

Raise the Compulsion Theory of Sustainability in Rural Drinking Water Supply System

Lila Prasad Limbu *

Ratna Rajya Laxmi Campus, Exhibition Road, Kathmandu, Nepal

*Corresponding author: lila_chemjong@yahoo.com

Abstract This study was conducted with objective of comparing the basic standard of sustainability between British Gurkha pipeline rural drinking water supply system and the Nepalese government pipeline rural drinking water supply system for reconstructing the sustainable rural drinking water supply system for rural area. So, the research article the compulsion theory of sustainability in rural drinking water project explores the causes of sustainability of rural Gurkha Welfare pipeline drinking water supply system and Weakness of Nepalese government rural pipeline drinking water supply system in Basantatar Village Development Committee in Dhankuta district. The study is mainly based on primary and secondary data which were collected by using field survey, discussion, focus group discussion, and observation methods with help of structured questionnaires and check-list. Finally, it concludes that compulsion is major element for sustainability for the rural pipeline drinking water project.

Keywords: *compulsion, sustainability, drinking water supply system, meter box*

Cite This Article: Lila Prasad Limbu, "Raise the Compulsion Theory of Sustainability in Rural Drinking Water Supply System." *American Journal of Water Resources*, vol. 5, no. 2 (2017): 24-28. doi: 10.12691/ajwr-5-2-1.

1. Introduction

Drinking water is the most important basic need for human being. Without drinking water people cannot survive on the earth. But, most of rural and urban people do not have access to water in developing country. So, it remains on the top priority in the agenda of rural development. It is given the fact that government affords priority to develop drinking water supply sector. Even though, it has challenges in different conditions like physical, biological and chemical conditions. "These interns are influenced by physical and anthropogenic activities" [1]. There is many theoretical and empirical literatures in the sustainability. It is determined by social, economical and environmental factors. So, they are taken as dimensions of sustainability.

According to Wills Jenkins "theories of sustainability attempt to prioritize and integrate social responses to environmental cultural problems. An economic model looks to sustain natural and financial capital, an ecological model looks to biological diversity and ecological integrity. A political model looks to social systems that realize human dignity. Religion has entered the debate with symbolic, critical, motivational resources for cultural change". Thus this study is also based on Socio-economic, physical and ecological model. But, it includes the physical prospect management because physicality also plays important role for constructing sustainability. But, it does not include the religious prospective.

According to Gro Harlem Brundtland "sustainable development is that which meets the need of the present without compromising the ability of future generations to

meet their needs." [24]. This research focuses on the concept of "sustainability" which stands apart from sustainable development. It mainly gives priority for socio-economic, environmental and physical management of drinking water and sanitation project.

According to Rolston "Ecological models propose to sustain biological diversity and ecological integrity." He directly focuses on the health of living world rather than focusing on capital or opportunity. Thus, this research tries to analyze the role of capita [19].

According to Plumwood, "political models of sustainability recommend sustaining the cultural conditions which needed to realize ecological personhood, civic identity or even personal faith through ecological membership" [17]. The statement clearly claimed that personal faith and civic identity to sustaining the project is essential. Thus, this research examines the role of people's responsibility and identity for rural drinking water projects.

Theoretical identity modeling theme is "necessary for modeling transition for sustainability." Hence, this research examines the rural drinking water projects need transition for model or not.

According to R.M. Slow [22]. "The level of consumption does not cover the time and its sustainability takes the form of constraint on use of resources". This research also examines the use of resources when programme was launched.

"The polluted drinking water is responsible for large number of mortalities and morbidities due to the water burn diseases like typhoid, cholera and healmentic infection" [25]. It shows safe drinking water is an important thing for reducing mortality of child. So, this research is suitable for developing country like Nepal because there is high child mortality rate.

According to Harka Gurung [10] “Gurkha soldiers are considered to be the greatest agent of local development and many other social and cultural changes in residing areas through their own earnings as well as through the Gurkha welfare fund which they raise themselves when they are in active services they contribute to supply of safe drinking water and construction of school building on way of Gurkha soldiers development activities”. On this process, they launched rural drinking Water Supply System in Basantatar VDC ward No 5 in Dhankuta district. Comparatively it is more sustainable than the Nepalese government project. It becomes sample of rural drinking water and sanitation program in Dhankuta district. Thus, this research tries to compare both GWS rural drinking water and sanitation project and government rural drinking water and sanitation project to find the weakness and strengths of both drinking water and sanitation projects to make sustainable drinking water policy for Nepalese people.

