

WOLKITE UNIVERSITY



COLLEGE OF SOCIAL SCIENCE AND HUMANITIES

DEPARTEMENT OF GEOGRAPHY AND ENVIRONMENTAL STUDIES

**Challenge and Opportunities of Watershed Management Practice in Kochere
Woreda Gedeo Zone, Southern Ethiopia Region, Ethiopia**

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This is to clarify the senior essay entitled “challenge and opportunities of watershed management practice at Kochere woreda in Gedeo Zone, Southern Ethiopia region. which is submitted on partial fulfillment of the requirement for the bachelor of art degree in geography and environmental studies.

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Declaration

Petros Becho and Tamirat Sheginu do here by declaring to the Wolkite University Department of Geography and Environmental Studies that this thesis is a product of our original research work and has not been submitted to any other university for any academic degree. Any materials and information in a report other than our own are duly acknowledged.

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ABSTRACT

This research study investigated the challenges and opportunities of watershed management practices in Kochere Woreda, Gedeo Zone, Southern Ethiopia Region. The research aims to provide valuable insights into the complexities surrounding watershed management in the region, highlighting both the obstacles faced and the potential avenues for sustainable water resource management practices in Kochere woreda. In this study, primary and secondary data were used. Primary data were obtained or gathered through personal observation; secondary data were obtained from different written materials, published and unpublished sources, and different books. The total number of households in the kebele was 1228. This sample size was determined by 7% of the total study, which is 1228 households. This was done using simple random sampling techniques to give equal chances to all respondents to be selected and minimize biases by every 92 respondents. The data was collected using a questionnaire from sampled households and personal observation. The collected data was analyzed qualitatively by using statements and quantitatively by tables, frequencies, and percentages, presented, and interpreted. Identifies and analyzes the primary challenges hindering effective watershed management in Kochere Woreda, such as deforestation, soil erosion, water pollution, a lack of community participation, and inadequate infrastructure. The challenge of watershed management has its own impacts on the environment. It leads to poverty, food insecurity, and social conflict. The negative socio-economic consequences of unsustainable resource use are significant. According to the respondents, there are watershed management practices in the study area, and they practiced physical methods of watershed management. However, farmers and most stakeholders were not aware of the major constraints for increasing effective watershed management practices, specifically in terms of economic, social, technological, technical, physical, natural, and environmental aspects. While practicing watershed management measures, the community was hindered by a lack of management equipment, a lack of incentives, a lack of advanced technology, and a lack of awareness. As recommended by the researcher, awareness, provision of equipment's provision, and incentives by governments were strategies forwarded by the researcher to minimize the problem in the study area.

Key Words: *Challenge, opportunities, watershed, management*

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Abbreviations and acronyms

FAO: Food and Agriculture Organizations of the United Nation

FDRE: Federal Democratic Republic of Ethiopia

HH: House Hold

LLPPA: Local Level Participatory Planning Approach

MSL: Mean Sea Level.

MERETMS: Managing Environmental Resource to Enable Transition to More Sustainable Livelihoods

MOA: Ministry of Agriculture

MOARD: Ministry of Agriculture and Rural Development

NGO: Nongovernmental Organization

NRM: Natural Resource Management

NWDPRA: National Watershed Development Project for Rain Fed Areas

PWD: Participatory Watershed Development

SNNPR: Southern Nation's Nationalities People Region

WSD: Watershed Development

WS: Watershed

WFP: World Food Program

SPSS: Statistical Package for Social Science

CHAPTER ONE

1. INTRODUCTION

1.1 Background of the study

In the world of watersheds, it is generally accepted that sustainable use and management of land resources are only achieved by an adapted system of improved land, water, and vegetation management and use based on an integrated approach to land resource development with the direct involvement and participation of the different sectors. Assessing the sustainability of waste water management systems in a multi-scalar disciplinary manner in Latin America Kirschke S(2019). In many developing countries, NWDPRA is a major initiative operating in accordance with the common approach to watershed development. It was jointly formulated and adapted by the ministry of agricultural and rural development in cooperation with the reasons learned from the success of the full project, especially in community participation (MOARD, 2005). Watershed management implies the wise use of natural resources like land, water, and biomass in watersheds to obtain optimum production with minimum disturbance to the environment (Wan, 2011). In the past, watersheds focused mainly on the management of these resources in medium or large river valleys, designed to slow down rapid runoff and excessive soil erosion (Desta et al., 2015). At present, the overall objective of watershed management and development problems is to treat watersheds as hydrological units and aim to adopt sustainable measures for soil and water conservation to provide adequate water for agriculture and domestic use and improve the livelihoods of the people. Managing watersheds for sustainable rural development in developing countries is a practice (Esser, 2002), as cited in Alemu (2016). The measures of hill slope and gully stabilization, regulating river systems, and rearranging farmland, combining soil erosion measures with optimum utilization of biological measures, have further developed the principle of soil erosion control. Appropriate management and use of degraded watersheds have obviously resulted in large-scale ecological, economic, and social benefits (MOARD, 2005). Participatory conservation and watershed-based approaches have been successfully introduced and expanded in various countries in Africa, particularly Kenya, Nigeria, Burkina Faso, and Mali, to name a few. Such programs have been realized within the context of combating

desertification and poverty reduction efforts (MOARD, 2005). Planning the development of a watershed for Ethiopia started in the 1980s. A planning unit for developing large watersheds comprised 30-40,000 hectares of large watershed planning in the different regions of Ethiopia. The purpose was mostly to implement natural resource conservation and development programs. Large-scale efforts remain mostly unsatisfactory due to a lack of effective community participation and a limited sense of responsibility. Overloaded assets created unmanageable planning units. The lesson learned from this experience encouraged the Ministry of Agriculture (MOA) and support agencies like FAO to initiate pilot watershed management planning approaches on a bottom-up basis, using small units and following community-based approaches. As a result, the minimum planning at the initial stage involved shifting from large watersheds to small sub watersheds. The Ministry of Agriculture (MOA) and WFP (World Food Programme) technical staff developed participatory and community water shade management practice planning. The local-level participatory planning approach (LLPPA) was developed for developed agents as a piratical approach, focusing mostly on integrated natural resource management (NRM) intervention productivity intensification measures and small-scale community infrastructure such as water ponds and feeder roads. During the last few years, hundreds of community plans were prepared and implemented with significant results. Today, LLPPA is at the core of the ministry of agriculture, rural development, and the World Food Organization. Assisted MERET, a project to address land degradation and food security in several regions. So, when we see challenges and opportunities in watershed management practice, there are different efforts made by different stockholders; some of those efforts involve biological and physical measures (FAO, 2015).

