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## Articles

### **Law on Control of Marine Environmental Pollution in Vietnam Today: Assessment of Content and Proposing Solution to Further Complete the Law**

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#### **Abstract**

This study focuses on analyzing the content of the current law on controlling marine pollution in Vietnam. These regulations are mainly under the Law on Environmental Protection 2014; Law on Natural Resources and Environment of Sea and Islands 2015 and documents guiding to implement these two laws. In general, the law on control of marine environmental pollution consists of two groups of provisions: a group of regulations on prevention of marine environmental pollution and a group of provisions on overcoming marine environmental pollution. The practice of implementing these regulations is still inadequate, thus leading to serious environmental pollution in Vietnam. In order to control the pollution of Vietnam's marine environment, it is necessary to amend and supplement the provisions of the law on control of marine environmental pollution and implement measures to improve the efficiency of law enforcement in this field.

**Keywords:** control of environmental pollution, environmental pollution, marine environmental pollution.

#### **1. Introduction**

Vietnam is a coastal country with a length of 3,260 km located on the west coast of the Pacific Ocean. This is a strategic position in terms of geopolitical, economic, marine arteries of the world, connecting the Pacific Ocean and the Indian Ocean; Americas with Asia; Europe, the Middle East with Asia, and among Asian countries (Amer, 2014; Cuong, Van Cu, 2014). The sea brings a lot of benefits to Vietnam for economic and social development such as marine life resources, petroleum resources, marine tourism resources, marine energy resources (waves, sea breeze), etc. (Ngoc, 2018; Nguyen, Nguyen, 2018).

According to statistics, the sea economic sectors account for about 10 % of the national GDP at present in Vietnam. The economy of 28 coastal provinces and cities is estimated to reach 65-70 % of the national GDP. In coastal provinces and cities, the human development index is higher than the national average; The average income per capita is 1.2 times or more compared to the national average income (Duong, 2019). However, in recent years, the situation of marine environmental pollution has been very serious, which negatively affects people's lives and the sustainable development of the marine economy (Tran, Nguyen, 2019). A good example of marine environmental pollution in Vietnam is the case of waste discharge by the Formosa Ha Tinh Steel

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pollution in 2016. This Taiwanese conglomerate Formosa Plastics Group discharged untreated wastewater from their steel mill leading to massive fish losses in most Vietnamese coastal provinces (Fan et al., 2020).

According to a Government report, the economic and social losses are huge, thus affects the long-term livelihood of people in coastal areas. This can cost more than 17,600 fishing boats and nearly 41,000 people have been directly affected; More than 176,000 dependents were affected. The coastal fishing output has lost about 1,600 tons/month (Trung Tu, Thi Ha, 2019). Currently, Vietnam has many regulations to control pollution of the marine environment. However, there are still some unclear regulations that make it difficult to enforce. Also, Vietnam still lacks human resources, science, and technology to effectively implement activities to control marine environmental pollution.

Therefore, research to improve the law on control of marine pollution and improve the efficiency of enforcement is necessary. The focus of this article is to assess the content of the law on the control of marine environmental pollution in Vietnam and propose a solution to further complete the law.

## 2. Methods and materials

This study is conducted basing on the current provisions of Vietnamese law on control of marine environmental pollution. At the same time, this study is also executed based on the reference of published studies (Sekhar, 2005; Thanh, 2021; van Truong, BeiPing, 2019).

This research was completed based on the simultaneous use of many different research methods, including analysis, synthesis, dialectical materialism, interpretation, comparative, and history in analyzing and commenting on issues related to the law on marine pollution control in Vietnam.

## 3. Results and discussion

### ***Assessment of the current law on the control of marine pollution in Vietnam today.***

According to Article 3.18 of Law on Environmental Protection 2014: “*Pollution control refers to the process for preventing, detecting, controlling and removal of pollutants or contaminants*”. From this regulation, it can be seen that controlling marine environmental pollution is an activity to control environmental pollution in a specific field. Controlling marine environmental pollution is the activity of state agencies and other individuals and organizations in society. The law on the control of marine environmental pollution is a combination of legal regulations promulgated by competent state agencies to prevent, detect, and handle pollution.

Regulations of law on control of marine environmental pollution include the following two main groups: Group 1 (regulations to prevent pollution of the marine environment) and Group 2 (regulations to overcome (detect, prevent and handle) pollution of the marine environment).

The division of legal regulations on the control of marine environmental pollution into the two groups above is only relative. Because there are regulations that are both preventive and corrective for pollution of the marine environment.

Currently, in Vietnam, the law on control of marine environmental pollution includes the following specific provisions:

#### ***1: Regulations to prevent pollution of the marine environment***

- Regulations aimed at attracting environmentally friendly investment projects in coastal areas.

Law on Environmental Protection 2014 and Law on Natural Resources, Environment of Sea and Islands 2015 all identify the principle of prevention as the key in controlling environmental pollution in the general and marine environment in particular. In the Vietnam Sustainable Development Strategy for the period of 2011-2020, Decision No. 432/QĐ-TTg also identifies one of the important goals, which is: “*Sustainable industrial development with industry structure, technology, and equipment to ensure environmentally friendly principles; actively preventing and handling industrial pollution, building a “green industry”, giving priority to developing environmentally-friendly industries, technologies, and products, promoting high-tech development in urban areas, big towns. Step by step developing the environmental industry*”. With such guidelines, the sustainable development of coastal manufacturing industries is

necessary. However, up to now, Vietnam has not had a list of environmentally friendly industries that need to be attracted to the coastal area. Therefore, many production and business establishments with industries that are at high risk of causing environmental pollution, along with irresponsibility in environmental protection, have seriously polluted the coastal areas. Typically, the case of the Formosa Group caused incidents of Vietnam's central marine environment (Fan et al., 2020).

- Regulations on the assessment of the environmental impact

Production and business establishments must carry out an environmental impact assessment to forecast in advance the risks that may cause to the environment and based on that, propose solutions to minimize and eliminate the possibility of causing environmental pollution. Owners of coastal production and business establishments must also perform this obligation. Regulations on environmental impact assessment are stipulated in the Law on Environmental Protection 2014; Decree No. 18/2015/ND-CP dated February 14, 2015, on environmental protection planning, strategic environmental assessment, environmental impact assessment, and environmental protection plans; Decree No. 40/2019/ND-CP. It can be seen that the current laws on environmental impact assessment in Vietnam are relatively complete. This is an important legal basis for environmental protection for coastal production and business entities to implement (Nhung, 2019). However, the reality of assessing coastal environmental impacts is much more difficult than in other areas. The assessment of the ability to cause damage to the marine environment by investment projects requires modern, scientific, and technological equipment and a team of qualified officials. At present in Vietnam, there is a lack of science and technology in this area (Sekhar, 2005; Tran, Nguyen, 2019).

- Regulations on general monitoring and supervision of natural resources and environment.

Article 3.10 Law on Natural Resources, Environment of Sea and Islands, 2015 has stipulated: *“General monitoring and supervision of natural resources and environment mean a process of monitoring natural resources and environment, and impacts on natural resources and environment in a systematical way to supply information for an assessment of current conditions and development of natural resources and environment, making forecasts and warnings about negative impacts on natural resources and environment.”*. This is an activity of the competent state agency to regularly update information on marine environmental quality from which to give time management solutions. However, this activity has not been effective because Vietnam still lacks human resources, finance, and science and technology. The slow environmental information provided makes it very difficult to control marine environmental pollution. That is also the reason leading to the fact that many production and business establishments pollute the marine environment for a very long time that the competent state agencies cannot detect.

- Regulations on public consultation when implementing coastal investment projects.

The Law on Environmental Protection 2014 provides for communities to participate in the process of environmental protection in general and the control of marine environmental pollution in particular. Specifically, in Article 21.2, project owners are obliged to consult with regulatory agencies, organizations, and communities that are directly affected by the project when conducting a report on environmental impact assessment. However, this provision is difficult to implement in practice. A major challenge is to define the agency, organization, or community which are directly affected by the project. Also, to find how many percentages of the agreement must be reached so that the project owner can implement the project. Besides, Article 146.1 of the Law also provides: *“Representatives of local communities bear the environmental impact of the production facilities, business services, have the right to request the home base business, production, services providing information on the protection of the environment through direct dialogue or in writing; the organization learns the reality about the environmental protection work of the production base, sales, service; collect, provide information to the competent authority and take responsibility for the information provided”*. This provision is not easily implemented in practice because the concept of community representatives has not been clarified.

