



## **IDENTIFY THE ECONOMIC IMPACTS OF THE WEMEDILLA RESERVOIR CONSTRUCTION: STUDY BASED IN GALEWELA DS DIVISION**

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### **Abstract**

Reservoirs have been used for thousands of years to regulate river flows and ensure adequate supply of water during dry periods. In the future, as population increase and water consumption rises, many people believe there will be a need for more reservoirs and dams. However, in recent years proposals for new reservoirs have in many places give impacts in a particular area. The impacts can be both positive and negative. According to that the study area, Galewela DS Division has the Wemedilla Reservoir. Through this reservoir economic and impacts were happened in the study area. Objectives of this research is to find the economic impacts caused by Wemedilla reservoir and identify the mitigation and prevention methods to mitigate the negative impacts. Primary data have been collected within the study area through questionnaire survey, interviews and field observations. Secondary data have been collected from the Divisional secretariat of Galewela, Irrigation office of Dambulla and published and unpublished materials. Microsoft excel 2013 used for the data analysis. Further this study assesses the positive and negative impacts through the reservoir of Wemedilla in the study area. Tourism, Agricultural activities, Livelihood Development and Regional Development are some of the Positive Economic Impacts through the Wemedilla Reservoir in the study area. Loss of agricultural Lands and Improper relief are other negative economic Impacts by the Wemedilla reservoir. This research Suggest some Recommendations to mitigate the Negative Economic Impacts.

Keywords: Economy, Impact, Reservoir, Development, Relief

### **1.Introduction**

A large natural or artificial lake used as a source of water supply called as reservoir. ([www.wikipedia.com](http://www.wikipedia.com)). Reservoir usually means an enlarged natural or artificial lake, storage pond or impoundment created using a dam or lock to store water. Most reservoirs are formed by constructing dams across rivers. People have been creating reservoirs for thousands of years. The oldest known dam in the world is the java dam and reservoir in what is now Jordan. It was built in about 3000 BCE to store water to use for irrigation or watering crops. The largest reservoir in the world by surface area is Lake Volta, which was created by damming the Volta River in the African nation or Ghana. (<https://www.nationalgeographic.org/encyclopaedia>)

Reservoirs are giving impacts on economically. When a reservoir created in particular place they give advantages and disadvantages to the community or area. Reservoirs can be used to supply drinking water, generate electricity



power, increase the water supply for irrigation, promote Agricultural activities, provide recreational activities and etc.

But other side negative Economic impacts also come through the reservoirs. More recently the construction of three Georges reservoir and other similar projects throughout Asia and Latin America have generated considerable Economical negative impacts. ([www.wikipedia.com](http://www.wikipedia.com)). reservoirs may be contributed to the changes in the earth's climate. It can lead to the diseases such as vector borne diseases. When the dams construct across the reservoir or canals construct through the reservoir in a particular area negative impacts can occur. Deforestation and resettlement occur by the construction of reservoirs. Because construction of reservoir lands of people's settlement areas has taken by the government. So people displace to another places. Through this they can loss their mind setup and livelihoods.

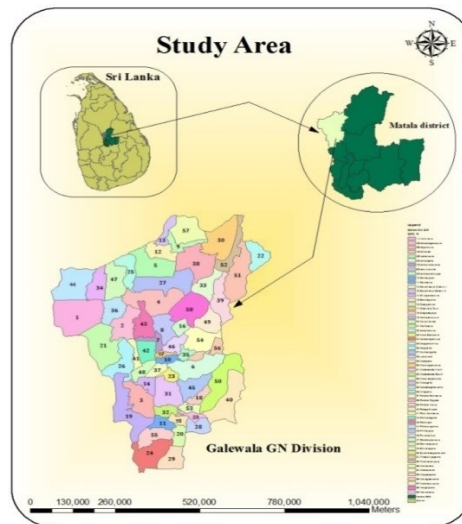
In Sri Lanka reservoirs are important. Sri Lanka is pockmarked with large number of dams and Reservoirs. Such as Senanayaka, Laxapana, Morgahakanda and Randenigala etc. Sri Lanka is an agricultural country. So reservoirs provide irrigation facilities to the agricultural sector and power generation. There are lot of economic impacts by the reservoirs in Sri Lanka. Impacts can be positive or negative. Recently Morgahakanda large reservoir was opened to the usage. It gives many Economic impacts.