1.2 Statement of the problem

Watershed management is one of the important practices that helps fulfill the basic needs of human beings as well as the survival of animals and plants and improves the economy of the country by increasing productivity. The UN Food and Agriculture Organization and the World Bank also use the watershed management approach to measure the ecological benefits of developmental projects and to maximize the availability of goods and services in a sustainable way (Sha et al., 2014). However, today's soil erosion and water resource degradation are becoming the burning issues in developing countries, which have a great impact on the

livelihood of people and environmental degradation (MOARD, 2005). However, in most watersheds, the farmers and most stakeholders were not aware of the major constraints for increasing the productivity/potential of the watershed specifically in terms of economic, social, technological, technical, physical, natural and environmental aspects. Watershed management is one of the important practices that helps fulfill the basic needs of human beings as well as the survival of animals and plants and improves the economy of the country by increasing productivity. The UN Food and Agriculture Organization and the World Bank also use the watershed management approach to measure the ecological benefits of developmental projects and to maximize the availability of goods and services in a sustainable way (Sha et al., 2014). However, today's soil erosion and water resource degradation are becoming the burning issues in developing countries, which have a great impact on the livelihood of people and environmental degradation (MOARD, 2005). However, in most watersheds, the farmers and most stakeholders were not aware of the major constraints for increasing the productivity and potential of the watershed, specifically in terms of economic, social, technological, technical, physical, natural, and environmental aspects. Watershed management states that societies are affected by water interaction with additional resources, and thus people can affect the nature and extent of those linkages (Manuelli, Hofer, & Vita, 2014). In rain-fed areas, low productivity, aggravated by water scarcity, degraded and poorly managed land, poor infrastructure, and a lack of markets, marginalizes agricultural and poor livelihoods (Joshi et al., 2019). Corresponding to these, the strong nexus between soil degradation, low agricultural productivity, and rural poverty has been a major challenge to rural development. In order to solve these intertwined problems, integrated and sustainable resource management practices are required and planned for farming system development (FDRE, 2009). productivity and potential of the watershed, specifically in terms of economic, social, technological, technical, physical, natural, and environmental aspects. Watershed management states that societies are affected by water interaction with additional resources, and thus people can affect the nature and extent of those linkages (Manuelli, Hofer, & Vita, 2014). In rain-fed areas, low productivity, aggravated by water scarcity, degraded and poorly managed land, poor infrastructure, and a lack of markets, marginalizes agricultural and poor livelihoods (Joshi et al., 2019). Corresponding to these, the strong nexus between soil degradation, low agricultural productivity, and rural poverty has been a major challenge to rural development. In order to solve these intertwined problems, integrated and sustainable resource

management practices are required and planned for farming system development (FDRE, 2009). According to the above problem, there is no research conducted by other researchers on the same title in the study area. So, our interest in this title study would be to conduct it specifically in Kochere woreda to reduce environmental problems caused by different factors. Our study focused on the challenge and opportunities of watershed management practice and the participation of local people with management organizations to conserve and protect natural resources and minimize negative impacts through applying a water shade management approach, local knowledge and expertise, creating awareness for society regarding watershed management practice and the indirect impacts of it on their lives, and establishing effective agriculture and rural development sectors. The research attempt is to fill the gaps by investigating the challenges and opportunities of watershed management practices in the area and the development of natural resources for the country, particularly in the Gedeo zone at Kochere woreda.

1.3 Objective of the study

1.3.1 General objective

The general objective of this study is to identify the challenges and opportunities of watershed management practices in Kochere woreda.

1.3.2 Specific objective

1. To assess the overall practice of watershed management in Kochere woreda.
2. To identify the factor that affects the watershed management practice.
3. To describe the role of society in watershed management practices in the study area.
4. To examine the challenges and opportunities of watershed management in the study area

1.3.3 Research Question

- ✓ What are the overall practices of watershed management in the study area?
- ✓ What are the factors affecting watershed management practices in the area?
- ✓ What is the role of society in watershed management practice?
- ✓ What are the challenges and opportunities of watershed management practice in the study area?

1.4 Significance of the study

Watershed management practice is a current issue in Ethiopia, and the significance of this study is introducing the importance of watershed management practice for society and the government in the area for the protection of natural resources, the development of agricultural productivity, increasing moisture and fertility in the soil, protecting climate conditions, minimizing environmental degradation, changing farming practices, and rehabilitation of degraded natural resources. Watershed conservation areas are important for the successful achievement of the development goal. In the zonal case, watershed management practices have a great impact on the economy of farmers through the development of agricultural productivity, and this study will be the source of information for investigation and serve as background for other researchers who want to conduct research on the same topic.

1.5 Scope of the study

The scope of this study was covered and conducted in the Gedeo zone of Kochere woreda, in particular. The study was focused on the challenges and opportunities of watershed management practice in the study area in a delimited manner. Because it is difficult to conduct comprehensive research at a whole level, it requires a lot of money and consumes a lot of time.