2. Regulations aimed at overcoming (detecting, preventing, and handling) pollution of the marine environment

- Environmental technical standards greatly serve the control of marine environmental pollution. This is the basis to determine whether the marine environment is polluted or not. Two groups of marine environmental technical regulations include (a) environmental technical

regulations with seawater and (b) technical regulations on waste and wastewater that is discharged into the sea. In 2015, Vietnam had a national regulation on seawater quality to assess and control seawater quality of the sea areas, serving the purposes of sports, aquatic recreation, aquaculture, protection of the marine environment, and other purposes; National standards on Waste Management to Effectively Control Marine Pollution ([Circular No. 67/2015/TT-BTNMT, 2015](#)). However, many national standards on waste and wastewater into the sea were issued more than a dozen years ago. For example, the National Technical Regulation on Coastal Seawater Quality; National Technical Regulation on Industrial Wastewater from Seafood Processing ... ([Decision No.16/2008/QĐ-BTNMT](#)). It can be seen that these technical regulations are no longer conforming to international standards and regulations and do not meet the requirements for the control of marine environmental pollution.

- Provisions on the handling of violations, overcoming pollution, compensating for damage when marine environmental pollution occurs.

First of all, organizations and individuals that commit acts of violating the legislation on the control of marine environmental pollution may be examined for penal liability and sanction of administrative violations. If causing damage, they must pay compensation and take responsibility to overcome pollution ([Art. 160 Law on Environmental Protection, 2014](#)). The provisions on penal liability prosecution have been stipulated in the Penal Code 1999 and now the Criminal Code 2015 (amended and supplemented in 2017) has many amendments to this provision. However, up to now, there have been no cases in which environmental polluters have criminal responsibility in Vietnam. Regarding administrative responsibilities, organizations and individuals that cause marine environmental pollution may be sanctioned for administrative violations according to Decree No. 155/2016/ND-CP. The highest administrative fine is VND 2 billion for organizations and VND 1 billion for individuals. Similarly, organizations and individuals polluting the marine environment may be deprived of the right to use licenses or suspend operation for a definite time (up to 24 months), and confiscate material evidence used for violations. However, the biggest difficulty is still the work of detecting violations of the law on control of marine environmental pollution. Many organizations and individuals stealthily dump waste into the sea. In particular, there are cases where businesses take advantage of the rain to open sewage pipes mixed with rainwater. Pollution of the sea environment is difficult to detect because it takes a long time and a large amount of waste to stink, creating a black area. Until the competent government finds out, the consequences are often very serious. Also, proving the violation is very difficult because the same sea area has many entities discharging together or due to proving the violation, it must apply complex science and technology. Any organization or individual violating the law on marine pollution control, if causing damage, must pay compensation per Decree No. 03/2015/ND-CP. However, in Vietnam today, if only applied according to common civil procedures, it is very difficult for the subject of damage because they are difficult to prove the damage and the causal relationship between violations and consequences. The practice of application of regulations on the claim for damages in the field of environment in Vietnam shows that there must always have the intervention of state management agencies. It seems that Vietnamese authorities are administrating a civil relationship ([Thi Luyen, Thuy Dung, 2018](#)). Hence, it can be assessed that Vietnam has not had an appropriate mechanism in claiming damages in the field of environmental protection.

- Regulations on responsibilities of state agencies in controlling marine environmental pollution.

According to current law, there are many entities involved in controlling marine pollution, including central and local authorities, common authorities, and competent authorities, which are: Government, People's Committees at all levels, Ministry of Natural Resources and Environment, Department of Natural Resources and Environment, Division of Natural Resources and Environment, officers in charge of the environment at the community level, other ministries and ministerial agencies... Despite the participation of many agencies, the control of marine environmental pollution in recent years still faces many shortcomings. This proves that the activities of competent state agencies are not effective. In particular, Vietnam has no specific regulations on the responsibilities of state management agencies when pollution of the marine environment occurs. Therefore, Vietnam's competent state agencies are still neglecting the management and control of marine environmental pollution ([Vuong et al., 2021](#)).



*3. Some solutions to improve the law on the control of marine environmental pollution and the implementation of this law in practice*

- To improve the law provisions on the control of marine environmental pollution and the effectiveness of these regulations in practice, Vietnam needs to implement the following solutions:

- The Government should soon develop a list of investment projects to encourage investment in coastal areas. These projects must be environmentally friendly. Investment project owners enjoy preferences according to the provisions of the law on investment preferences. In addition, each locality also needs to have a list of environmentally sensitive marine areas such as aquaculture areas, beaches, tourist areas, protective forest areas ... so as not to allow projects with a high risk of causing pollution investing into this area.

- Completing regulations on community participation in controlling marine environmental pollution. Accordingly, the law should clarify the following contents:

+ The stages where people are involved in controlling marine environmental pollution. From the author's point of view, people are involved in every stage of marine environmental pollution control. This is, right from the time the investor prepares the project, people have the right to express their opinions about whether or not they agree to implement the project. During the operation of the project, the people have the right to supervise the investors' performance of their obligations to protect the marine environment;

+ Determine who can give an opinion. From the author's point of view, it is necessary to specify the conditions of participants expressing their agreement or disagreement about the implementation of investment projects: People with full capacity for civil acts; Residents at a radius of 3 km for an environmentally friendly project, 5 km for a project with high environmental pollution risk. The figure of 3 km, 5 km is according to the author's senses, the state needs the advice of environmental experts to give more scientific figures.

+ Clarify the concept of "Representative of the community". In the author's view, a community representative is a group of people nominated by the community to represent the community in environmental relations. Community representatives are not competent state agencies. The opinion of the representative of a community does not exclude the opinion of every individual in that community.

- Competent state agencies should soon develop and publish technical standards on seawater and wastewater and garbage that are discharged into the sea. These technical regulations need to access international standards and regulations and meet the needs of controlling marine environmental pollution.

- Vietnam needs to develop a separate legal procedure for instituting an environmental dispute. Accordingly, there are many contents of the proceedings in the field of the environment which will be different from ordinary civil procedures. The establishment of this procedural mechanism is based on the following basic principles: Principles of public intervention; Principles of expert consultation; Principles of support and cooperation; Principles of paying penalty for pollution from the polluters; Principles of prevention.

- Completing regulations on responsibilities of state management agencies when marine environmental pollution occurs. This responsibility is primarily defined for local state management agencies because this is the direct management entity and often has the earliest information on the pollution of the marine environment. The content of environmental pollution management in general and marine environmental pollution, in particular, are criteria to determine the people's confidence level with management entities.

- There should be a plan for scientific and technological development to apply to activities of controlling marine environmental pollution. Accordingly, Vietnam can implement the following roadmap: Step 1: Import science and technology from developed countries to serve activities to control marine environmental pollution; Step 2: Actively encourage to develop domestic science and technology towards proactive in the technology of controlling marine pollution.

- Training human resources for activities of controlling marine environmental pollution. Currently, officials in charge of marine environmental pollution control are mainly concurrent. To ensure the quality of controlling marine environmental pollution, each province or city directly under the central government needs to train a group of officials specialized in this field. Vietnam can cooperate with countries that have successfully controlled marine environmental pollution to send officials there to study or have their experts come to teach and impart experience.

#### 4. Conclusion

This article has analyzed, fully assessed the laws on the control of marine environmental pollution and current practices in Vietnam. The article also proposed some valuable solutions to further complete the laws on the control of marine environmental pollution and some solutions to improve the efficiency when implementing the laws on the control of marine environmental pollution in Vietnam. Controlling marine pollution plays a huge role in Vietnam's sustainable marine economic development strategy. Currently, the law has many provisions governing this activity. However, the pollution of the marine environment still occurs in many places and the consequences are very serious. The main causes are identified as some of the legal provisions in this area are still missing, inadequate and contradictory. Besides, in many places, the competent state agencies are still loose in management and lack specialized officials in this field. Science and technology have not yet met the needs of controlling marine environmental pollution. Technical standards on seawater, wastewater, and garbage discharged to the sea are outdated, which do not meet the practical needs. Vietnam still lacks a special procedural mechanism for initiating environmental disputes. Hence, to operate effective marine environmental pollution control, Vietnam needs to resolve the above difficulties and contradictions. Any solution needs to be concerned enough to achieve the best results.

#### 5. Author contributions

The author conceived the idea, wrote the manuscript, approved the submitted version, and takes public responsibility for its content.

#### 6. Conflicts of interest

The author declares no conflicts of interest.