In the study Wemedilla reservoir and dam is selected. Study area is Galewela D.S. Division. It is located in Matale District of central province. It is located near to the Dambulla Town. Wemedilla reservoir has a capacity of 7.46 million cu yd. (5.70 million meter cubes). It is a 72 ft high embankment dam with a 35 deep clay core built by the Department of Irrigation. Through this reservoir the study area get impacts economically. Therefore, this study will undertake to assess the economic impact on Wemedilla Reservoir.

## **2.Study area**

The Galewela Divisional Secretariat Division is selected as the study area which is located in Matale District of central province. According to the 2012 population survey the population of the study area was 70,042 respectively. There are 59 Grama Niladari Division in the study area. The coordinates of the study area are  $7^{\circ} 45' 27''$  N Latitudes and  $80^{\circ} 34' 10''$  E longitudes. The Wemedilla Reservoir is located in the study area.

Figure 1: Map of the Study area



Source: Retrieved by Arc GIS 10.1

### 3. Research Problem

A Reservoir is a lake where water is stored. Reservoirs take main place in country's economic development. Sri Lanka is an Agricultural country from ancient times the irrigation systems have taken vital part in the country's economy. Through the development projects water tanks, reservoirs and dams have been constructed. They can provide positive and negative impacts on the economic. Reservoirs give many advantages. Source of water for irrigation systems and industrial activities, power generation, tourism and recreational activities are some of the advantages of reservoirs. But when a reservoir construct it causes lot of damages on the. Economic Sector. Resettlement also occur because of people's settlements has taken to the reservoir and they displace to another place. so they lost their Jobs.

In the study area the Wemedilla reservoir gives positive impacts on economic wise. But when it constructed this reservoir gave negative impacts. Now a day to the Wayamba Ela water project, there is a canal has constructing through this reservoir. it is also contributing to the damages or negative impacts. Although there are mitigation activities which are taken by government and local authorities still negative impacts has affect the area.

### 4. Objectives

The Research has a main Objective and Two Sub Objectives. The following aspects of Impact Assessments are proposed to be studied. Clear objectives afford a best research. From these Objectives, we can gain a clear idea of the research.

#### 4.1 Main objective

To find the socio economic and environmental impacts caused by Wemedilla reservoir.

#### 4.2 Sub objectives

1. Investigate the factors which are influencing the impacts



2. Identify the mitigation and prevention methods to mitigate the negative impacts.

## **5.Literature Review**

Construction of dams and reservoirs are to simply supply water for several purposes. However, adverse environmental and socio-economic impacts have been realized after construction of such many structures. This article analyses the impacts of Khoupum dam. Most of the data are acquired through field survey and observation. After acquiring the relevant data, comparative analysis was carried out to find the positive and negative impacts of the Khoupum Dam Project and comparing the socio- economic and environmental condition of the valley.

Manatunga J, Nakayama M and Priyadarshana T, **Environmental and Social Impacts of Reservoirs: Issues and Mitigation** analyses the positive and negative impacts of the reservoirs. The aim of this paper is to discuss environmental and social impacts of dam construction and how mistakes from the past can be rectified for better implementation of such projects. While acknowledging the vast benefits that can be derived from reservoirs, the discussion details the negative impacts, too, in order that these adversities are lessened and dam construction can be utilized as a positive development objective without hampering the well-being of the society, environment, and their interrelations. The discussion is far from exhaustive; however, references and other sources of information are provided where necessary.

Jagdish Chand (2014), **Socio-Economic and Physical Impact of Theri Dam: A Geographical Review:** this paper examines the impacts of Theri dam in Uttarakhand Pradesh in India. The Tehri Dam Controversy is not new to the debate of development of infrastructural set up in northern part of hilly states that is basically Garhwal district of Uttarakhand. The controversy provoked based on three issues: the dam will displace many people and submerge several towns, this is vulnerable to earthquake and the dam may be structurally faulty as to lead to one or if one that may cause even more devastation as ever, and it will lead to the deaths of hundreds of thousands people and destroy downstream towns of immense religious importance. All these concerns have provoked civil protests that have given rise to large agitation all across the nation. According to these impacts this article analyses all the other impacts. The aim of this paper is construction in its various dimensions.