1.6 Limitation of the study

From the beginning to the end, this study faced different obstacles or limitations. That is, lack of well-organized data in the study area in the sector, shortage of money to buy different materials like paper and binder, copying research papers for transportation, calling the phone to meet with official servants, and also time to collect data from the different respondents. Some respondents are unwilling or reluctant to give their real information to us that relates to our topic, lack of technological materials like paper, binder, and copying research papers for transportation, calling the phone to meet with official servants, and also time to collect data from the different respondents. Some respondents are unwilling or reluctant to give their real information to us that relates to our topic, lack of technological materials like personal computers (PCs) to edit data, and unwillingness or reluctant ness to give their real information to us that relates to our topic, lack of technological materials like personal computers (PCs) to edit data, and the highly

temperate time of data collection at the study area to the complete research. This is the same limited faced when the end of the research paper conducted.

1.7 Definition of operational term

WATERSHED: The entire geographical area is drained by rivers and their tributaries.

CONSERVATION: refers to the sustainable and responsible management of natural resources, including land, water, plants, and animals.

PRACTICE: refers to the implementation of specific actions or methods aimed at promoting sustainability and minimizing negative impacts on the environment.

CHALLENGE: The disagreement or argument about watershed management.

CHELELEKTU: Is the name of the town found in the Kochere woreda?

ITNSET: This type of production grows in dega and woina dega as part of the agro-climatic conditions. And used for food kinds.

MANAGEMENT: It is the act of managing or showing direction for how to practice environmental conservation.

OPPORTUNITY: Possible due to a favorable combination of different environmental qualities

WEATHE ROAD: This is the type of road constructed from beach materials.

1.8 Organization of the study

The paper was organized into five chapters. The first chapter focused on the introduction part of the study. This contains background, statement of problem, objective of the study, research question, significance, scope of the study, and limitation of the study. The second chapter covers a review of the literature and is concerned with water shad management practice, identifying challenges and opportunities of the water shad management of the study area. Which is discussed about the location, economy, infrastructure, demographic character, socioeconomic, environmental, and topography of the cultural attraction described in the study area. The fourth chapter focused on data analysis and presentation in general, collected from respondents, and the fifth chapter discussed the conclusion and recommendation of the study.

CHAPTER TWO

2. REVIEW OF LITERATURE

2.1 Concepts and definition of watershed

A watershed can simply be defined as any surface area from which runoff from rain falls and is collected and drained to a common point (outlet). It is synonymous with a drainage basin or catchment area. At the socio-economic level, a watershed includes people, their farming systems, interactions with their land resources, coping strategies, and social, economic and cultural aspects (Lakew et al., 2005). A watershed is a drainage area on the earth surface from which runoff resulting from precipitation flows past a single point into larger stream rivers, lakes, or the ocean. Many definitions have been developed over the past year for the term watershed. While the definition employs a wide variety of words, they all mean practically the same thing. Most generally, a watershed can be defined as a body of soil with definite boundaries around it. Above and below it. In other words, it is a land surface (body of soil) bounded by a device that contributes runoff to the common point (MOARD, 2005). A watershed is a topographically defined area that is drained by a stream system. Watersheds are hydrological units that have been described and used as physical, biological, and, on many occasions, socio-economic and political units for the planning and management of natural resources. There is no defined size for a watershed; it may be several thousand square kilometers or as small as only a few square kilometers (Singh, 2016).

2.2 Watershed management practice

Watershed management is the process of formulating and carrying out a course of action involving the manipulation of resources in a watershed to provide goods and services without adversely affecting the soil and water base. Usually, watershed management practices must consider the socio-economic and institutional factors operating within the watershed area. All watersheds contain many kinds of natural resources: soil, water, forest, wildlife, and minerals. The use of the same natural resources was complementary. While others were comparative. For instance, logging affects water resources, and changing intensive land uses to less intensive ones may benefit soil and water resources. The key is to use these resources as efficiently and

perpetually as possible with minimum disturbance to the watershed management as a whole. Although, for many reasons, watershed managers may not be the decision-makers on resource use, their task is to plan and carry out practices. Which will encourage those wise to be complementary and suggest preventive and protective measures for those uses that may impair the watershed. Since watershed management involves decision-making about the use of resources for many purposes, a multi-disciplinary approach is essential. The work will include government institutions from various disciplines and also involve people from different parts of society. On the other hand, the involvement of too many elements in planning and decision-making can lead to efficient and unsatisfactory end results. Participation should be limited to representatives from key government institutions, and local communities will be directly affected. Watershed management is ongoing, taking in new elements; both manmade and natural occurrences may become factors at any time. It is important to remember that when new challenges arise, the original management plan must be revised. It is the watershed managers or planners responsibility to make government authorities aware that WSM is a continuous and flexible process. (Singh, 2016)

2.2.1 participatory watershed Development (PWD)

Participatory can be defined as the rational and socially acceptable utilization of all natural resources for the optimum production to fulfill the present need for animal degradation of natural resources such as land, water, and environments. Local farmers and other land users, as well as the wider community that depends on the land, must be involved from the very beginning of the planning process. Since they are the ones that will live with the end propriety rating and decision-making at the local level, Initial planning must be followed by a system of manufacturing, and evolution must make changes. If necessary to ensure a satisfactory result (MOARD, 2009),

2.2.2 Participatory watershed management and its linkage to institution and overall development

Participatory watershed management considers management strategies aiming to reduce poverty, conserve natural resources, promote good institutions, social linkage, and economic returns. The

development strategies that link institutions, particularly community-based ones, have been used to access and control resources. Community-based institutions were established to empower the community, and they helped to become masters of their own destiny by mobilizing and using their own resources (knowledge, materials, money, and social capital). As well as by demanding, on behalf of the poor and marginalized groups whose voices were not fully respected, the community's human, social, and economic rights. Community-based institutions normally help to ensure the sustainability of development activities by developing a sense of community ownership with regard to the activities. More positive empowering of individuals and communities resulted in an ability to control their community resources and make decisions pertaining to their lives. The institutionalization of community-based integrated watershed development bonded the community together and waded them extra trust to regenerate the economic and social background and, by large, broaden their vision so as to protect and manage the environment for sustainable rural livelihoods. (kerr,2014)