The interim constitution of Nepal, (1950) has defined “access to the water as fundamental right to its citizens and support this the country has set a target to provide all Nepalese with access to basic water supply and sanitation services in 1960 AD.” However, it is only limited in slogan. The most of rural people do not have reliable drinking water system at present. In this situation, the Nepalese government should change the policy formation for drinking water system. So this research helps the planners to formulate new policy for drinking water.

According to Grant and Grant [9] “Water education is essential for sustainability to enhance institutional capacity at the community level.” But I believe that water education remains incomplete without finding sustainable method of drinking water operation and maintenance system of rural drinking water and sanitation project. Hence, this research tries to find sustainable operation maintenance and construction system of rural pipeline drinking water system.

UNICEF/WHO report (2010) shows “worldwide 2.6 billion people do not have access to basic sanitation and 1.1 billion people do not have access to safe drinking water. The majority of these are poor people who live in Asia, and particularly in south Asia.” Nepal is south Asian country so it does not have good access to safe drinking water and sanitation. It needs the good expansion to get access for safe drinking water and basic sanitation. Hence this research explores the good elements of sustainable drinking water supply system.

In Nepal around 16,000 people die every year from water borne diseases and other causes related to poor water quality [12]. It shows that unsafe drinking water is main cause of high mortality rate in Nepal. It needs good water supply and sanitation accesses in Nepal. But there is no such research for the sustainable drinking water supply system and sanitation. Due to this, only 11.06 percent have access of safe drinking water, 88.94 percent people have no accesses of safe drinking water. But government has been building many water supply and sanitation project. Thus, for very long period of time rural people are far away from safe drinking water and basic sanitation. So, this research tries to find way of sustainable construction approach of water supply and sanitation programme.

According to Ghimire, [8]. “Those people who have access to piped water don’t get safe and quality water.

Even though, there is possibility to increase the supply of water system by controlling leakage.” It focuses on the sustainable drinking water supply to stop leakage, whereas this research mainly focuses on sustainability of pipeline drinking water system.

According to Probin [28], “Most of the water pipes were led down during the time of Ranas period. Ranas have little or no maintenance. Due to being careless water went waste from tapes. They let open water tap after using water. This kind of carelessness exists till now. It creates scarcity of water in other taps. Thus, this research tries to dig out the causes of local people carelessness.

According to World Vision Nepal “Each day more than 600 children under age of five die from diseases spread by unsafe drinking water” Due to this cause, Nepalese Government also tries expand pipeline drinking water system every year in different parts of country. But, the pipelines drinking water supply systems are not functioning well within a year. It wastes the large amount of money every year. Even though, Nepalese Government does not conduct any research on this drinking water supply system. Thus, this research tries to find out the problems of rural drinking water supply system and tries to give suggestion to the government to solve the problems of those which are emerging in rural drinking water supply system.

According to the department of water supply and sewerage [4], “In Nepal 80% of the total population has access to drinking water but not safe. These people are belonging to poor and excluded group in rural areas who have limited access”. But, all water supply systems are not reliable and well functioning some of them needs a repair and reconstruction because of lacking unsustainable management system. The most of water systems are not equal situation. However, no one conducted research on water system in Nepal. This situation needs to conduct research on this topic in Nepal.

1.1. Conceptual Framework of This Research

Solow (2000) says “sustainability is vague concept and it would be wrong to think of it as being precise or even capable of being made precise.” That’s why it is different type of conceptual frame work to observe the sustainability measurement indicators. Even though, researcher made following diagram for sustainability measurement in this research.

2. Research Methodology

Proper research methodology is needed for successful research. So, this research “The comparative study between sustainability of British Gurkha Rural Drinking Water Supply System and the Nepalese Government Rural Drinking Water Supply System in Basantatar VDC ward no.5 of Dhankuta district” has used various methods to gather different information. Basantatar VDC ward No.5 was selected as the study area for micro level purposively as the researcher found interest to study about the comparative study of sustainability between the British Gurkha rural drinking Water Supply System and the Nepalese government rural Drinking Water Supply

System. It would be considered as a new research work. It is observed that British Gurkha Rural Drinking Water Supply System is comparatively better than the Nepalese government Rural Drinking Water Supply System as both programmes were lunched at this place. Here, this research adopted quantitative and qualitative exploratory design This research work is designed to analyze the collected data in descriptive and analytical form. For this study 35 households, i.e. 40%, were selected from 86 households randomly who used the Nepalese government rural drinking Water Supply System in the past and they have been using British Gurkha Rural Drinking Water Supply System at present. They were interviewed to this research. While taking the sampling, random judgmental method is used. Data collection was based on both primary and secondary sources. Primary data were collected by using field observation, field survey, discussion, focus group discussion and interview methods with the help of structured check lists and questionnaires are used for quantitative analysis. The secondary data were collected from CBS, GWS office, VDC, DDC, WAS office, DWSS office, internet, website, UNICEF, UNDP, health post etc. for qualitative analysis.