Dr. Ranasinghe M. H. S. K. (2012), **Environmental and social impacts of reservoirs: Issues and mitigation: A case study of the proposed drinking water reservoir in Per Aru Vavuniya.** This research examines the both positive and negative impacts. The case study in this article is the construction of a reservoir across Per Aru River in Vavuniya District, Sri Lanka for the purpose of providing drinking water by the National Water Supply and Drainage Board. The findings say the reservoir is to be located across a proposed jungle corridor and therefore there would be an impact on the migration of fauna especially elephants although the availability of water for most part of the year will be beneficial. With regard to the social impacts, 130 claimants will lose their cultivations (paddy and uplands). One kovil will also be submerged.

Aminu Mansur (2015), **Impact of Gafan Dam Construction and Its Adverse Socio-Economic Effects on Bunkure Local Government Area of Kano State:** the aim of the study is to assess the impact of Gafan dam construction and its adverse socioeconomic effects on Bunkure Local government area of Kano state. The



research methodology was an observational study to independently assess the impact of Gafan dam construction. The dam was repeatedly monitored over a period of seven (7) years between (2007-2014) as well as field measurements involving morphological parameters of the dam such as length, width and depth were carried out and recorded manually, water level at Gafan dam were also recorded during the period of this study. Additional hydrological considerations were established from stream examination such as water discharge, sediment intensity and height of the water. The result of the study reveals that human activities involving large-scale irrigation and dam construction have an effect on the ecology of the area.

## **6. Materials and Methods**

The Study area of this research is Galewela DS Division. Materials and Methods play a vital role to conduct a good research. Data collection should be proper and thorough to get a valuable output. The study is based on both Primary and Secondary data. They are focused on Qualitative and Quantitative Data Analysis.

The study conducted with two types of Data Collection, those are;

- Primary Data Collection
- Secondary Data Collection

### **6.1 Primary Data Collection**

Interviews, Questionnaire Survey and Observation were used to collect the data as Primary Data collection. Interviews were conducted with Grama Niladari officers, Environmental officers, Agricultural officers and Native people of the study area. Also through the field observation some data were collected. According to the random sampling Method Hundred Questionnaires Were Distributed in the study area.

### **6.2 Secondary Data Collection**

Secondary data collection collected by these ways. Divisional secretariat office report (Galewela), Irrigation department reports (Dambulla), Mahaweli authority reports, District profile of Matale, Newspaper articles, Internet sources, books, researches, essays, google earth pro.