2.2.3 Planning watershed management

Social and hydrological factors are perhaps the most important elements of science. Largely determine whether the desired program can be carried out or not. The portion of the hydronic cycle from the time. The water is received on the land surface until it leaves the area as stream flow or is returned to the atmosphere by the evapotranspiration process, which is the central core of control in watershed management. When precipitation occurs, air temperature, wind velocity, and humidity are described as duration and type. (Singh, 2016). Hydrological characteristics of soil, such as infiltration capacity, moisture content, and other soil characteristics, affect the movement of the water; similarly, run-off is affected by the length and steepness of the slope, the amount, and the type of reputation stoniness. Although all these factors affecting water movement cannot be changed through management, the same of the factors can be modified to achieve the aim of management. Soil character can be changed by mechanical means, and the effectiveness, length, and steepness of the slope can be considerably changed by agronomic and mechanical practices (Singh, 2016).

2.2.4 Socio-economic aspect of watershed management

Watersheds are the natural units for economic management, and therefore, it is management. Besides the government view point, the viewpoints of individuals and communities that live in the watershed should also be considered. The people have their own needs, customs, and values, and therefore, the measures taken for the treatment of the watershed should have comparability with the needs of the people. Proper management of the watershed, therefore, requires not only the knowledge and application of scientific techniques but also sustainable investments of labor and capital that are incompatible with the perspective of the farmers. How to motivate the farmers to make the necessary investment and sacrifice is a socio-economic problem. The most important economic aspect of watershed management is determining whether investment decisions are made in such programs. There are alternative techniques of soil conservation, water harvesting, storage, and conveyance of water; alternative cropping patterns; and technology packages for making maximum use of available water. It is the job of the economist to evaluate this alternative and suggest an efficient one (Singh, 2016).

2.3 Challenge and Opportunities of Watershed Management Practiced

2.3.1 Watershed degradation features

Watershed degradation is the loss of value over time, including the productive potential of land and water, accompanied by a marked change in the hydrological behavior of river systems, resulting in the inter- or intra-quality and timing of water flow. The result of the destruction of physiographic features, climate, and poor land use (indiscriminate) deforestation in appropriate cultivation, disturbance of soil and slope by mining, the movement of animals, road contraction, badly controlled diversion storage, transportation, and sucking of water (watershed degradation) in turn leads to accelerated ecology degradation, reducing economic opportunities, and increased social problems (Sing, 2016). Soil erosion and degradation: soil erosion is one of the most common phenomena of land degradation. Soil erosion and degradation are reductions in soil depth and fertility. It is caused by erosion (soil removal, loss of nutrients), reduction of soil water holding capacity, and excessive exploitative use of the land. Land and water resources are not protected and conserved against the source of erosion. Soil resource degradation occurs in

various forms. In a degraded watershed, the form of degradation can be physical, biological, or chemical (MoARD, 2005).

2.3.2 Existing untapped potentials for optimizing uses of soil and water in watershed

In Asia and Africa, hundreds of millions of poor and marginal farmers really depend on degraded land and water resources and struggle to cope with an array of adverse agro-climatic production and market risks. It is estimated that there is a late stage of land degradation in rain-fed areas. In India in the 1990s, it is likely to have proceeded at more than twice the rate observed in the 1980s, basically on account of soil erosion from run-off. At the same time, these regions, and the world in general, do not have enough utilizable water to grow food to adequately feed future generations. The world is rapidly converting ring forests, wet land, and other critical habitats into agricultural land to meet growing demands and divert major rivers to produce food. How to produce more and better food and maintain or improve critical ecosystem services without farmers undermining our environment is a major challenge (Bharat R. Sharma and Christopher A. Scott, 2013). land rehabilitation and productivity enhancement related to the above. Related degraded lands in Ethiopia constitute a larger part of the entire woreda and regional. Some areas are more degraded than others. Unfortunately, the "degradation trends" of later are also fast. With the highest erosion rates being recorded in the highland potential areas for cultivation, degradation occurs on land, cultivated, grazed, and others. However, over 60% of the total erosion in the country occurs on cultivated land. Most importantly, rehabilitation of degraded land areas is essential for exploiting the water harvesting potential of the area to protect and enhance the productivity of the cultivated areas and to increase the overall biomass for multipurpose uses. Land reclamation intervenes in cases where degradation is very severe or inlands considered unsuitable for production because they are very arid or affected by other problems such as salinity and forest. There are also excellent opportunities for harvesting such trends by using watershed development principles. Actually, it may be costly, but it is often worth the investment. Large gully networks can be harnessed through a combination of vegetation cover and physical measures, including innovative approaches such as soil storage overflow dams. A Tigray region is the best example of water harvesting (2012, World Water Week in Stock Holm). Protection, development, and sustainable management of forests

Watershed development is also about greening landscapes, including protecting existing natural forests or reforestation with multipurpose special areas. This activity has multiple functions, like increasing access to firewood, forage, fruits, timber, dyes, gums, and forests for related activities like beekeeping and others. (MOARD,2005). Water harvesting is an integral part of watershed development and needs to be seen as a key factor in improving people's livelihoods through providing income, generating, restoring, and enhancing land productivity, supporting the rehabilitation of lands, enhancing the development of natural resources, and contributing to small-scale infrastructure development. Water harvesting is about conserving moisture on site as well as using surface runoff effectively (Singh, 2016).

2.3.3 Measures of watershed management

Measures contributing to watershed management can be classified into two broad categories: interim of purpose, method, and accomplishment. Interim's purpose includes land use, infiltration rate, water holding capacity of the soil, and preventing soil erosion on watershed lands. They include all biological and mechanical methods of erosion control, including water stabilization measures. Those include planted structures or vegetation. The second category of measures includes those planted primary for the management of water flow after it has left the fields and formed water ways to reach the small branches and tracks. These measures include flood water-retarding structures, stream channel improvements to increase carrying capacity and stabilize bodies and banks, manor floodways, and similar measures (Singh, 2016).