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## **Formation of the Policy of Involvement by Local Government Bodies in Territorial Communities of Ukraine**

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### **Abstract**

Despite the sufficient support for public involvement in decision-making on community development, citizens' direct participation remains relatively low. And the attraction actions taken by individuals or even civil society organizations cannot be considered adequate for them to influence the management process and reflect the consolidated point of view and aspirations of the whole community. Besides, the practice of introducing the participation tools in Ukraine gives grounds to speak about the risks of participation manipulation by officials of local councils or authorities. In the previous publications, the author identified the difference between the concepts of "participation" and "involvement" and described the risks and impediments to public participation at the level of local communities in Ukraine. The author established that a relatively significant number of participation forms and mechanisms do not have a statutory "representation quota" designed to recognize the position expressed as a "consolidated public opinion." This fact provides government and local government officials with ample space for participation manipulation as a social phenomenon. Those mentioned above and some other factors, in one way or another, impact the process of shaping the involvement policy by local political elites, its quality, and effectiveness. The article aims to define the concept of "involvement policy" at the territorial community level, outline the prerequisites for its formation, and determine the factors of its success. The study identified the concept of "involvement policy" and found several aspects of its successful construction and implementation. Moreover, the author outlined the difference between "involvement policy" and "participation policy," whose study and description are a promising direction in further research and investigations.

**Keywords:** involvement policy, involvement, local policy, participation, public legitimation, public/civic participation.

### **1. Introduction**

The introduction of forms and mechanisms of public participation in decision-making processes by local authorities and self-government bodies is primarily due to democratization, the selection of the European vector of Ukraine's development, and the ratification of several European international documents. These international documents include the European Charter of Local Self-Government, Additional Protocol to the European Charter of Local Self-Government on the right to participate in the affairs of a local authority, etc. The expansion of public participation mechanisms is a necessary prerequisite for building democracy, especially at the local level.

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Moreover, it is beneficial for the state to regularly involve people in public affairs since spontaneous public participation can often be destructive in modern society.

Citizens' possibility to participate in decision-making processes at the primary, local level – the range of territorial communities – often becomes formal and sometimes even manipulative (Ivanina, 2020). Thus, identifying and analyzing the factors influencing the quality and effectiveness of participatory practices in local communities is a precondition for molding an effective, comprehensive local policy to stimulate participation. Some studies and publications devoted to the formation and implementation participation are included in local policies. Authors who have researched this concept include O. Yatsunska, A. Nekriach, P. Vorona, O. Kondratynsky, S. Sakhnenko, M. Baimuratov, and others' works.

Myroslava Lendiel defines local policy as that one whose processes take place in a small space, among institutions enjoying autonomy from the state, which is close to the social community with which citizens identify themselves and which creates opportunities for the growth of democratic participation (Lendiel, 2009). However, today, the local policies studied by domestic scientists still come out mostly in exercising local government bodies' powers (Lendiel, 2009). Detailed reviews of local policies, especially outlined in a profile or directional way, factors of their formation and implementation, are carried out exceptionally rarely, and the list of publications in this direction is somewhat limited. Besides, when investigating the policies implemented by the authorities and local governments in the plane of civil society development, researchers often confine themselves precisely to the policies aimed primarily at involving residents (males/females) in management processes. Meanwhile, another component of participation acquires much less attention. This approach forms a stable subject-object model of participation, where the subject is the authorities or local self-government (from now on – referred to as "government"), while the object – citizens (males/females), local communities, civil society organizations, and institutions, etc. (from now on – referred to as "community").

Intrinsically, such a model cannot be considered a comprehensive view of participation as a phenomenon. In this case, the "community" is not considered an active shaper and local policy implementer. The policy itself can be called the "policy of involvement" ("policy of attraction"), where the ultimate goal of its implementers – "government" – may be ensuring the formal participation of the "community" to increase (and sometimes to provide) the level of legitimization of their own decisions and actions (Lendiel, 2020; Arnstein, 1969).

The study aims to analyze the approaches and tools for shaping the policy of involvement to legitimize the "government's" activities at the level of territorial communities in Ukraine. The study set the following objectives:

1. To define the "involvement policy" concept at the fundamental level of local government;
2. To determine the involvement policy success factors in territorial communities.

## **2. Materials and methods**

During the article preparation, the author analyzed several publications of Ukrainian and foreign scholars and scientists who are conducting (or conducted) their research on local policies, deliberative democracy, and the introduction of participatory practices at the local community level. The author also conducted a content analysis of the processes of involvement policy formation in some local communities of Ukraine and available research results of these processes. Furthermore, the author carried out an analytical organization of national and international policies to observe the levels of participatory opportunities available to the public. Thus, the following research methods were applied during the material processing: observation, comparison, analysis and synthesis, content analysis, definition, and description.

## **3. Results and discussion**

In the Ukrainian political lexicon, the terms "participation" and "involvement" are almost always used synonymously. However, the paper evaluates the participatory processes in terms of the role – subject or object – played by the "community." It becomes clear that there is a fundamental difference between the forms united by the concept of "participation" and the elements linked by the idea of "involvement." The difference consists in the fact that in the process of "involving," the subject is "government," which invites the "community" (acting as an object) to join government initiatives actively. In the "participation" process, the drive comes directly from

the "community," which offers its vision in solving problems and acts as an equal subject along with the "government" (Ivanina, 2019). The "government" initiates participatory initiatives, which primarily belong to "involvement" and are the largest beneficiary of these processes. So, we can say that involving the "community" in the decision-making processes is an integral part of the local policy pursued by the "government."

A new segment in Western political science, namely "local political studios," emerged in the late 70s of the twentieth century and turned into one of the most popular social science directions. It perceives local politics to have some differences in procedural and institutional characteristics compared to "big politics." The supporters of this trend emphasize that the essence of political and governmental decisions made by local authorities is determined, first of all, in the course of implementing "local (communal, municipal) policy" within a particular community (municipality). It only indirectly depends on the organization of the local self-government system in general (Lendiel, 2009).

The methodological approach of "neo-institutionalism" formed in the 1980s is also stimulating. It analyzes both the standard (officially accepted) structural features of society and politics and informal, not fixed in law, which, along with the former, influences socio-political actors and citizens' behavior in general (Lendiel, 2009). At the same time, Max Weber speaks of politics in the sense of "a concept that has a comprehensive meaning and covers all self-managing activities. You can talk about the policy of banks, the policy of trade unions during strikes, the school policy of rural or urban community..." (Weber, 2018). Considering the above, we can say that local policy-making subjects are all the actors who intend to influence the community decision-making processes. Local policy is segmental due to a set of powers exercised in the community by various actors, including education, medicine, housing, communal services, culture, economic development, etc. Thus, we can single out a local policy segment associated with the development of civil society in the community, introduced by one of the domestic policy subjects, namely – the local self-government body. Based on the above-mentioned subject-object nature of participatory practices available in communities, this local policy segment will refer to as "involvement policy."

Let us take as a starting point the thesis that domestic policies are formed within the local government authority. It is advisable to refer to the framework law that defines these powers – the Law of Ukraine "About Local Self-Government in Ukraine" (VRU, 1997), which grants a list of authorities by both local councils, and their executive bodies (VRU, 1997). Let us note that the powers in civil society development are not available in this list. Still, it is not exhaustive. The law allows for the local governments to exercise "except for the authority stipulated by this Law the other powers granted by law as well" (VRU, 1997). The activity analysis of local councils gives grounds to assert that most of their program documents envisage activities aimed at developing civil society. These actions aim to increase citizens' potency and civil society organizations in designing and implementing activities related to community development. The Constitution of Ukraine stipulates that public authorities and local governments, their officials are obliged to act only on the basis, within the powers, and in the manner prescribed by the Constitution and laws of Ukraine (Constitution, 1996). Naturally, the involvement policy formation on their part should occur in the same way – within limits and in the manner prescribed by the legislation of Ukraine. It is also apparent that the local self-government policy, including the policy of involvement, is reflected in the documents adopted by the local council – strategies, programs and plans of social and economic development, regulations, procedures, target programs, budgets, and so on.

The level of "community" activity in the direction of joining the proposed forms of participation depends on how qualitatively the "government" has formed the involvement policy. Alongside, an American researcher Sherry Arnstein notes that municipalities' activity in involving citizens (males/females) in decision-making processes is often associated with the desire to give these decisions a greater degree of legitimacy in the community's eyes. The author attributes such initiatives to the lowest participation level, actually non-participation - manipulation (Arnstein, 1969). We have analyzed the risks related to manipulating the public and civic participation in the corresponding study.