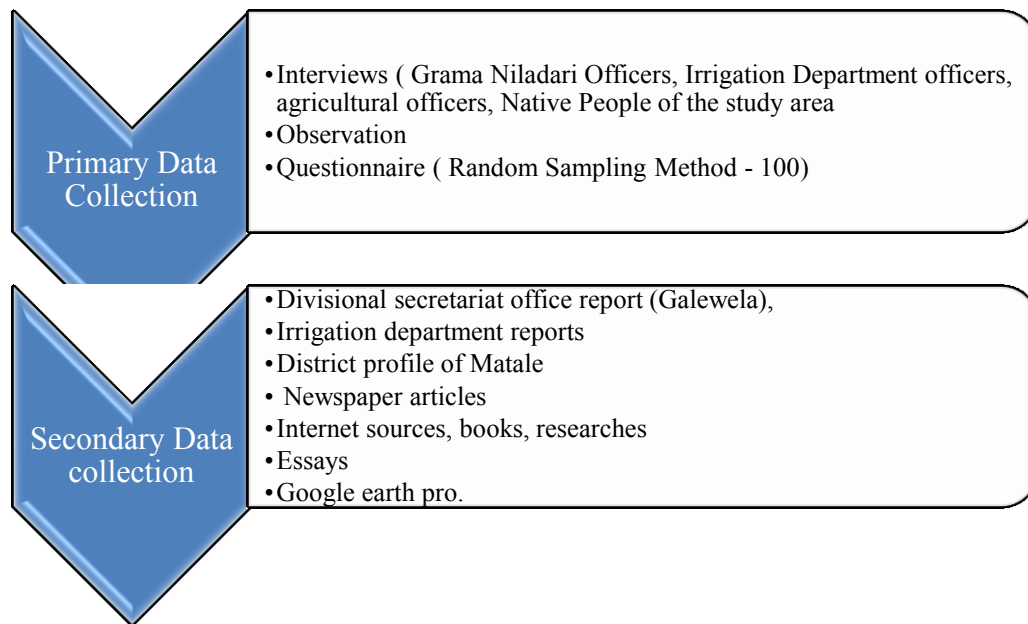


Figure 2 Data collection methods

## 7. Results and Discussion

An economic impact examines the effect of an event on the economy in a specified area, ranging from a single neighbourhood to the entire globe. An economic impact analysis typically measures or estimates the change in economic activity between two scenarios. Reservoir can support numerous economic activities that generate employment for both local people and immigrants. Also the construction of the reservoir can make some negative impacts at the particular place. According to that the Wemedilla reservoir construction has made several economic impacts in the Galewela DS Division.

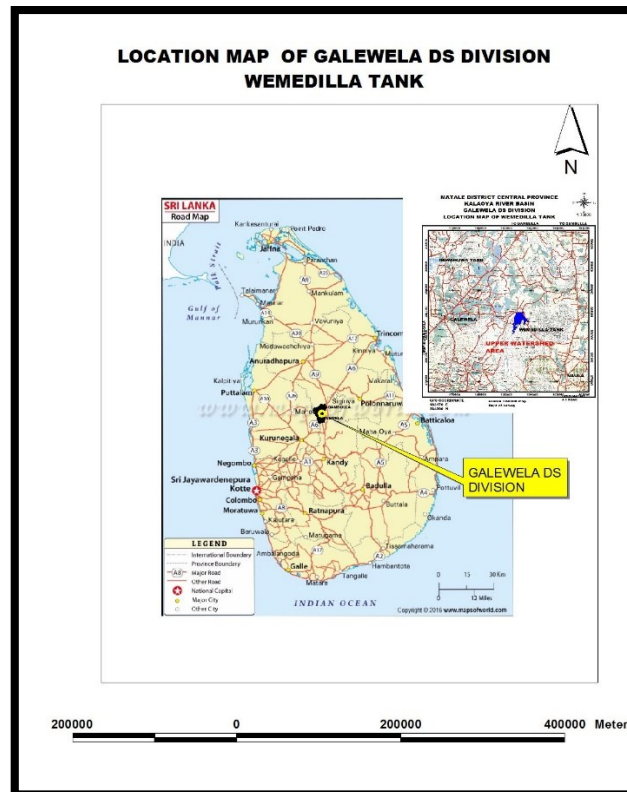


Figure 3 Location map of the Wemedilla Reservoir

## 7.1 Positive Impacts of Economic Aspects

### 7.1.1 Livelihood Development

Livelihood Development is about improving the well-being of every individual in the society so they can reach their full potential. Through the Wemedilla Reservoir the Livelihood Development has happened in the study area. Because after the construction of this Reservoir many employment opportunities and development activities have established. Also it is contributing to the People’s economic sector such as Agriculture, Industrial Sector and Service Sector. When all of these sectors has improved in the study area, through this Reservoir, the social Empowerment has automatically come to the society of the study area.

Through the questionnaire survey, 75 questionnaires were received out of 100. And also 52 respondents said this reservoir has made Livelihood Development in the Galewela DS Division. When the Interviews were conducted, the Samurdhi officers and Native people of the study area that they said after arrival of this reservoir.

### 7.1.2 Regional Development

Development is a process by which a societal problem is to be solved by implementing a systematic and well-defined change process. Regional development activities are always aimed at addressing regional problems and issues through development interventions which are best carried out at the regional level. When the development activities are happening in a particular Region it is motivated the Region’s or area’s Development.



According to the chart 4 the most of the people were responded to the regional Development in the Questionnaire Survey. Fifty-five respondents were responded that the Regional Development is happened through the Wemedilla reservoir in the study area. The percentage is 34%. Many development projects are ongoing surrounding the reservoir area and near to the reservoir area.