2.3.4 Watershed flood control measures

Broadly watershed flood control measures can be grouped into two general classes. (1) that retard flow or reduce runoff by watershed treatment or flood control reservoirs. (2) Those that include the channel's capacity to accelerate the flow. These, including channel improvement, channel straightening, and leaf measures that retard the flow or reduce runoff, are economically and physically more desirable due to the following reasons: Firstly, they remove all visible evidence. Secondly, it results in uniformity in the streams through greater recharge of the groundwater and an adequate water supply. Thirdly, they are an important step in the conservation of natural resources. Fortunately, they result in higher crop yields, especially in

areas with efficient irrigation water supplies. The fifth and last one is that these measures also result in the in the introduction of sedimentation in lower tributaries (Singh, 2016).

2.3.5 Watershed treatment

Here, the objective is to increase the storage of water on the surface and in the soil profile. Watershed treatments, including all practices applied to the land that are effective in reducing flood or runoff control, soil erosion, and increasing the amount of surface water storage, rate of infiltration, and water holding capacity of the soil runoff retardation by land management and type, are largely dependent on vegetative cover and favorable soil surface conditions (Singh, 2016).

CHAPTER THREE

3. RESEARCH METHODOLOGY

3.1 Description of the study area

3.1.1 Location

Kochere woreda is one of the woreda's in the southern nation nationalities and people region of Ethiopia, part of the Gede'o zone. This woreda is absolutely located between 5° and 48' of north to 6° and 12' north of the latitude and 38° and 10' east to 38° and 40' east of the longitude, and the relatively woreda is bordered east by Gedeb woreda, south by the Guji zone in Oromia, and north and west by Yirgacheffe woreda. There are two towns found in the woreda. These are Fishagenet and Chelelektu towns. From this town, chelelektu is the major town of the study area.

3.1.1.1 Map Of Study Area

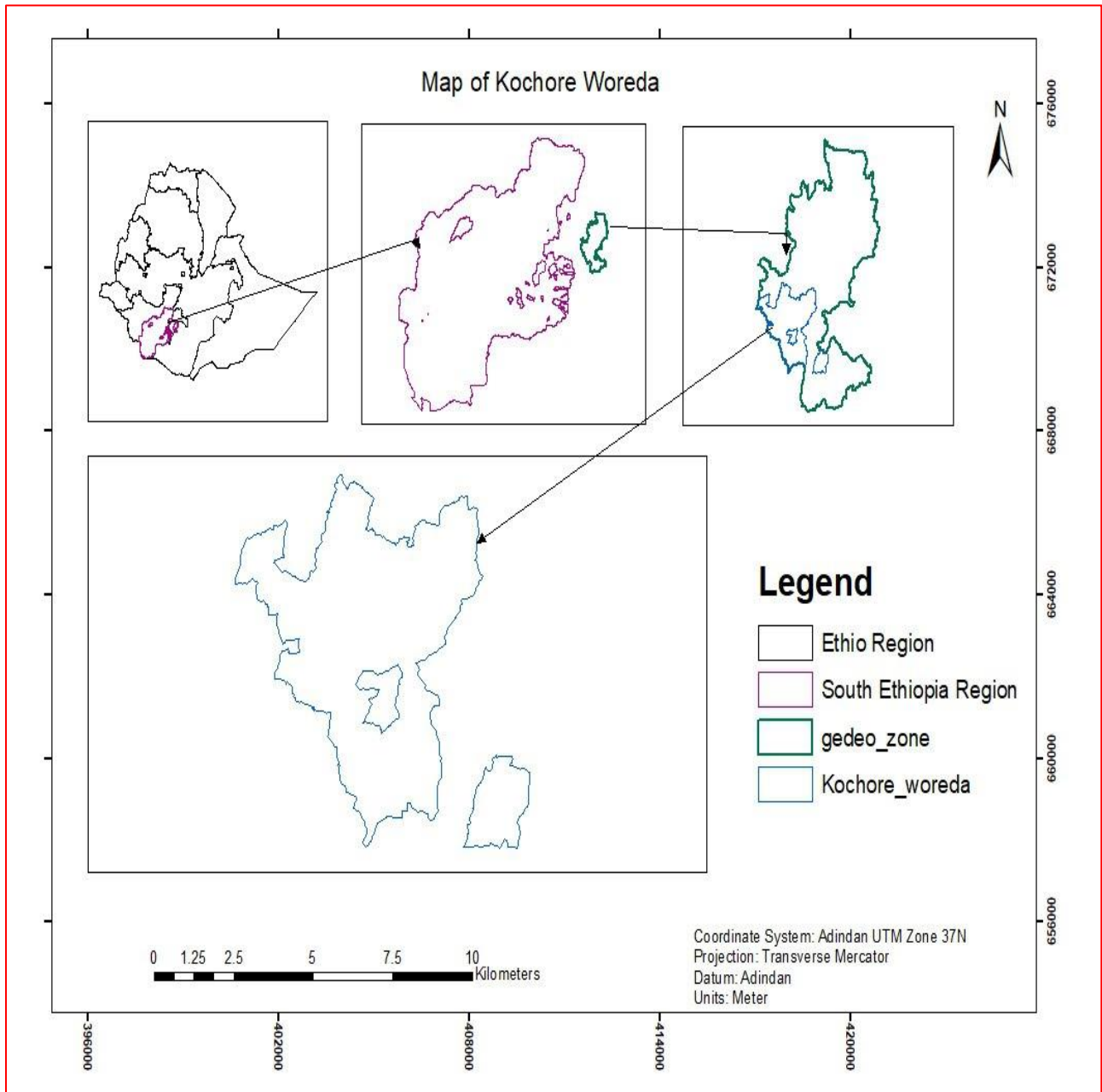


Figure 3. 1. Map of the study area. Source: -Ethio GIS)

3.1.2 Topography

Most of the Kochere woreda land escape is dominated by rugged mountains up and down. The altitude of the study area ranged from 1501 meters to 2500 meters above sea level. Inworeda 1501 meters is a lower area, and 2500 meters above sea level is a higher area in the woreda. Due to this reason, the topography of the area, as mentioned above, slopes. The slopes accelerate the

water drainage from the north to the south part of the woreda. At the study area, people want to protect soil erosion by participating in the practice of agroforestry and planting different types of trees and erosion protection methods. (Source: Woreda geo-special and statics sector, 2017)

3.1.3 Climate and Vegetation

Kochere Woreda has a temperate climate with an average annual temperature of around 18°C. The area experiences two rainy seasons: the long rainy season from June to September and the short rainy season from February to April. The vegetation is characterized by lush green landscapes with a mix of forests, grasslands, and agricultural fields. The woreda is known for its high altitude and cool climate, making it suitable for the cultivation of coffee.