As a result, we have found out that the riskiest group of involvement tools concerning the possibility of manipulation are "public hearings," "public consultations," "public councils," and



others, whose final regulation of the introduction mechanism the legislator referred to the powers of local governments (Ivanina, 2020).

These forms were also attributed to "passive participation" when joint development and decision-making can occur, but community residents have little or no influence on the process. Hence, the involvement policy is supposed to contain rather significant risks associated with manipulation of participation as a phenomenon, as well as with the degradation from the level of "passive participation" to the level of "non-participation" (Ivanina, 2020). And since the documents (local regulatory legal acts) regulating the mechanisms and instruments of participation and involvement somehow reflect the community self-government involvement policy, it is evident that the quality of these documents directly affects the grade of community involvement policy as a whole.

What are the factors behind the success of involvement policy at the community level? Any policy's ultimate goal is to achieve the most effective result towards its implementation. Speaking about the involvement approach, the final destination of "government," as noted above, is to provide the highest level of legitimacy of its decisions (Arnstein, 1969), or, in other words – the legitimation of its activities by the "community." According to V. Nechiporenko, it is "a public process of certifying, approving, justifying or proving the validity and necessity of a certain social action, status or institution" (Nechiporenko, 2009).

In the overwhelming majority of modern political science theories, legitimacy is interpreted as "the concept according to which political actions are carried out by officials and are consistent with the principles and norms recognized and accepted by society" (Nechiporenko, 2009). In jurisprudence, legitimacy opposes legality as something that is endowed not with a legal but with a moral function to justify, first of all, power on the criteria of authority and goals (Gritsanov, 1999). Max Weber defines three types of legitimacy (Weber, 2018):

- Legitimacy based on the authority of traditions.
- Legitimacy based on the strength (charisma) of an extraordinary leader.
- Legitimacy based on the authority of legalized (legal) procedures.

The first type provides for the moral function of justifying the government since the very concept of "tradition" is defined as a system of norms and rules, guided by a relatively large and stable group of people (Ivin, 2004), in other words – the community. Thus, an essential factor in raising the level of "government" legitimation is the long-term nature of appropriate procedures and exercising power. Another factor is the increased number of people who approve, accept, agree; in other words – legitimize "government" in the community. It seems to be the aim of politicians who formulate and implement the involvement policy in communities because public participation constitutes one of the forms of power legitimation through appropriate public initiatives in a law-governed way (Afonin et al., 2006).

It would be wrong to believe that the "government" does not need legitimization by ensuring civic participation by the second and third types, arguing that it receives legitimacy of political procedures - elections and further acquisition of powers under the Constitution and laws of Ukraine. The widespread expression "the severity of laws in Ukraine is compensated by optional nature of their implementation" indicates the practice of legislative and normative violating (including at the local level) the specific procedures for exercising government and self-government powers. In such cases, "government" may resort to "public legitimation," using it to balance the lack of legal or regulatory legitimacy. The examples of extreme manipulation were the so-called referendums in Crimea and Donbas in 2014. Local authorities (in Crimea) and local self-government (in Donbas) deliberately violated Ukrainian laws and procedures regulated by them. They justified their actions by referring to many people who took part in those "referendums." Such examples demonstrate the manipulation of participation (in this case, in the form of a local referendum) to legitimize the illegitimate actions of the "government" (type 3 according to Weber).

The second type of legitimacy – "leadership" – is mostly inherent in the authoritarian government style. As some examples in the recent history of Ukraine show, even in countries with declared democracies, political leaders can resort to "public legitimation" of their actions. Thus, one of the President of Ukraine, Volodymyr Zelensky's first decisions, was to terminate the Verkhovna Rada of Ukraine of the 8th gathering, which was subsequently substantiated by the low level of public confidence in the legislature, as some sociological studies confirmed.

In the last two examples, to legitimize its actions, the "government" relied on the results of "referendum" and "questionnaire" forms of participation, which Lynn Frewer and Genome Rowe classified as "consultation" (Rowe et al., 2005). Hence, we can assume that the "government" may need "public legitimation" by all three legitimacy types. So, the formation and implementation of effective involvement policy become a critical task while discharging its authority. The study experience of involvement policy implementation in different Ukrainian communities shows that the quantitative indicator of "community" participation, which, as noted above, is the final goal of the involvement policy, entirely differs in the proposed participatory practices. It depends on several factors that ultimately impact the citizens' motivation to participate in various forms of involvement and, consequently, the involvement policy success.

Open management provides policies to ensure transparency, accountability, and citizens' participation in governance. There exists an interdependence between the level of openness of local self-government in communities and the level of public and civic participation. Transparency International studies prove this relationship real (Krasnopilska, 2016). Accordingly, government openness turns to be one of the involvement policy success factors. However, a set of factors influencing the success or failure of the involvement policy implementation is not limited to the openness of the "government." Thus, E. Afonin, L. Goniukova, and R. Voitovych consider participation to be a manifestation of a new civilizational orientation in contemporary citizens' lives, who can actively, in a mobile way, and openly defend their interests and rights to participate in state-building (Afonin et al., 2006). Proceeding from this, the issue of equal conditions for human social participation in public and political life deserves special attention. The practicality for raising such a question consists in the awareness that people are individualized and not equal by nature.

Nevertheless, the main task in overcoming such inequality on the state's part must be creating appropriate conditions for equal participation (Afonin et al., 2006). The principles of non-discrimination, equal treatment, and openness, namely equal access for everybody, including meeting the needs of minorities, persons in poor conditions, vulnerable or socially excluded individuals, or groups of persons wishing to participate, are also mentioned in the recommendations on promoting associations to taking part in government decision-making from the participants of the Civil Society Forum. It was organized as part of the 2015 Supplementary Human Dimension Meeting devoted to freedom of peaceful assemblies and associations (CE, 2016). Therefore, we can say that equal access is also among the success factors of the involvement policy.

As noted above, when involving the population in management processes, the "government" may pursue the goal of legitimizing its activities following the first type of legitimacy (by Weber) – legitimacy based on tradition strength. Therefore, the local politicians' task is to provide their actions with signs of traditionality, including activities related to community involvement in decision-making processes. The following thesis can express the idea: "the government always (traditionally) attracts the community to the development and implementation of its decisions. So, these decisions and this government cannot be illegitimate." Let us dwell separately on the definition of the term "tradition," interpreted as experience, customs, views, tastes, norms of behaviors, etc., which have developed historically and transmitted from generation to generation (Bilodid, 1980). That is, one of the tradition-forming factors is its continuity – "transmission from generation to generation."

M. Shaikhullin somewhat narrows the definition, dividing the concept of "custom" and "tradition," claiming that tradition can exist for a short period. In contrast, the custom is a historical phenomenon (Shaikhullin, 2013). This interpretation removes the need for the duration – from generation to generation – to mold traditions and allows the use of the term "tradition" in the context of participatory research at the community level. Thus, it becomes evident that "traditions of participation" can emerge in a community. One of their form factors is the continuity of mechanisms and tools of participation developed in the community. In this case, continuity can be ensured by repetition in specific management cycles, for example, the budget period.

V. Kuybida states that "the efficient operation of self-government system is only possible in the presence of reliable information links between all its units" (Kuybida, 2002). We can rephrase this statement relative to the research topic of involvement policy success factors at the local level. It reads as follows: "effective implementation of the involvement policy is possible provided there are reliable information links between all its participants – government and community." Sherry Arnstein also defines informing as the first step towards effective civic participation. But at the



same time, she warns against one-lateral communication (only in the direction of government-community), as it becomes a real obstacle to the actual influence of residents (males/females) on community decision-making (Arnstein, 1969). The importance of communication at the local self-government level is also proven because it is a reliable and constant supplier of valuable information, further employed in the management process (Shturkhetsky, 2011). Thus, an essential condition for the involvement policy formation is the arrangement of effective mutual ("government" – "community") communication.

Undeniable is the statement that the result is the logical end of any process, the final summary of any occupation, activity, development, etc. (Bilodid, 1980). However, in the involvement processes, it is reasonable to differentiate the beneficiaries of the result – a policy subject (actually – "government") and a policy object ("community"). We have determined above that the government's involvement policy result is an increase in the number of people involved to legitimize its activities by the "community." However, such an outcome is hardly relevant for other participants of this policy - "community."