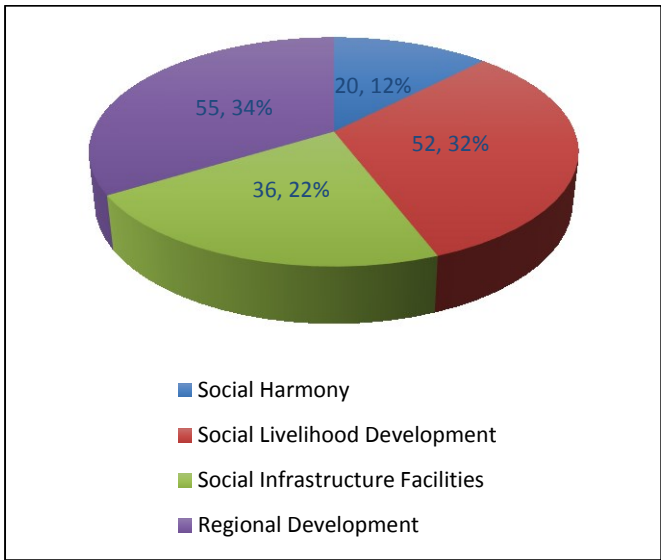


Figure 4 questionnaire survey about Regional Development



Figure 5 Regional Development

### 7.1.3 Agriculture

Agriculture is the Main Income to the people of the study area. by the help of Wemedilla Reservoir, the agriculture has improved a lot. when there is no rain in the Galewela area through the reservoir water has given to the small Tanks and Farmers are used this water. According to the Questionnaire Survey out of 75 Questionnaires 60 Respondents were agree this reservoir has contributed to the Economic Development of the study area. The percentage is 80%. also 20% of respondents said this reservoir doesn't contribute to the Economic development. Agricultural lands are irrigated by the Wemedilla reservoir in Galewela area. The farmers are cultivated the crops in both two seasons. The reason is Wemedilla reservoir. When water is not enough for the agriculture this reservoir has provided the water for the agriculture. The farmers are getting usages from this reservoir.

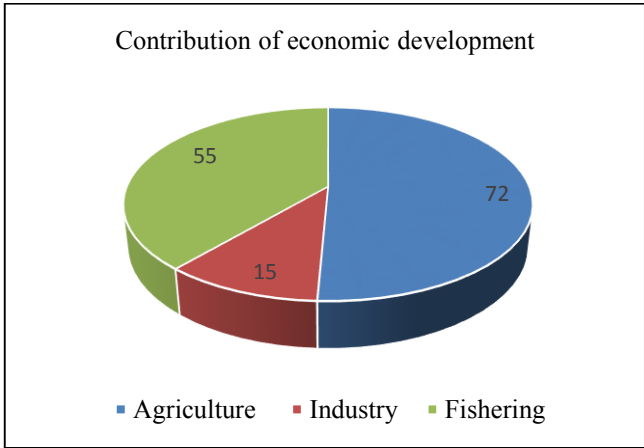






Figure 6 Contribution of economic development

According to the Figure 6 we can see the most of the contribution in economic development has happened by Wemedilla reservoir in agriculture. 72 respondents said the economic development has happened in Agriculture in the study area.

Table 4.1 Small Tanks for Agriculture

1.	Silwathgama Wewa
2.	Pahala Wewa
3.	Walas Wewa
4.	Tholombugolla Wewa
5.	Bennathgama
6.	Epita Wewa
7.	Kethigana Wewa
8.	Lolugas Wewa
9.	Dalupotha Wewa
10.	Puwakpitiya
11.	Omaragolla Wewa
12.	Namadagahawatta
13.	Bathalakottuwa Wewa
14.	Galapita Wewa

Source: Dambulla Irrigation office, 2017

This chart Describes about the small Tanks in Galewela area. these tanks are getting the water for the agriculture from the Wemedilla reservoir. so the village farmers are used the water for their agricultural purposes.

According to the Interview with Irrigation officers they said this reservoir has given the water to the 16 small Tanks of Galewela DS Division for the agriculture. Also when interviews were conducted with Native people of the study area they said this Wemedilla Reservoir has provided the water to 2000 acres paddy land. Another interview result is there is 110 acres of paddy land in Namadagahawatha GN Division. Through this reservoir 50-60 acres of paddy land is getting the water.

