative Percent
Strengthen/empower institutions through enforcement of laws	8	32	32

Promulgate necessary laws	1	4	36
Task force to monitor the river bodies	4	16	52
Ban all illegal mining	1	4	56
Coordination of EPA, WRC & the security task force	2	8	64
Individuals & gov't should fish out the detractors & make them to face the law	1	4	68
Intro of technology to manage the resource	1	4	72
Public education	5	20	92
Protection of the buffer zone	1	4	96
Improvement of employment in hard hit areas	1	4	100

**Table 15: If Table 12 is d/e, which organization(s) should carry out the Remedy?**

Organization to carry out Remedy	Frequency	Valid Percent	Cumulative Percent
WRC	5	25	25
District Assemblies (DAs)	1	5	30
WRC, National Security & DAs	2	10	40
All Stakeholders together	6	30	70
WRC, EPA & DAs	1	5	75
WRC & National Security	2	10	85
WRC & Das	3	15	100

Who to blame?	Frequency	Valid Percent	Cumulative Percent
General Societal Problem	4	45	45
WRC, EPA & DAs	1	11	56
WRC, DAs, Chiefs & Politicians	2	22	78
WRC	1	11	89
WRC & DAs	1	11	100

### WRC reaching out and Registering most/all water users in Ghana

Registered water users – surface	Frequency	Valid Percent	Cumulative Percent
259	21	84	84
Over 250	2	8	92
Over 100	1	4	96
Over 300	1	4	100

Registered Water users – ground	Frequency	Valid Percent	Cumulative Percent
93	22	84	84
Over 100	2	8	92
Over 200	2	8	100

Registering other water users	Frequency	Valid Percent	Cumulative Percent
Yes	31	100	100
No	0	0	100



<b>Why other water users not registered?</b>	<b>Frequency</b>	<b>Valid Percent</b>	<b>Cumulative Percent</b>
Ongoing process	1	4	4
How to Reach out & Registering them	1	4	8
Lack of enforcement & Monitoring	10	35	43
Leadership & Logistics	7	25	68
Enforcement & Public education	1	4	72
Inadequate staff	8	28	100

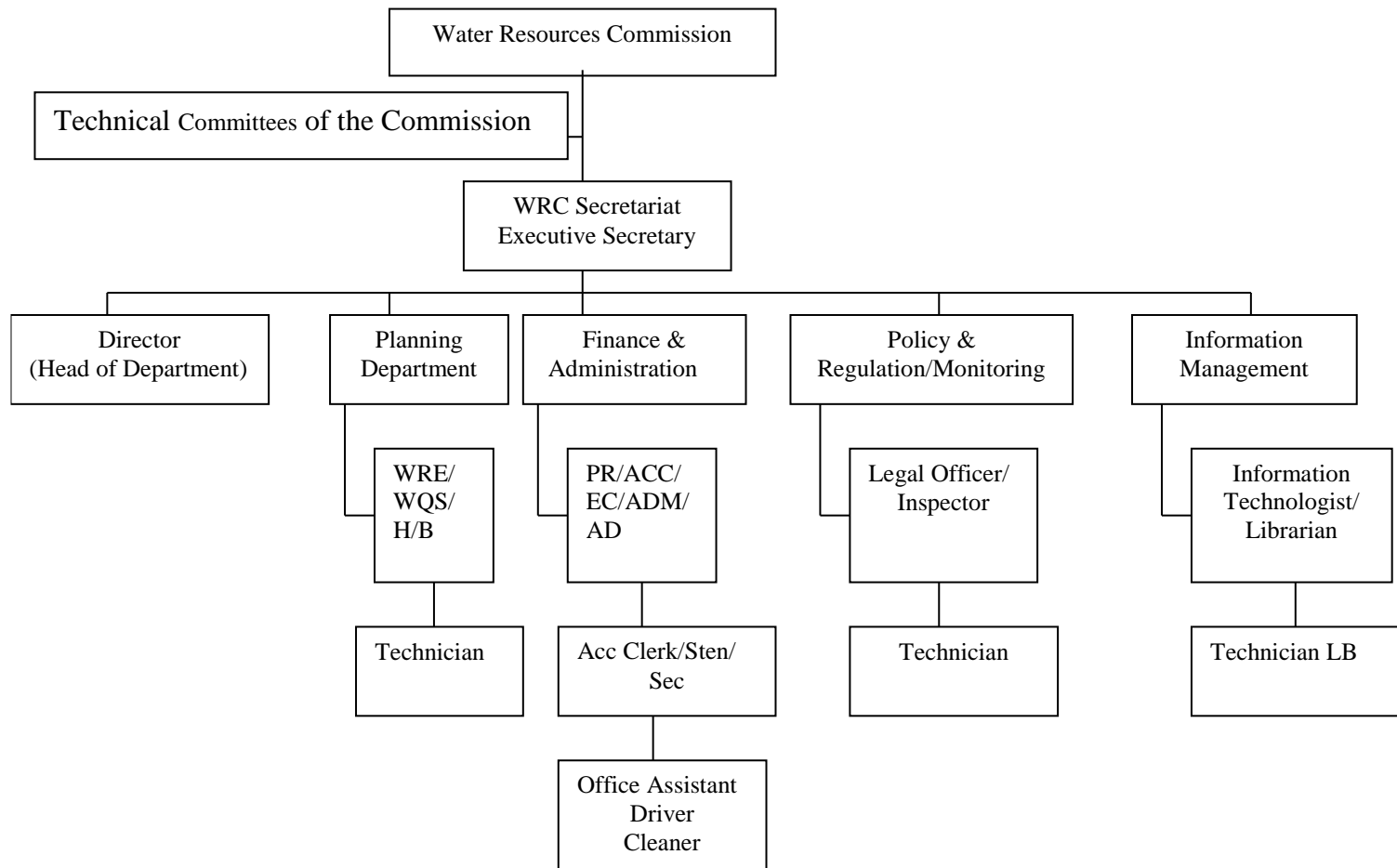
<b>Ways to register users not covered now</b>	<b>Frequency</b>	<b>Valid Percent</b>	<b>Cumulative Percent</b>
Establish more offices nationwide/employ more staff	4	13	13
Proper coordination with relevant stakeholders	2	7	20
Public education & monitoring	8	27	47
Make water use permit a requirement for all water users	3	10	57
Compliance, monitoring & enforcement	8	27	84
Leadership	4	13	97
Prosecution of offenders	1	3	100