3. Data Analysis and Presentation

Nepalese Government tries to expand pipeline water systems in every wards of Basantatar VDC. In the process, Basante, Suntale and Laxmitar drinking Water Supply System was launched in Basantatar VDC ward no-5 in 1995, with the co-operation of Dhankuta District Development Committee and Basantatar Village Development Committee (Basantatar VDC Record-1995).

From Field Survey, it was found that after two years, 75 percent water supply system stopped functioning. Only ten households have been using that water supply system till present date. But, they have been maintaining the

system frequently. Drinking water is not safe. Reservoir tank and safety tank are open. Besides, they were leaking in different places. After two years, the people who have been living in Suntale and Laxmitar went to stream to fetch drinking water. They started to use dirty water as that was also used by animals.

In 2008, local people applied for drinking Water Supply System taking responsibility by Harka Dhoj Limbu and Sahar Man Limbu to the British Gurkha Area Welfare Office, Dharan. After two years, British Gurkha Area Welfare Office, Dharan lunched Drinking Water Supply System in Basantatar VDC ward no-5, especially, Suntale, Laxmitar and Atharsaya by fitting metre boxes in every household's water tap [11].

During the study mainly two questions are focused.

1. What are the causes of stopping working of Government Water Supply System?

Options are given for easiness for the observed group to answer are:

- a. Lack of Repair
- b. No meter box fitted
- c. Lack of Technician
- d. Lack of public awareness program
- e. Others (if any)

Responses collected from respondents are presented in Table 1.

In Table 1, all the percentage are presented out of total 35 respondents (i.e 100 % respondents). Among the 35 respondents, there are 22 from Limbu Caste, 9 from Chettri caste, 3 from Rai and 1 from Pariyar. From Table 1, Out of Total 35 respondents, 15 Respondents (42.86%) said cause of stop working of Government Water Supply System is due to not fitting metre box, 12 respondents (34.29%) replied lack of repair fund is main cause. In the same way, 4 respondents (11.43%) said lack of awareness and 3 respondents (8.57%) said lack of technicians is main cause of the damage in government water system and 1 respondent (2.86%) said other reasons.