#### 7.1.4 Fishing



The activity of catching fish, either for food or as a hobby called as fishing. Through the Wemedilla reservoir people are doing the fishing. People do the fishing as their livelihood. According to the Questionnaire Survey this result has got. Fifty-five respondents had agreed through this reservoir fishing activities are happening. After the agriculture Fishing has taken the second place in economic development by the Wemedilla Reservoir.



Figure 7 Fishing in Wemedilla Reservoir (Source: Field observation)

### 7.1.5 Tourism

*Tourism* is the activities of people traveling to and staying in places outside their usual environment for leisure, business or other purposes. tourism is travel for pleasure or business; also the theory and practice of touring, the business of attracting, accommodating, and entertaining tourists, and the business of operating tours. Tourism may be international, or within the traveller's country.

According to that the Wemedilla Reservoir is a Tourism place in the Galewela area. Because many local tourists from the near places come to this Reservoir for visiting. The nature of the Wemedilla Reservoir is most beauty. Also near to this Reservoir one of the Archaeological Reserve and Arboretum is situated. so this area is famous in Galewela for the Tourism.



Figure: 8 Sceneries of Wemedilla reservoir



### 7.1.6 Employment Opportunities

When employment opportunities are created in a particular Region the economic development can occur in that area. Through the Wemedilla reservoir the employment opportunities have created in the Galewela area. When it was in constructed stage it gave many employment opportunities to the people. After the construction also it has given many opportunities to the people of study area. Now a day through the Wemedilla Reservoir the Wayamba Ela Water project is ongoing by crossing the study area. to this project the canal is constructing from the Wemedilla Reservoir. Through the construction it has given many employment opportunities to the Galewela DS Division people.

According to the Questionnaire survey 60 people were agreed this reservoir gives employment opportunities. 10 respondents were disagreeing with that. so the majority of the people said that this Wemedilla Reservoir has created the lot of employment opportunities in the study area.

### 7.2 Negative Economic Impacts

The reservoirs give the negative impacts too. Because of the Wemedilla Reservoir, construction and after the construction many negative impacts have occurred in the Galewela Division

#### 7.2.1 Loss of Agricultural Lands and Other Income Properties

Eighty-seven percent of the respondents reported that the people lost Agricultural land property during dam construction and thirteen percent reported to have not lost any property. The respondents who lost property had been displaced during the dam construction and their land was directly used by dam authority. Through the construction of the Wemedilla Reservoir in Galewela area, the people lost their agricultural lands such as paddy lands. Many paddy Lands were lost During the reservoir construction in the study area. After now a day to the construction of canal also many paddy lands have taken from the public, it is one of the negative economic impact through the Wemedilla Reservoir in the Galewela area. Many paddy lands were taken from the Namadagahawatha, Pallewela, and Welampitiyava villages.

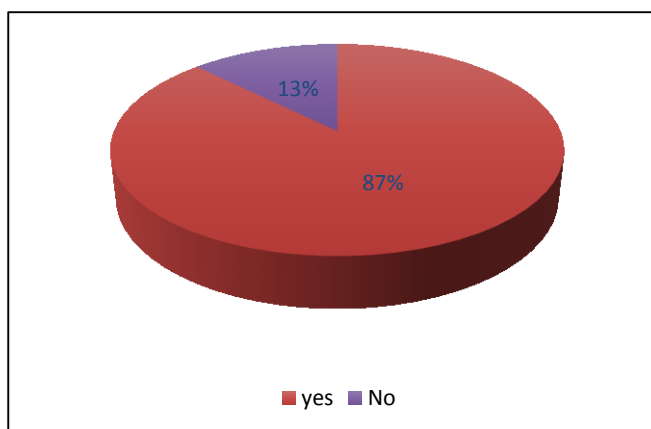




Figure: 9 Loss of Agricultural Lands

This result was got according to the Questionnaire survey. Also the interviews also got this result according to the interviews with Native people of the study area Near to the Reservoir area. When the interview conducted with secretary of the Namadagahawatha Agricultural Society he said again and again through the construction activities of Wemedilla Reservoir the agricultural Lands of the people are taken. According to this chart majority of the respondents said loss of agricultural lands is a one of the negative economic impact through this reservoir construction. Also under the Wayamba Ela canal project, many paddy lands were taken to the construction of canal within the study area.