3.1.4 Soil Type and Characteristics

In the study area, the type of soils is predominantly classified as salt loam and sandy soils. Those soils dominated the red-brown soils in the area. It has a high iron content. The soils allow for the development of an extensive root system, meaning that the coffee plants can get more nutrients and moisture from the soils. So, the soil has high contents. Iron is one of the micronutrients that play an important role in coffee, inset, and other crop production in the study area. (Source: Wenda Agriculture and Rural Development Sector, 2017)

3.1.5 Natural Resources

Kochere Woreda is rich in natural resources, with coffee being the most significant resource. The area is also known for its fertile soil, which supports the growth of various crops. Other natural resources include water bodies, forests, and mineral deposits (such as limestone and clay).

3.2. Demographic character

3.2.1. Population

Based on the 2007 census of Ethiopia conducted in socio-economic and static sectors, the woreda has a total population of 130,486 people, of whom 64,703 are male and 65,783 are women. Of this total population, 10606 (8.13%) are urban dwellers.

3.2.2. Ethnic group

There are many ethnic groups in the woreda. From this ethnic group, the largest in the study area is the Gedeo ethnic group. The Gedeo ethnic group covers 84.05%, the Oromo (11.35%), the Amhara (2.65%), and other ethnic groups make up 1.988% of the total population. Gedeo is spoken as a first language, known as gede'uffa. In the study area, 84.93% are spoken as the first language, 10.74% speak Oromiffa (affan Oromo), 3.77% speak Amharic, and the remaining 0.56% speak all other languages of Ethiopia in the woreda.

3.2.3. Religions

There are many religious followers in the woreda. From these religions, the major people in the habitats were 79.25% protestant followers of the total population, 9.04% Ethiopian orthodox Christianity followers, 8.33% observed traditional religions, 1.74% were Catholic Church followers, and 1.37% were Muslim followers reporting those beliefs in the woreda (Source: Kochere Woreda socio-economic and static sector, 2017).

3.2.4. Economic activities

There are different economic activities and practices in the study area. Agriculture, particularly coffee farming, is the primary economic activity. From these activities, 93% cover agriculture. Most of the study area is devoted to growing coffee and enset production, as well as other meal and fruit production. From this production, coffee is the main cash crop for the farmers. Which enhance the business activities and attraction of business means of the different ethnic groups and of the country as well as the world. On the other hand, enset, banana, and meal crops are the

next economic activities covered under agriculture. And 7% of economic activities cover service and other economic activities in the study area (source: Kochere Woreda's socio-economic sector, 2017).

3.3. Infrastructure

3.3.1 Education

Education is one of the basic infrastructure services that the population needs. Faster population growth area to increase the facility of education to increase the quality of education and manpower. In the study area, there are 21 primary schools, 4 secondary schools, and 1 preparatory school found in the woreda. In the study area, 87% of the access and infrastructure for education were successfully implemented. In the study area, the problems were that a large number of the students went a long distance from rural to urban schools. Because of the shortage of high schools and especially preparatory schools in the study area, the long-distance students' problem is decreasing the quality of education and the economy of the local population. This shows fast-increasing numbers of students, schools, and teachers are not growing at a similar rate, deteriorating the quality of education and the number of student withdrawals from the school (Source: Kochere Woreda Educational Planning Sector, 2017).

3.3.2 Health

Health care services are one of the social services for society. The governments of developing countries have to construct new hospitals, supply medicines, and train healthy people. So as to provide health care service growth for the population on the other side of the country. There is one health center and a health care station in the woreda. The woreda has 130,486 total inhabitants who live in the woreda. 68% of the total population was able to gain access to health care through the assistance of governmental and non-governmental organizations. In the woreda, there is no hospital. This poses challenges to the local population and the health care sector in the woreda. (Source: Kochere Woreda Health Care Office, 2017).

3.3.3 Road

Road is the basic infrastructure for that population to connect one place to another, woreda by woreda and country by country, to sustainable developments of socio-economic and political conditions. According to the Kochere woreda report, 34 kilometers of asphalt roads, 14 kilometers of all-weather roads, and 18 kilometers of dry weather roads connect place to place in the study area. 45% of the road infrastructure is accessible (Source: Kochere woreda socio-economic sector, 2017).

3.4. Research Methodology

3.4.1 Research Design

The study used a descriptive research method because it is appropriate for describing the extent and role of community participation in the difficulties and opportunities of watershed management faced by farmers. Descriptive research describes the research variable on which the research was conducted. The descriptive research approach is used to answer questions such as who, what, when, and how. Descriptive research enables us to employ both qualitative and quantitative research approaches. A qualitative description is one that uses words to describe data, whereas a quantitative description uses numbers. Researchers used descriptive method of study

3.4.2 Sample size and sample techniques.

3.4.2.1 sample techniques

Among the different types of sampling techniques, we would use the simple random sampling technique, as this method has no personal bias and every person has the right to be selected and give reliable and accurate information depending on our topic of study. In the study area, there are 23 kebele and a total population of 130,486. From those kebele, we selected Hama kebele purposefully as it gives full and accurate information in Kochere woreda in terms of the challenges and opportunities of watershed management practice.