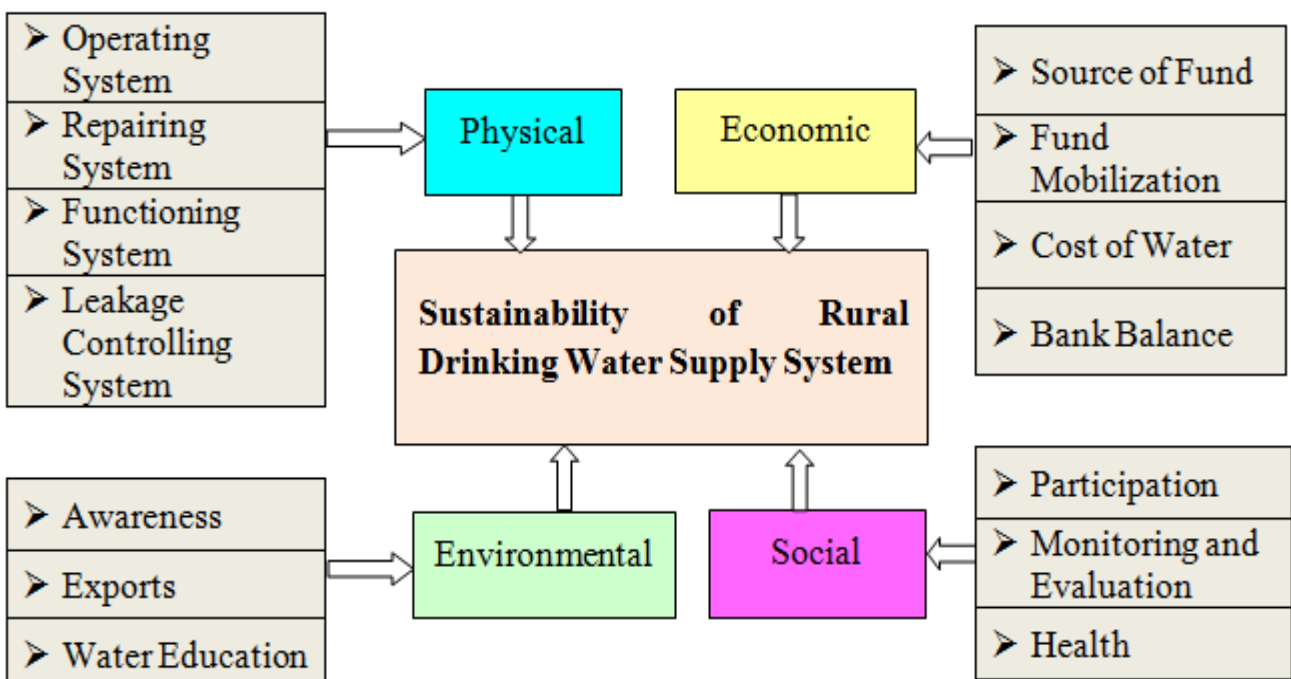


Figure 1. Conceptual Framework of the Study

Table 1. Causes of Stop Working of Government Water Supply System

Caste	Causes of Stop Working of Government Water Supply System Respondents										Total No.
	Lack of repair		No metre box fitted		lack of technician		lack of public awareness		Others		
	No.	%	No.	%	No.	%	No.	%	No.	%	
Limbu	10	28.57	8	22.86	2	5.71	2	5.71	0	0.00	22
Chhetri	2	5.71	5	14.29	0	0.00	1	2.86	1	2.86	9
Rai	0	0.00	2	5.71	0	0.00	1	2.86	0	0.00	3
Pariyar	0	0.00	0	0.00	1	2.86	0	0.00	0	0.00	1
Total	12	34.29	15	42.86	3	8.57	4	11.43	1	2.86	35

Source: Field Survey -2015.

Table 2. Causes of Sustainability for British Gurkha Drinking Water Supply

Occupation	Causes of sustainability of British Gurkha Drinking Water Supply								Total
	Participation		Fitting metre box		Regular monitoring		Awareness		
	No.	%	No.	%	No.	%	No.	%	
Agriculture	4	11.43	13	37.14	4	11.43	1	2.86	22
Teaching	0	0.00	2	5.71	1	2.86	0	0.00	3
Health worker	0	0.00	1	2.86	0	0.00	0	0.00	1
Sub overseer	0	0.00	0	0.00	2	5.71	0	0.00	2
Senior Sub overseer	0	0.00	2	5.71	1	2.86	0	0.00	3
Project supervisor	0	0.00	2	5.71	1	2.86	0	0.00	3
Others	0	0.00	1	2.86	0	0.00	0	0.00	1
Total	4	11.43	21	60.00	9	25.71	1	2.86	35

Source: Field Survey-2015.

Next question given as:

2. What are the causes of sustainability of British Gurkha Drinking Water Supply System?

Options are given for easiness for the observed group to answer are:

- Participation
- Meter box fitted
- Regular monitoring
- Public awareness program

Responses are presented as occupation wise of respondents in Table 2.

In Table 2, all the percentage are presented out of total 35 respondents (i.e 100 % respondents). Among the 35 respondents, there are 22 from Agriculture occupation (i.e. farmers), 3 respondents are teachers, 1 respondents is health worker, 2 respondents are Sub- overseer, 3 respondents are Senior Sub-overseer, 3 are project supervisor and 1 respondent is other (plumber). This Table 2 shows that 13 farmers (37.14%), two teachers (5.71%), two Senior Sub-overseer ((5.71%), two project supervisor (5.71%), one health worker (2.86%), and one others (2.86%), in total 21 respondents (60%) replied fitting meter box on every household is main cause of sustainability. Similarly, four farmers (11.43%), two sub-overseers (5.71%), one senior supervisor (2.86%), one teacher (2.86%), and one project supervisor (2.86%), in total 9 respondents (25.71%) said regular monitoring and evaluation is main cause of sustainability, followed by 4 famers (11.43%) said people participation is main cause of sustainability. In the same way, one farmer (2.86%) respondent replied awareness is main cause of sustainability.

4. Discussion

From the above data analysis, Most of respondents said sustainability of British Gurkha Welfare Drinking Water Supply System is due to meter box fitting for measuring the water volume uses for which they have to pay, which controls from excess water using and wastage of water. But that is lack in Nepalese Government Drinking Water Supply System. Due to this, it has been functioning very well without leaking water tap, and reservoirs are constructed for storing water. When minor problems are seen in water system, local people maintain immediately from repairmen fund which is established from deposits of local people from uses volume of water cost. Hence, it becomes samples of sustainable drinking Water Supply System in Dhankuta district.