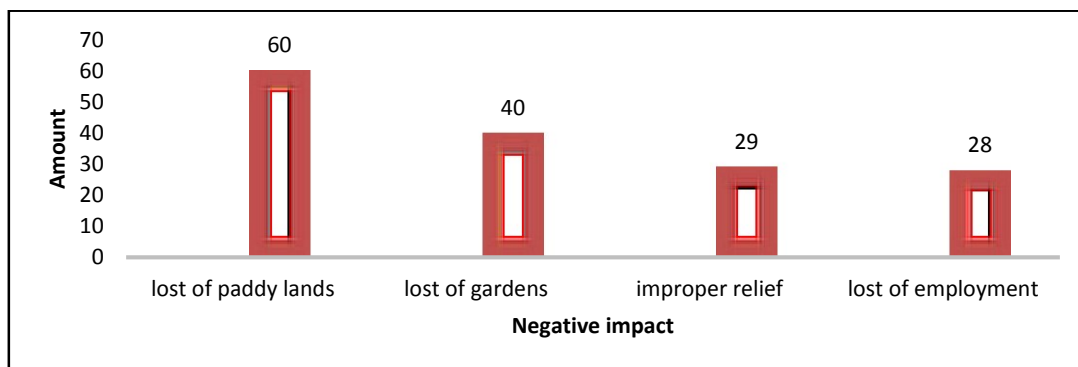


Figure 10 Negative impact of economy by Wemedilla Reservoir

Through this chart we can see loss of paddy lands and gardens were occurred by the Wemedilla Reservoir. According the Questionnaire, the sixty respondents said paddy lands were lost. also fourty persons responded that the loss of gardens was occurred through this reservoir construction in the study area.so the final result is loss of agricultural lands by the Wemedilla Reservoir is a one of the negative economic impact in the study area.

### 7.2.2 Improper Relief

When the people's Lands of properties are taken by the authorities to the development activities the authorities will give the relief to the particular people as land or money. Here we can see to the construction of Wemedilla Reservoir People's Lands were taken by the government. After that the government gave the relief facilities to the affected people of Galewela area. But it doesn't complete. Some people still don't get the proper relief for their Lands. Also the relief didn't give according to the value of their land. So it is the one of the Negative impact of this Reservoir in the study area.

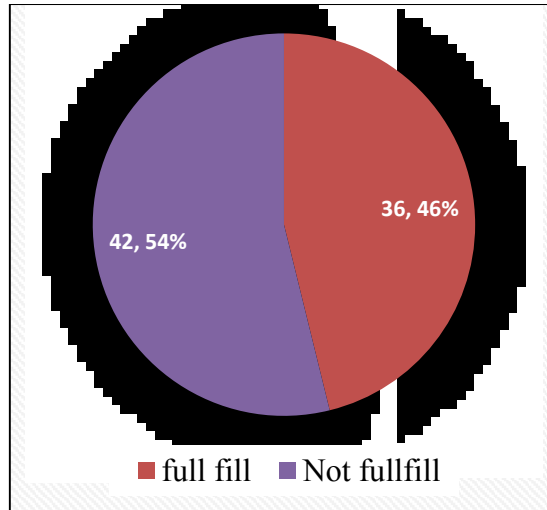


Figure 11 Full fillment of the Relief

According to the above Figure we can identify the relief providing to the reservoir construction in Galewela. through the questionnaire survey it was identified.42 people said the relief hasn't full filled yet. The percentage of this amount is 54%.but another 36 people were disagreed with that. The percentage of this amount is 46%.so this questionnaire survey clearly say that the relief hasn't finished yet. Affected people don't get the relief in proper manner. Some people got the relief. But another some people don't receive the proper relief for their value of Land or property.