Is revenue generation enough by WRC?	Frequency	Valid Percent	Cumulative Percent
Yes	5	17	17
No	25	83	100

What should make WRC self-sustaining?	Frequency	Valid Percent	Cumulative Percent
Raise revenue by generating more IGF with increase fee charges	7	26	26
Compliance, monitoring & enforcement	4	15	41
Improve condition of service	1	4	45
The WRC does not have the capacity to be self sustaining now or in the near future	1	4	49
Gov't charges on WRC's profit should be reduced	1	4	53
WRC should be exempted from capping	2	7	60
Public education & sensitization	2	7	67
Leadership (Leadership should lead the crusade)	8	29	96
Intro of technology into WRC's operations	1	4	100

Other information
WRC can be very viable if its enforcement and monitoring activities are conducted vigorously
Improve visibility through continuous media presence and other social media platforms
The state of the WRC is not one of the best in terms of infrastructure. It lacks the ability to employ more technical people.
Government should not retain the 34% on WRC's revenue
Good, strong & decisive leadership needed at the WRC.

**Appendix 1**



**Water Resources Commission – Organisation Chart**

**Source: Water Resources Commission**

## Appendix 2

### ACT 522



### WATER RESOURCES COMMISSION ACT, 1996

AN ACT to establish a Water Resources Commission, to provide for its composition and functions on the regulation and management of the utilisation of water resources in Ghana and for related matters.

*Establishment and Functions of the Water Resources Commission*

#### 1. Establishment of Water Resources Commission

- (1) There is established by this Act a Water Resources Commission.
- (2) The Commission is a body corporate with perpetual succession and a common seal and may sue and be sued in its corporate name.
- (3) The Commission may for and in connection with the performance of its functions purchase, hold, manage or dispose of movable or immovable property and may enter into the contracts and transactions that are reasonably related to its functions.

#### 2. Functions of the Commission

- (1) The Commission is responsible for the regulation and management of the utilization of water resources, and for the co-ordination of any policy in relation to them.
- (2) Without prejudice to subsection (1) of this section, the Commission shall
  - (a) propose comprehensive plans for the utilisation, conservation, development and improvement of water resources;
  - (b) initiate, control and co-ordinate activities connected with the development and utilisation of water resources;
  - (c) grant water rights;
  - (d) collect, collate, store and disseminate data or information on water resources in Ghana;
  - (e) require water user agencies to undertake scientific investigations, experiments or research into water resources in Ghana;
  - (f) monitor and evaluate programmes for the operation and maintenance of water resources;
  - (g) advise the Government on any matter likely to have an adverse effect on the water resources of Ghana;
  - (h) advise pollution control agencies in Ghana on matters concerning the management and control of pollution of water resources; and
  - (i) perform such other functions as are incidental to the foregoing.

The Act was assented to on 30th December 1996 and notified in the *Gazette* on 31st December 1996.