5. Conclusion

Comparatively British Gurkha Rural Drinking Water Supply System is more effective than the Nepalese Government Drinking Water Supply System. Since, British Gurkha Welfare Office fitted meter box on every household water tap. Due to that every household people should pay levy for the drinking water according to the used water units. That helps in controlling the leakage of water because every household pays the charge of leaking water. As a result, local people immediately maintain the damaged things. The meter box makes local people responsible to control water leakage and maintain drinking water supply system. So, this situation totally rejects

Pulpwood Political Model of sustainability and theoretical identity modeling of sustainability. Because Pulpwood theory the Political Model of sustainability claimed that personal faith and civic identity to sustaining the project and theoretical identity modeling theory theme is "necessary for modeling transition for sustainability. But this research shows compulsion is needed for the sustainability of any projects because British Gurkha Welfare creates compulsion for the people by fitting meter box on every household. Due to this cause British Gurkha Welfare Rural Drinking Water Supply System is more sustainable than Nepalese Government Drinking Water Supply System.

Acknowledgments

This research is funded by University Grants Commission Snotimi, Bhaktapur.

References

- [1] ADB/ICIMOD. 2006. Environmental Assessment of Nepal, Emerging Issues and Challenges. Asian Development Bank and International Centre for Integrated Mountain Development, Kathmandu. pp: 55-64.
- [2] DDC report, (2011/2012). Annual district development report plan, Kathmandu.
- [3] DWSS (report 2011). National wide coverage and functionality status of water supply and Sanitation.
- [4] DWSS (report 2014). National wide coverage and functionality status of water supply and Sanitation.
- [5] Jenkins, W. (1987). Sustainable theories, world Commission and environment Department, U.K. New York: Oxford Press.
- [6] Thomes, S. (2009). Rural Water Supply and Water Quality issues.
- [7] GESO, (2010). The white paper, Pulchowk, Kathmandu.
- [8] Ghimire, M.P, (2011). Drinking water supply widening Gap. (volume-4).
- [9] Grant, B. and Grant, N. (2007). User stratification and sustainability of drinking water Schemes in rural community Nepal.
- [10] Gurung, H. (1998). Nepalese Social Demography and Expression Kathmandu, New Era.
- [11] GWS, (2010). Annual report of rural drinking water schemes, Siva Dhara Dharan.
- [12] ICIMOD, (2010), Annual report 2010. ICIMOD, Kathmandu, Nepal.
- [13] MPW, (2009). National urban water supply and sanitation sector policy (Ministry of physical Planning and work).
- [14] NLC, (2007). Interim constitution Nepal. (Nepal Law Commission)
- [15] NRM, (2014). Drinking water project (Nepal Revive Ministry).
- [16] NWSC, (2066 BS). Drinking water amendment act (Nepal water supply Corporation)
- [17] Plumwood. et al. (2002). Environmental Culture: The ecological crisis of reason. New York: Rout Ledge.
- [18] RMN, (2014). Drinking water project. Available www.nepalreviveministries.com.
- [19] Rolston, H.III. (1994). Conserving natural value. New York: Columbiya University Press.
- [20] Shrestha, H.K, (2010). Water security in Peri-urban Asia inception workshop paper. Available www.info@dwss.gov.np.
- [21] Shrestha, P.(2007). Drinking water and present in the context of Nepal. (The Kathmandu Post April-2007).
- [22] Solow, Robert M. (1993). Sustainability: An economist's perspective in Robert Dorfman and Nancy (ed.), economics of the environment, New York: Norton.
- [23] UNDP, (2004). Water Governance for poverty reduction, key issues UNDP Response to Millenium Development Goal, United Nation Development Programme Bareau for Development policy 304 ES 45th Sreet New York.
- [24] World Commission on Environment and Development (WCED). (1987). Our common future. Oxford, U.K.; New York: Oxford University Press.
- [25] WHO, (1997). Health report of under developing countries.
- [26] World Health Organization, Regional office for South-East Asia (WHO-SEARO). 2010. *Drinking water quality in the South-East Asia Region*. Mahatma Gandhi Marga, New Delhi, India.
- [27] WVN, Drinking water project Bhaktapur/world vision international Bhaktapur. Available www.wvi.org/Nepal/gallery/drinking-water-project-bhaktapur.
- [28] Yadev, p. (2014). Pokhara making three decades. (The Republica 21st December).