One of the reasons why participation arises is citizens' dissatisfaction with the policies and decisions carried out by the authorities and local governments. The conviction that the "government" makes wrong or ineffective decisions generates in the "community" a desire to contribute to the processes of their adoption and implementation to transform existing practices for the better qualitatively or to focus on issues that were secondary to the government but made a problem for the community (Ivanina, 2019). Therefore, it is evident that people expect quite concrete results from their participation – namely, solving relevant problems to whose resolution they are ready to join, implementing their initiatives, etc. Participation is one of the manifestations of social activity, which, in turn, can be described by some essential characteristics: the orientation of the individual to other people or society as a whole; basing on social interaction; the desire to achieve particular goals with the help of community; expressiveness in specific actions (simple or complex) aimed at achieving the objectives desired by the subject, which may be prosocial or antisocial (Klymkiv, 2014).

Failure to achieve goals or implement initiatives will harm a person's motivation to be engaged in participatory processes, which can take the form of both elementary refusal to be involved and formation of protest sentiments about the "government." Neither the first nor the second helps achieve the involvement policy goal – an increase in the number of people involved in participatory forms. Therefore, we can claim that executing "community" initiatives molded during participatory practices is a significant factor in policy success. There arises a question about the appropriate number of implemented public initiatives to the total number of proposed ones. It is relevant because 100% implementation can give the impression of replacing real power with public participation ("we can make decisions on our own, we need "power" only to realize them or do not need it at all"). Simultaneously, complete ignorance can reduce citizens' motivation to participate ("if our initiatives are all the same not implemented, it makes no sense to participate at all"). However, investigating this issue is not seen as possible in this article format and can be considered promising in further work.

The study conducted in January 2020 as part of the program "Join!" (Engage, 2020) shows that the most widespread forms of participation in communities are precisely public hearings (6 % of respondents participated in such hearings). Along with public hearings, a set of tools most frequently used by the "government" includes "public consultations" and "public councils." The corresponding study has analyzed the regulatory framework of Ukrainian participatory processes (Ivanina, 2019) and highlighted a characteristic feature for regulating the participation and involvement mechanisms. It refers to legislator's delegation of powers to regulate them to the fundamental level of local self-government unless they act in current regulatory instruments controlled by the Law of Ukraine "On Local Self-Government in Ukraine" (VRU, 1997). Among such tools, we have the following: general meetings of citizens at the place of residence (VRU, 1997); local initiatives (VRU, 1997); public hearings (VRU, 1997). Except for the above, the Resolutions of the Cabinet of Ministers of Ukraine provide for the other tools which are recommendatory for local governments: public councils (CMU, 2010), public consultations (CMU, 2010), public expertise (public scrutiny) (CMU, 2008). Only "local initiatives" and "public expertise" of the mentioned tools fall into the category of "participation," the rest – into "involvement" (Ivanina, 2019). Therefore, it is evident that the quality and effectiveness of

local regulatory legal acts (regulatory instruments), which would regulate community participation, directly affect the involvement policy quality and efficacy.

Yu. Byrchenko gives generalized indicators of the projected legislation efficiency (Byrchenko, 2004) to determine the local regulatory legal acts (RLA). Among them are:

- The practical validity of the local RLA.
- The level of its developers' political and legal culture.
- Correspondence of the local RLA provisions to the national legislative and regulatory frameworks.
- The language of the document and its accessibility to the population.
- Conciseness, clarity of wording.

The content of the local RLA should not require additional comments and clarifications. Since the local RLA is binding on the territory of the community (VRU, 1997), the observance of this principle by the local self-government body is also a confirmation of its legitimacy by the 3rd type (according to Weber) – legitimacy based on the authority of legalized (legal) procedures. In other words, any activity (decision) of a local self-government body is a priori legitimized if it occurs under existing standardized or legally regulated operations. The performance of local politicians towards implementing the involvement policy is no exception.

So, the clarity and inviolability of the procedures that normalize participation in the community belong to this policy's success factors. However, one should remember a significant difference between an empty ritual of formal participation and the possession of real power necessary to influence the process (Arnstein, 1969). That is, the mechanical procedure execution in various forms of participation does not automatically lead to the goal set by the "community" by engaging in participatory practices that "government" offers as part of its involvement policy, namely – redistribution of power and real impact on management processes (Arnstein, 1969), which, in turn, can seriously hamper the achievement of the involvement policy final goal – an increase in the number of people involved in the preparation, adoption, and implementation of decisions in the community and, thus, legitimization of local "government" and its activities.

#### **4. Conclusion**

Summing up the above, we can say that the involvement policy formation and implementation will increase the legitimization level of the local government's decisions and community activities. Simultaneously, it appears to be the primary goal of the "government" to initiate and implement participatory practices, which, in turn, can hardly be considered the target for the citizens who participate in them. We can also assume that along with an involvement policy, "community" can also develop a participation policy, whose subject will be "community" in all its manifestations – from residents (males/females) and their groups to civil society institutions. This policy content and success factors are sure to differ from the involvement policy's scope and success factors introduced by the "government."

It is reasonable to assume that both participation policy and involvement policy models are subject-object. The only difference consists in the fact that the subject of participation policy is the "community," while "government" is an object." As well as with the involvement policy, the participation policy can hardly contribute to building a democratic, legal, socially-oriented community with effective management in the case of its significant dominance over the involvement approach. For reaching this goal, it would be expedient to construct a participation-stimulating policy as a social phenomenon ("participation policy"), which would develop according to the subject-subject model, where both "government" and "community" are equal subjects of design and decision-making processes. This area is quite promising for research.

#### **5. Author contributions**

The author conceived the idea, wrote the manuscript, approved the submitted version, and takes public responsibility for its content.

#### **6. Conflicts of interest**

The author declares no conflicts of interest.

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## Domestic Water Sources in Northern Region, Ghana

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### Abstract

The study was designed to assess households' perception of the use of different water sources in Northern Ghana. The mixed-method approach was used for the study. Using a multi-stage sampling technique, the study collected cross-sectional data from 356 households in the Region for the study. Descriptive statistics and computation of perception index were used to analysed data for the study. The study revealed that households in the study area use water from both improved (boreholes and taps) and unimproved (rivers, well, and rain collection) sources for various domestic purposes such as cooking, drinking, livestock watering, and cleaning. Improved water was perceived as safe and thus used for drinking and cooking. The study revealed that 35 %, 24 %, 28 %, and 13 % use wells, boreholes, taps, and rivers, respectively. About 47 % of households use unimproved water sources as their main source of water. The study recommends that government and non-governmental organizations should provide adequate improved water for use at all times.

**Keywords:** domestic water sources, improved water, perception, Northern Ghana.

### 1. Introduction

Globally, water is considered a vital commodity to human lives and it is essential for development. Its importance can be related to the quality and quantity of the water. To achieve good personal and domestic hygiene practices, it is critical to gain access to the required quantity of water needed for sustenance. Water quality is needed, especially for the maintenance of health. Water is the most-searched-for commodity on the planet and many are dying due to its non-availability or poor quality. Lack of access to safe water has become a problem of pressing global importance (UNICEF/WHO, 2008). Presently, more than two billion people around the world (between 1990 and 2010) have gained access to improved water for the first time. Through the activities of various stakeholders (including both private and public institutions), most developing countries gained access to improved water for drinking. The water sector in Ghana has not been static either; there has since 1990 been a significant improvement in water coverage. These have been succeeded by a series of reforms and they have had significant influences on the level of water supply recorded in the country. The access to improved water sources has contributed to the achievement of the Millenium Development Goals (MDGs) in the country (Asiedu, 2010; UNICEF/WHO, 2015).

In most communities, the main sources of drinking water are surface and groundwater

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(Abanyie et al., 2020). It is therefore perceived that access to improved water sources can lead to development and reduction in disease burden in rural communities. However, these sources stand the risk of contamination with chemicals and microbes since they threaten human lives. Water treatment for domestic use by households in Ghana is also not a common practice (Amoah, 2020). These issues can be attested by several studies that have indicated that the provision of improved water can translate to the usage of improved water (Abanyie et al., 2020; Amoah, 2020; de França Doria, 2010).

Other studies revealed that user perceptions regarding their water services were related to the long-term sustainability of water services (Herbst et al., 2009; Ramos da Silva et al., 2010; Francis et al., 2015). This is because many people are often guided by their perception of water quality and not physico-chemical and bacteriological qualities that are often the most important parameters for measuring access to improved water sources (UNICEF/WHO, 2012). By depending on perceptions, users hold different views about the aesthetic values of water quality (de França Doria, 2010). Improved water systems are generally provided to enhance lives, hence, must be established appropriately, effectively, and sustainably for use by beneficiary communities. User perceptions, preferences, and determinants of these improved water systems are necessary for evaluating the quality of the water sources as part of the efforts to achieve overall safe water coverage in the country (UNICEF/WHO, 2012). This would play an important role when trying to undertake preventive measures against water-related diseases. It has been reported that poor perception of water quality can prevent people from taking any water quality treatment measure before drinking and this could be deleterious to human health (Ramos da Silva et al., 2010).