These kebeles were selected because they represent the social, economic, and physical characteristics of the wider Woreda sufficiently to meet the research goals. In selected kebele in the Kochere woreda, there are 1228 total households. From this target group, local communities have close contact with agricultural and rural development sectors. The researchers collect data from the local communities, which play a great role in enhancing the development of agricultural productivity. As a result, researchers took 92 respondents from a total of 92 households in different local communities and sectors. The selected sampling respondents would provide information for researchers to succeed in the aim of the study and use time. Budget constraints will address the key information by applying local knowledge and expertise, participation and ownership, contextual understanding, and targeted interventions. By collecting data from local communities, researchers identified specific challenges and constraints that are hindering agricultural productivity at the grassroots level. Overall, involving local communities in data collection to enhance agricultural productivity ensures that interventions are contextually appropriate, sustainable, and impactful. It also promotes community participation, ownership, and knowledge sharing, leading to long-term development outcomes.

3.4.2.2 Sample Size

According to the house and population census in 2007 E.C., then of Kochere woreda was 130,486; among them, 1228 households are found in Hama Kebele; thus, we selected 92 respondents.

Table 3. 1. Sample population

Total Population in kochere woreda	Total households in hama kebele	Sample house hold
130,486	1228	92

By applying RNal.m.wris, 1998 formula such as $n = \frac{N}{1 + N(e)^2}$ $n = \frac{N}{1 + N(e)^2}$ by substituting given numbers above

$$n = \text{respondents} \quad n = \frac{1228}{1 + 1228(0.1)^2} \quad N = \text{households} \quad n = \frac{1228}{1 + 1228(0.01)^2}$$

$$e = \text{error} \quad n = \frac{1228}{1 + 12.28} \quad n = \frac{1228}{13.28} = 92$$

3.4.3 Source of the data

The relevant data was collected mainly from both primary and secondary data sources. The primary data was collected directly from the respondents of the study area of the house holding level, including concerned individuals who participate in challenges and opportunities of watershed management practices and other concerned bodies. As a source of primary data by using open and closed questionnaires and interviews. Secondary data sources were collected from different documented materials like books, magazines, journals, the Internet and newspapers about community participation and the challenges and opportunities of watershed management practice in the study area.

3.4.4. Methods of data collection, and instrument

The instrument for collecting primary data, or first-hand information, and secondary data sources about the challenges and opportunities of water shade management in the study area is by using data collection tools such as questionnaires, interviews, and also field observation methods. The instrument plan for the data collection that researchers used consisted of 80 respondents by questionnaire and 12 respondents by interview data collected from local communities and local agricultural development sectors. Respect and field observation with regard to the nature of the instrument, most of the questionnaire, and interviews. Woreda was designed for the sample population of the study.

Questionnaires

Questionnaires are very important for data collection because they are full instruments that collect sufficient information from a relatively large number of respondents. Due to resource and time constraints, the research could not entertain a large number of people in case studies, in-depth interviews, or wider focus group discussions. Therefore, questionnaires are used in order to collect facts or opinions to fill the gap and support the representative sample to address as many individuals as possible to help gather relevant first-hand information about the problem. Two different sets of questions will be prepared: closed-ended and open-ended questions, and a form of examination with an alternative or choice and blank space for the respondent's understanding

of ways, the background of the respondents, and assessments of problems. In order to gather information from different people, preparing questionnaires is very essential. Due to this, we will prepare the question in English for the respondents and translate it into Amharic in order to easily understand the respondents.

Interview

We conducted interviews to get relevant information for our investigation. In this study, many interviews are carried out with the intention of collecting the maximum amount of data until saturation is reached. We would conduct face-to-face interviews with the woreda rural agricultural development sector on the challenges and opportunities of watershed management practice. Sem-structured and structured interviews would be employed in order to be free to arrange the form, order, and timing of questions. The raised questions in the sector include the benefits of watershed management for the community, the role of the community in watershed management, which government supports the practices of watershed management, and the challenges of management at practice times in the area. In this interview, different sections of society are taken into account. Some to mention are farmers and their families, among others. We will conduct interviews to get relevant information for our investigation.

Field observation

Among the primary data collection techniques, observation is crucial to understanding people's activity based on how, what, and why they are doing certain things. Personal observation was conducted together with taking field notes on the behaviors and activities of individuals, and we will observe the role, level of challenge, and opportunities of watershed management practice on the field. These observed facts will be triangulated to consolidate information that was obtained through interviews and questionnaires and focus discussion with natural resource management and local peoples. The reason for the data observation is to know what is a preliminary problem, which problems have been achieved in the past, and nowadays, it depends on the preliminary data study about the problems or challenges to minimize the problems in the study area.

3.4.5 Method of the data analysis

Data analyses based on the collected data in qualitative and quantitative form are employed for data analysis. The data obtained from different respondents' questionnaires, interviews, and field observations will be arranged according to their type. Quantitative analysis was employed in the in the statistical package for social science. (SPSS). The data will be edited and coded before entering the cells of SPSS. The qualitative data, which is generated from different sources, is analyzed, and the results of the key findings would be displayed in the form of tables, frequencies, percentages, and charts to provide evidence and support qualitative information analysis.

3.4.6 Ethical consideration

During the study, considering all ethical considerations is very important, especially during the data collection from different respondents. The researchers have certain ethical standards to consider, as suggested by Kvale (2009). These include informing the participants about the purpose of the research, voluntary participation, confidentiality, avoiding dependent relationships, etc. After obtaining the participants' full willingness and consent, the researchers would conduct a voluntary interview.

CHAPTER FOUR

4, Data analysis and Interpretation

Under this chapter, the researcher's tried to analyze and interpret the demographic and socio-economic characteristics of the respondents, such as sex, age, family size, martial and educational status, which have their own relation directly and indirectly with respondents on the challenges and opportunities of water shade management practice at the gedee zone in Kochere woreda in a specific area of Hama Kebele. The data are analyzed and presented in the in the form of tables, percentages, and descriptions.