**The Functions of the WRC**  
**Source: Water Resources Commission**  
**Appendix 3**

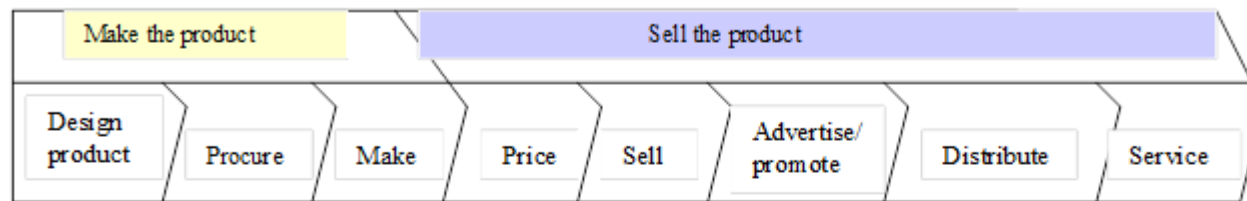


Ghana calls on African Foreign Missions to help fight galamsey.  
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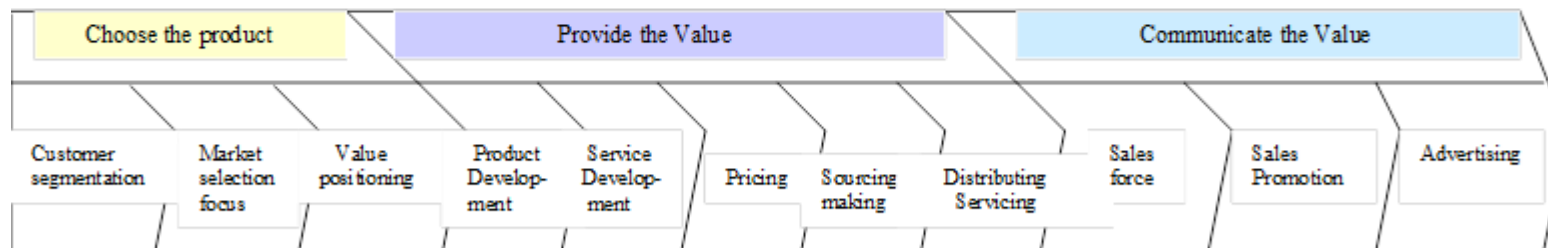
#### Appendix 4



**Traditional physical process sequence**

Source: Kotler, P.

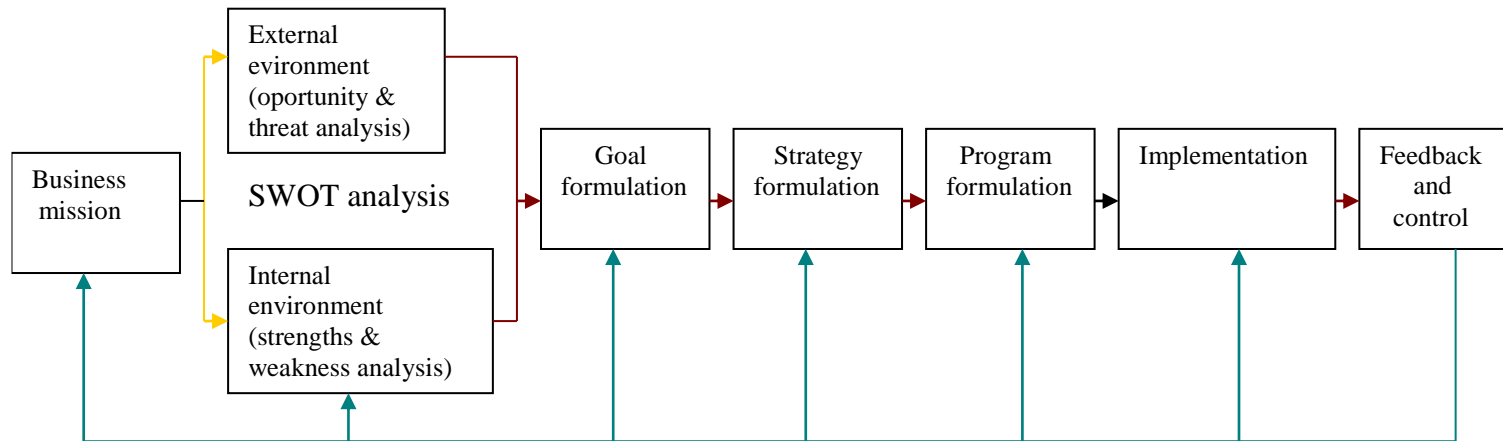
#### Appendix 5



**Value creation and delivery sequence**

Source: Kotler, P.

### Appendix 6



**The Business Strategy-Planning Process View**

**Source: Kotler, P.**

### Appendix 7