The goal of ensuring water quality in Ghana is to improve the livelihood and health of citizens in different regions by improving access to potable water and safe sanitation and hygiene (Abanyie et al., 2020; Essumang et al., 2017; Keraita et al., 2003). Notwithstanding, the indirect effect of environmental and water quality-related risk on mortality adds more than 40 % to the cost of directly caused mortality in Ghana (Bartram, Cairncross, 2010). Aside from this, there exists a dearth of evidence supporting the situation of water quality assessment in Ghana, especially at the household level. Consequently, little has been done on households' perception and use of improved water sources in Ghana. This study, therefore, seeks to illuminate the various community perceptions and preferences related to the use of different sources of water services in the Northern Region of Ghana.

The following research questions guided the study:

1. What sources of water are available and used by households in Northern Ghana?
2. Do households have access to improved water?
3. What are the reasons for the choice of main water sources?
4. What are the perceptions of households regarding the provision and use of improved water sources?
5. What are the perceptions of stakeholders regarding the provision and use of improved water sources?

## **2. Materials and methods**

The study area was the Northern Region of Ghana. Specifically, respondents were selected from the Bunkpurugu-Nakpanduri District in the Northern Region. The study employed a cross-sectional research design. The mixed-method (quantitative and qualitative) was employed to provide a better presentation of the data and increase validity by providing the participants with the ability to expand on ideas not offered in the quantitative questions. Thus, the approach complemented each other and created valuable information on households' perceptions of the use of different water sources in Bunkpurugu-Nakpanduri District.

The study population comprised households (household heads) within four (4) communities in Bunkpurugu District. A mathematical method by Glaser (1965) was used to estimate the sample size. The sampling frame for this study was then the lists of households in Bunkpurugu-Nakpanduri District was calculated using the following formula:



$$n = \frac{N}{1 + N(\alpha)^2}$$

Where:

n = Sample size, N = Sample frame = 17,621 households, Confidence interval ( $\alpha$ ) = 0.05. Using the formula above, the sample size arrived at was 395 households (respondents).

The multistage sampling technique was used to select the respondents for the study. This technique enabled the researcher to design a convenient sampling frame to make the study practicable. This study combined five sampling stages, namely, purposive sampling, cluster sampling, simple random sampling, quota sampling, and systematic sampling. Primary data was gathered from household heads and focus group participants (women and youth groups). Two sets of instruments were used to solicit data; one for households and the other for water managers and the interview guide for women and youth groups.

The quantitative and qualitative raw data were cross-checked, edited to check inconsistencies and errors, and coded (group responses into a limited number of categories, strings, or themes). Quantitatively, the Statistical Package for Social Scientist version 21, STATA 13, Microsoft Word, and Excel were used to analyse the edited data. Qualitatively, data were transcribed, cross-checked and edited. Afterward, they were organized into themes and analyzed. The final output was presented in the form of texts and direct quotes by respondents under the stated objectives of the study. Descriptive statistics such as frequencies and percentages, pie charts, and bar charts were used to summarize results on available water sources, use of various water sources for different domestic purposes, sources that constitute their main water sources as well as the reason for that choice.

Households' perception of improved water was measured using the perception index score. The assumption is that the agreement level corresponds directly to the contributions, either positive or negative. To calculate the perception index score, the respondents rated each statement using one of a five-point Likert scale (strongly disagree, disagree, neutral, agree, and strongly agree). Each of the scales was respectively assigned a value of 1, 2, 3, 4, and 5. The summation of the perception score for each statement was obtained through the addition of the product of responses for each scale and the respective values. The average score of each statement was derived by dividing the perception statement score by the total responses (respondents) to each of the twenty-four (24) statements.

Mathematically, this is expressed as:  $AveragePerceptionScore = \frac{\sum PSS_i V_i}{\sum p_i}$

Where: PSS<sub>i</sub> is the summation of the frequency of a Particular Statement Scale (PSS)

V<sub>i</sub> is the value of assigned to each scale

P<sub>i</sub> is the total number of Persons (P) who answered the questions

### 3. Results and discussion

#### Water sources available and used by households in the study area

Water sources available in the study area for use by households are reported in [Table 1](#). An analysis of the multi-response question on the available water sources in the study area revealed that 37 % of respondents had tap water in their communities; 68 % also confirmed the availability of boreholes in their area of stay. About 64 % and 57 % of the respondents confirmed the availability of rivers and wells respectively. All (100 %) respondents revealed that they had access to water from rain seasonally since the district finds itself within the savannah zone of the country which experiences a single maxima rainfall called the rainy/wet season, from June to September.

**Table 1.** Water availability and use by households

Water sources	Availability	Use	Cooking	Drinking	Livestock	Washing
Borehole	242 (67.98 %)	242 (100 %)	241 (99.59 %)	242 (100 %)	185 (76.45 %)	172 (71.07 %)
Tap	133 (37.36 %)	129 (96.99 %)	129 (100 %)	129 (100 %)	73 (56.59 %)	106 (82.54 %)
River	226 (63.48 %)	226 (100 %)	171 (75.66 %)	153 (67.70 %)	200 (88.49 %)	226 (100 %)

Well	202 (56.74 %)	202 (100 %)	197 (97.52 %)	187 (92.57 %)	184 (91.09 %)	201 (99.50 %)
Rain	356 (92.13 %)	356 (100 %)	301 (84.55 %)	256 (71.91 %)	291 (81.74 %)	328 (92.13 %)

Source: Field Survey, 2019

From the result, all households have access to at least one water source regardless of its reliability or quality, with the tap water (best-treated option) recording the least available percentage (37 %). However, its presence signifies the likelihood of future expansion to cover a greater part of the District given public education on improved water is stepped up and subsidies initiated to attract households to get connected. Concerning the use of these available water sources by households, all the other water sources (borehole, river, well, and rain) recorded 100 % use except for tap water. This reduction in use by households (from 100-96.99 %) could be because the other water sources were freely supplied. This confirms studies that indicated that water beneficiaries are usually reluctant to pay for improved water services. (Agyenim, Gupta, 2010; Hope, 2015).

In general, households used these sources for domestic purposes such as cooking, drinking, washing/cleaning purpose, and livestock watering. Livestock watering fell under domestic as the people practiced a semi-intensive kind of animal rearing where animals such as goats, sheep, donkeys, chicken, and others spend a good amount of time in the house fed and watered by owners. The majority of households that used boreholes and taps used them for drinking and cooking. 99.60 % and 100 % used water from boreholes for cooking and drinking respectively while all (100 %) respondents who used taps used it for both cooking and drinking. The results also showed reduced use of these (borehole and taps) sources for purposes such as livestock watering (borehole: 76.45 %, tap: 56.59) and washing/cleaning (borehole: 71 %, tap: 82.54 %). The reverse also holds for river users, where the majority of respondents who used the river would use it for livestock watering and washing than respondents would use it for cooking and drinking. The use of river water by households for cooking, drinking, livestock watering, and washing was therefore recorded as 75.66 %, 67.70 %, 88.49 %, and 100 % respectively.

Meanwhile, the use of wells and rainwater by respondents did not vary as almost the same percentage of use (wells and rain) was recorded across all purposes. For well the use was in this order cooking (97.52 %), drinking (92.57 %), livestock watering (91.09 %) and washing (99.50) whilst rain, on the other hand, recorded the following percentages for the different purposes cooking (84.55 %), drinking (71.91 %), livestock watering (81.74 %) and washing (92.13 %). The reason for the pattern of water use is that some household heads perceived boreholes, taps, and wells as a safer source for human consumption even though they felt there was relatively more cost (in the form of monetary and time) associated with its use. For instance, one 53 years female household head during the focused group discussion who reported using tap and borehole mainly for drinking and cooking explained that: *“Even though I would prefer my household to use water from borehole and tap for every activity, water from these sources are difficult to come by, so why will I waste it on activities that do not really matter (referring to washing and livestock watering).”*

Another respondent who consented with the earlier statement put it that: *“I will rather waste money on human beings than inanimate things, that’s why my households depend on borehole and tap for drinking and cooking and water from free sources for washing/cleaning and livestock watering”*. Nonetheless, this finding agrees with that of Mahama (2013) who found that 11.3 % of households used unimproved water sources for other purposes either than drinking. From Table 1 above it can be seen that apart from tap and borehole that recorded 100 % use for drinking, all the others recorded a reduced percentage. Well as a source which was seen as the best alternative in the absence of tap and borehole recorded 92.57 % used for drinking, rain recorded 71.91 % and river recorded the least (67.70 %).