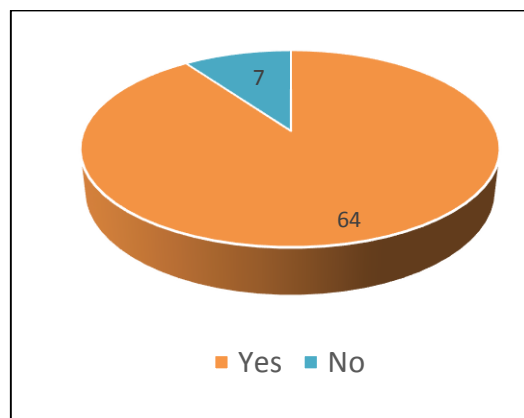


Figure 12 Resettlement by Wemedilla Reservoir

According to that Figure 13 sixty-four respondents were agreed that the resettlement was occurred due to the construction of Wemedilla reservoir. The most of the people were agreed with the resettlement occurrence. Only 07 respondents were disagreed with the resettlement occurrence.

Table 2 Resettlement by Wayamba Ela Project through Wemedilla Reservoir



District	DS Division	GN Division	Sex		Effect of Residence	
			Male	Female	Relocation	Isolate
Matale	Galewela	Danduyaya	1		1	
		Ranwediya	2		2	
		Pahalabambawa	4		4	

Source: Resettlement survey: NWPC project 2015

The Table 2 Describes about the occurrence of Resettlement through the Wemedilla Reservoir in Wayamba Ela Project. It is also one of the Negative Economic Impact in the study area. Through the resettlement that particular people lost their economic activities in the study area.

Also according to the Table 2 we can identify the Displacement of people by the Wemedilla reservoir in Wayamba Ela project. So those people lost their jobs in their area.

Table 3 Displacement of people by Wayamba Ela Project

GND	Age group Below 18 years				Age group 19-59 years				
	Male		Female		Male			Female	
	Married	Unmarried	Married	Unmarried	Married	Unmarried	Widow	Married	Unmarried
Lenadora-North				3	1	1		1	
Ethabendiwewa		1		1	3	3		3	1



Welampitiyava			2	3	1		4	
Danduyaya		2		1			1	
Ranwedyawa		1		2			2	
Pahalabambawa			1	2			3	1
<b>TOTAL</b>		<b>4</b>	<b>7</b>	<b>12</b>	<b>4</b>		<b>13</b>	<b>2</b>

Source: Resettlement survey: NWPC project 2015

**8. Conclusion**

The study concludes that since the construction of Wemedilla Dam and Reservoir it has contributed economic impacts of the catchment community of Galewela area. The impacts are both positive and Negative. The construction of this Reservoir had finished in 2009. Through the primary and secondary data analysis it was declare that the Negative Economic impacts are happened in the study area due to the construction of Wemedilla Reservoir. But through the arrival of this reservoir positive economic impacts are received to the Galewela DS Division.

Considering the positive impacts there are a lot to indicate. The economy of people is rose due to this Wemedilla Reservoir. Due to the construction process of this reservoir it has provided many employment opportunities to people of this area. More than hundred people of this area get the employment opportunities. Also this reservoir has provided the contribution to the agriculture, fishery and industry of the Galewela DS Division. After the arrival of this Wemedilla reservoir that the infrastructure facilities have improved in the study area. Such as road facilities, Irrigation schemes, Canal and bridge construction have improved in the Galewela area. The regional development has happened in the study area.

According to the analysis the Negative impacts are identified in the study area. The people of the area were resettled to another place by the construction of the Wemedilla reservoir. Economical value of the lands such as paddy lands and gardens were taken to the reservoir. People's displacement was happened through this construction of this reservoir in the study area. More than thirty families were displaced to the near places of Naula, Nikkula and some other places. Pre and post impact has identified in this research. To mitigate the negative impacts some strategies and solutions have implemented. It can be reducing the negative impacts through the Wemedilla Reservoir.

**9. Recommendations**

1. Introduce the computer-based technology system to assist in combating the problems by providing reliable, up-to-date and comprehensive data on land use change and other environmental variables by the construction of the reservoir.
2. Government should fulfil the relief facilities for the affected people.



3. Policy, guideline should be put in place to regulate water use for irrigation and provide efficient and coordinated methods of irrigation.
4. There is a need to increase research funding for sustainable development and management of water resources in the field of water supply in order to generate useful information for planning, design and decision making.
5. Stakeholder partnership is essential for mitigate the negative impacts. So the stakeholder management should have implemented.
6. Further Research is necessary to identify the more impacts through this reservoir.

## **10. Acknowledgement**

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