### Households Access to Improved and Unimproved Water Sources

To create a clearer picture of this data and also find out the number of households who depended mainly on improved sources, the sources of water identified were further categorized into two groups (improved source and unimproved source). Using the WHO definition, in consideration of what pertains in the area, improved sources of water included pipe and

boreholes while unimproved comprised river and wells. With this knowledge, it can be realised from Figure 1 that even though a majority of households constituting 53 % used improved sources as their main source, 47 % also depended on unimproved water sources. This finding confirms that of Engel et al. (2005) who established that households with access to improved water still used unimproved water as their main domestic water source; either from hand-dug wells or surface sources from rivers, ponds, and streams.

**Table 2.** Categorization of the main source into improved and unimproved

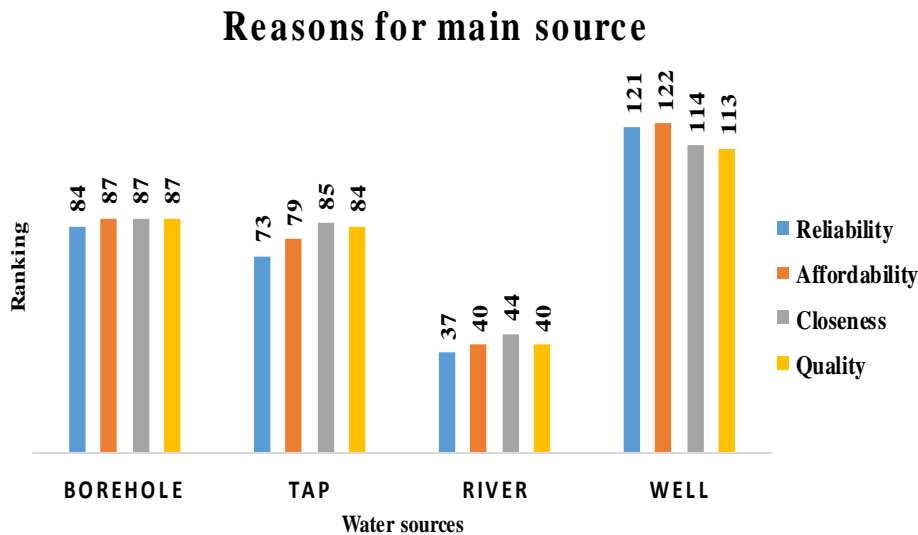
Access	Frequency	Percent
Improved	204	52.0
Unimproved	191	48.0
Total	395	100.0

Source: Field Survey, 2019

Access to improved water sources is very critical to the health of the citizens. However, in Ghana, this has been the usual challenge to rural residents (Amenga-Etego, 2003). The situation may even be more serious among people living in areas where wells often dried up in the dry seasons (Peloso, Morinville, 2014). Good water promotes good health and enhances national development (Stoler et al., 2015). For that matter, safe drinking water and sanitation are considered indispensable to sustain life and promote health as well as enhance the fundamental to the dignity of all (Peloso, Morinville, 2014).

**Reasons for Use of Main Water Source**

There was also a need to know why a household selected a particular source as its main source. The respondents were allowed to provide multiple responses using indicators such as reliability of the source, affordability, closeness to household, and quality of water. Out of the 87 who selected boreholes as their main source, 84 gave the reason as reliability and all respondents (87) gave a reason as affordability, closeness as well as quality. Meanwhile average rank for these reasons stood at 2 signifying medium reliability, affordability, closeness, and quality.



**Fig. 1.** Reasons for Use of Main Water Source (Multiple Responses)

Source: Field Survey, 2019

Again, out of the respondents who selected tap as the main water source, 73 of them said it is because of its reliability, about 79 said it was because it is affordable, 85 also said it was based on closeness to home, and finally 84 because of quality. For tap source, the average rank for reasons was medium (2) reliability, affordability, closeness, except quality that was ranked high (3) by most respondents. With the river, 45 households used it as their main source and the number of people

with their reason for that choice was as follows; 37 people mentioned reliability, 40 people went for affordability, 44 closeness, and 40 quality. The average rank for the river recorded a high (3) rank for reliability and affordability while closeness and quality for the river had a medium (2) average rank. Lastly, the 124 people who used well as their main water source, had 121 of them giving the reason as being reliable, 122 said is because water from that source is affordable, 114 mentioned closeness to home and 113 gave the quality of water from that source as their reason for patronizing wells more frequently. Also, the majority of the respondents giving these reasons for the use of wells ranked all reasons a medium (medium reliability, affordability, closeness, and quality). UNICEF/WHO (2015) confirms the indicators used by the households respondents because it is believed adequacy, quality, reliability, and convenience of the water to the users are very critical in the choice of water sources for domestic purposes.

### Perception of Households on Improved Water

It is evident from the results that the majority of the respondents agreed to positive statements under administrative (3.5), reliability (3.5), and quality (4.1). This can be explained that the respondents had a positive perception of improved water. Respondents, however, remained neutral on participation (3.3) in the planning and implementation of improved water systems. The overall index for all the perception statements leaned towards agreeing (3.6) signifying that respondents have a positive perception of improved water which may translate into the use of such sources. [Table 3](#) describes the perception of the households on improved water sources.

**Table 3.** Perception of households on improved water

Perceptions on improved water	SD=1 N(%)	D=2 N(%)	N=3 N(%)	A=4 N(%)	SA=5 N(%)	Mean
<b>Participation</b>						<b>3.3</b>
Water users were consulted on the type of design and planning	56(15.7)	17(4.8)	50(14.0)	110(30.9)	123(34.6)	<b>3.6</b>
Water users were consulted on the location of the water	71(19.9)	24(6.7)	72(20.2)	105(29.5)	84(23.6)	3.3
Water users decided on billing mechanism, if any	51(14.3)	49(13.8)	106(29.8)	73(20.5)	77(21.6)	3.2
Water users determine prices of water, if paid	60(16.9)	58(16.3)	81(22.8)	70(19.7)	87(24.4)	3.2
Water management team ask for suggestions about how to improve services	66(18.5)	23(6.5)	68(19.1)	99(27.8)	100(28.1)	3.4
<b>Administrative</b>						<b>3.5</b>
Decisions of users are accounted for in the planning of the improved water system	40(11.2)	19(5.3)	82(23.0)	133(37.4)	82(23.0)	<b>3.6</b>
Suggestions of users are seriously considered in the management of improved water systems	39(11.0)	32(9.0)	71(19.9)	122(34.3)	92(25.8)	<b>3.6</b>
3.Decision taken with regards to the water is favourable to everyone	43(12.1)	54(15.2)	66(18.5)	155(32.3)	78(21.9)	3.4

Water managers have the required training in water management	56(15.7)	16(4.5)	72(20.2)	121(34.0)	91(25.6)	<b>3.5</b>
Water managers are given on the job training on water management	50(14.0)	22(6.2)	112(31.5)	117(32.9)	55(15.4)	3.3
Revenue accrued from water source is managed properly	30(8.4)	52(14.6)	95(26.7)	94(26.6)	85(23.9)	3.4
<b>Accessibility</b>						<b>3.5</b>
Water facility is constantly maintained and is functioning	51(14.3)	49(13.8)	25(7.0)	113(31.7)	118(33.1)	3.6
Water system is opened at all-time everyday	49(13.8)	53(14.9)	15(4.2)	93(26.1)	146(41.0)	<b>3.7</b>
Relatively, less time is needed/spent to draw water from improved sources	49(13.8)	59(16.6)	62(17.4)	105(29.5)	81(22.8)	3.3
Price for improved water is reasonable	16(4.5)	34(9.6)	36(10.1)	153(43.0)	117(32.9)	<b>3.9</b>
Water source is close to household	36(10.1)	54(15.2)	52(14.6)	72(20.2)	142(39.9)	<b>3.7</b>
Queues are managed at water points to avoid quarrels and enhance access	49(13.8)	40(11.2)	68(19.1)	104(29.2)	95(26.7)	3.4
Water is adequate for all households	29(8.1)	46(12.9)	60(16.9)	116(32.6)	105(29.5)	<b>3.6</b>
Seasonal reliability of water	95(26.7)	48(13.5)	28(7.9)	110(30.9)	75(21.1)	3.1
<b>Quality</b>						<b>4.1</b>
Water from improved source lathers easily with soap	64(18.0)	61(17.1)	64(18.0)	78(21.9)	89(25.0)	3.2
Water from improved source is odourless	3(0.8)	37(10.4)	1(0.3)	136(38.2)	179(50.3)	<b>4.3</b>
Water contains no particles/clear	3(0.8)	23(6.5)	52(14.6)	118(33.1)	160(44.9)	<b>4.2</b>
Water has no taste	2(0.6)	26(7.3)	29(8.1)	94(26.4)	205(57.6)	<b>4.3</b>
Water from improved source is relatively safe	5(1.4)	21(5.9)	36(10.1)	96(27.0)	198(55.6)	<b>4.3</b>
<b>Total</b>	<b>356</b>		<b>Perception Index Score=</b>			<b>3.6</b>

Source: Field Survey, 2019

A critical look at the results also shows that a good number of people, if not the majority, may not use improved water because of the negative perception they have regarding its reliability. On their perception about participation and administration, about 28 % (100) and 40 % (143) disagreed respectively that improved water facilities are constantly maintained (and functioning) and reliable seasonally respectively. On accessibility, about 31.9 % had the view that because the queues that develop at water points are not managed properly, they often breed quarrels. A 33-year female household head during the study reported that: *“Because of the pressure at water point myself and children cannot rely on improved sources as we often leave home in the mornings,*

leaving their cans at the point to enable us to fetch immediately we are back, we end up getting a limited number of buckets not enough for the whole family". Another woman supported her submission by adding that: "Sometimes leaving your cans there doesn't guarantee you getting water, as you may come to meet some neighbors who will not allow you to fetch giving the reason that they recognize the presence of human beings and not things (water cans)". Regarding use of water, the perceptions of users are a very important factor to consider (de França Doria, 2010).

### Perception of Water Managers on Improved Water

Table 4 describes the perception of the water managers on improved water sources. From the table, respondents (managers) strongly agreed to 1 statement under quality, agreed to 11 statements, remained neutral on 11 statements, and disagreed on 1 statement. Just like the household heads, a good number (40 %) of managers disagreed with the statement that less time is spent to draw water from improved sources. However, a majority (55 %) of managers were of the view that improved water sources are not seasonally reliable. This explains why some households cannot rely mainly on improved water sources but rather depend highly on unimproved sources for their water needs. Other outcomes that explain the water use pattern in District are the fact that 30 % strongly disagreed that improved water systems are always functioning and were also of the view that the inadequacy of these systems generates queues at water points sometimes leading to the outbreak of quarrels when poorly managed. Generally, managers also had a good perception with regards to improve water as the average index stood at 3.5 signifying an agreement to perception statements posted.

**Table 4.** Perception of water managers on improved water

Perceptions on improved water	SD=1 N (%)	D=2 N (%)	N=3 N (%)	A=4 N (%)	SA=5 N (%)	Mean
<b>Participation</b>						<b>3.6</b>
Water users were consulted on the type of design and planning	4(20)	0	0	7(35)	9(45)	<b>3.9</b>
Water users were consulted on the location of the water	3(15)	2(10)	0	6(30)	9(45)	<b>3.8</b>
Water users decided on billing mechanism, if any	3(15)	1(5)	0	7(35)	9(45)	<b>3.9</b>
Water users determine prices of water, if paid	5(25)	1(5)	3(15)	4(20)	7(35)	3.4
Water management team ask for suggestions about how to improve services	8(40)	1(5)	0	6(30)	5(25)	3.0
<b>Administrative</b>						<b>3.4</b>
Decisions of users are accounted for in the planning of the improved water system	7(53)	1(5)	1(5)	7(35)	4(20)	3.0
Suggestions of users are seriously considered in the management of improved water systems	3(15)	1(5)	0	11(55)	5(25)	<b>3.7</b>
Decision taken with regards to the water is favourable to everyone	6(30)	1(5)	0	5(25)	8(40)	3.4
Water managers have the required training in water management	8(40)	0	0	6(30)	6(30)	3.1



Water managers are given on the job training on water management	8(40)	1(5)	1(5)	4(20)	6(30)	3.0
Revenue accrued from water source is managed properly	4(20)	0	1(5)	5(25)	10(50)	<b>3.9</b>
<b>Accessibility</b>						<b>3.3</b>
Water facility is constantly maintained and is functioning	6(30)	0	2(10)	2(10)	10(50)	<b>3.5</b>
Water system is opened at all-time everyday	4(20)	5(25)	0	4(20)	7(35)	3.3
Relatively, less time is needed/spent to draw water from improved sources	7(35)	1(5)	3(15)	3(15)	6(30)	3.0
Price for improved water is reasonable	5(25)	4(20)	0	3(15)	8(40)	3.3
Water source is close to household	4(20)	2(10)	0	7(35)	7(35)	<b>3.6</b>
Queues are managed at water points to avoid quarrels and enhance access	5(25)	1(5)	1(5)	4(20)	9(45)	<b>3.6</b>
Water is adequate for all households	6(30)	3(15)	1(5)	4(20)	6(30)	3.1
Seasonal reliability of water	4(20)	7(35)	1(5)	6(30)	2(10)	2.8
<b>Quality</b>						<b>3.8</b>
Water from improved source lathers easily with soap	9(45)	7(35)	1(5)	0	3(15.0)	2.1
Water from improved source is odourless	2(10)	0	0	10(50)	8(40)	<b>4.1</b>
Water contains no particles/clear	4(20)	0	0	7(35)	9(45)	<b>3.9</b>
Water has no taste	2(10)	2(10)	1(5)	4(20)	11(55)	<b>4.0</b>
Water from improved source is relatively safe	0	0	1(5)	5(25)	14(70)	4.7
<b>Total</b>	<b>20</b>		<b>Perception Index Score=</b>			<b>3.5</b>

Source: Field Survey, 2019

These responses did not deviate from that of the households, thereby confirming the index generated from the households responses. The results show that managers' agree (Perception Index Score = 3.6) that water users were involved in the design and execution of improved water systems while household's remained neutral (Perception Index Score = 3.3) on user participation. This occurrence may be due to the non-participation of respondents even though platforms were created for user participation. Meanwhile, according to Francis et al. (2015), there is the need to effectively involve communities at important stages of implementation is crucial to ensure a long-term success of water quality interventions. As household heads agreed (Perception Index Score = 3.5) that they were involved in the management of the water systems through the suggestion that they make for the improvement of water systems, water managers were neutral on user involvement in the administration of improved water. On accessibility, households agreed (Perception Index Score = 3.5) that improved water was accessible while water manager neither agreed nor disagreed (Perception Index Score = 3.3) to the accessibility of improved water. Finally with perception on improved water quality both respondents agreed that improved water is of high quality and safe for drinking. This explains why the majority (53) of respondents uses improved water as the main source for their household even though some (47) still depended on unimproved water.

#### 4. Conclusion and recommendation

It was found that households in the study area use water from both improved (boreholes and taps) and unimproved (rivers, well, and rain collection) sources for various domestic purposes

(such as cooking, drinking, livestock watering, and leaning). However, when it comes to households' main water source, the study revealed that 35 %, 24 %, 28 %, and 13 % use wells, boreholes, taps, and rivers respectively. By WHO/UNICEF categorization, close to half (47 %) of the respondents relied on unimproved water in the presence of improved water. Further probing revealed the unreliability and affordability issues of unimproved sources to be the main reason. The average perception index of the 24 statements on improved water posed to both household heads and water manager revealed an overall mean of 3.6 (Participation = 3.3; Administrative = 3.5; Accessibility = 3.5; Quality = 4.1) and 3.5 (Participation = 3.6; Administrative = 3.4; Accessibility = 3.3; Quality = 3.8) respectively, signifying that they both agree to the statements have a positive perception about improved water.

The following policy recommendations are made to help promote access and use of improved water in the Bunkpurugu-Nakpanduri District of the Northern Region of Ghana and the long run achieve good health for sustainable development. They are;

- That improved water sources should be adequately provided by the Government and Non-Governmental Organizations to the communities to improve physical access. This will also help to bridge the gap in improved water consumption (53 % of 100 %).
- Water managers should also be trained on the maintenance of improved water systems so that improved water is available regularly. This will help boost the confidence of households in improved water sources at the expense of unimproved sources.

## 5. Authors contributions

The authors conceived the idea, wrote the manuscript, approved the submitted version, and takes public responsibility for its content.

## 6. Conflicts of interest

The authors declare no conflict of interests.

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