4.1 Backgrounds of sampled house hold respondents

4.1.2 Age of selected house hold respondents

The age of sampled house hold respondent Variety from 21-60 in the selected kebele.

Table 4. 1 Age composition of the selected house hold.

Age group interval	Frequency	percentage
21-30	23	25%
31-40	29	31.5%
41-50	28	30,43%
>51	12	13.04%
total	92	100%

Source, own survey, 2024

The above table 4.1 describes the age of selected respondents, which indicates most of them are under the age of 31–40 and 41–50, which are 31.5% and 30.43% out of the total respondents, respectively, and the age of 21–30 and >51 was covered by 25% and 13.04% out of the selected total respondents, respectively. Respect participated in the challenges and opportunities of watershed management practice. This shows most of the respondents were of the most productive ages. The study of respondent age was used to identify productive and dependent populations in the study area.

4.1.2 Sex composition of respondent

The sex composition of the respondents in the study area comprises house-holding by men and women, as is obvious and discussed in the table below.

Table 4. 2 Distribution of respondents by sex

Sex	frequency	Percentage
House hold head by men	69	75%
House hold head by women	23	25%
Total	92	100%

Source own survey, 2024

According to Table 4.2, the total number of male respondents covers 75% of the total respondents, while female respondents cover 25% of the total respondents in watershed developments and management practices. These show low amounts of female population participating in watershed management practices as well as in agricultural activities in the study area. So, in the study area, females have a lower percent of participation. The majority of the respondents are male. This indicates that the majority of the population is male and has more responsibilities to support a house with practically working water shade than women in the study area.

4.1.3 Martial status of the respondents

The marital status (married, unmarried, or divorced) of the respondents. Is shown below.

Table 4. 3: The distribution of the respondents by marital status.

Marital status	Frequency	percentage
Married	76	82.61%
Unmarried	16	17.39%
Divorced	-	-
total	92	100%

Source own survey, 2024

Table 4.3 above presents the distribution of the respondents by marital status. that the majority of respondents are married, which covers 82.61% of the total respondents; 17.39% of the total respondents are unmarried; and there is no divorced person among the total respondents. This shows that in the in the study area, the respondents are mostly married. So, the selected respondents do not divorce, and this implies that in this area, the families respect each other.

4.1.4 Educational background of the respondents

Table 4. 4 Shows general educational status of the respondents.

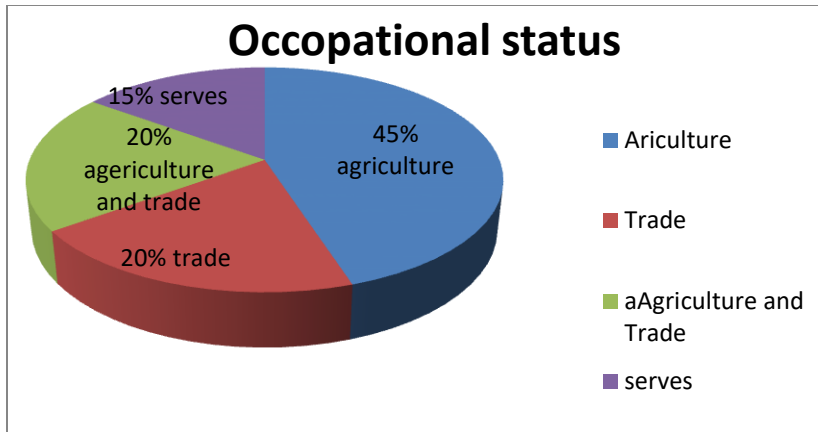
Level of education	Frequency	percentage
Grade 1-4	35	38%
Grade 5-8	23	25%
Grade 9-12	18	19.6%
Grade diploma	10	10.9%
Grade degree and above	6	6.5%
Total	92	100%

Source own survey, 2024

According to table 4.5, a large number of the respondents are in grades 1-4, which covers 38% of the total respondents; grades 5-8 cover 25% of the total respondents; grades 9–12 cover 19.6% of the total respondents; 10.9% take diploma certificates; and 6.5% take fist and above degrees from the total respondents in the study area.

4.1.5 Occupational status of the respondents

Figure 4.1 Chart describe the occupations of the respondents



Source own survey, 2024

Figure 4.1 above presents the occupation of the respondents in the study area. In the study area, most respondents depend on agriculture. Those cover 45% of the total respondents; this shows that in the study area, most people depend on agriculture, and trade covers 20% of the total selected respondents' economic activities. The trader or merchant supports During the study, considering all ethical considerations is very important, especially during the data collection from different respondent's watershed management in the study area by buying different materials helps take the form of a money gift. 20% for the total respondents answered both agriculture and trade, and 15% for the total respondents answered practically economic activities on the study area. Those show all respondents participate indifferent activities of economic sustainable development in the study area.

4.2 Assessment of the challenge and opportunities of watershed management practices

The importance of multiple economic, social and environmental benefits derived from land-based resources has increased in recent years. Sound management of these resources is therefore prerequisite to sustainable resource-based production systems. Watershed management, which in essence is the application of land resource management systems, is considered by many to be the most appropriate approach to ensuring the preservation, conservation and sustainability of all land-based resources and improving the living conditions of people in the uplands and lowlands. Integrated watershed management with participation of all the relevant key actors has become widely accepted as the approach best suited for sustainable management of renewable and non-renewable natural resources in upland areas.

4.2.1 The factor that affect watershed management practice in study area

Below, data is analyzed on the title challenge and opportunities of water shade management practices. This analysis is based on data collected from the selected respondents in the study area. By using different collection methods and instruments. The collected data was analyzed in the in the form of a table and description methods of the data.

Table 4. 5 Present factor that affect watershed management practice

Factor that affects water shade	Frequency	Percentage
Lack of area closure	33	35.9%
High population pressure	33	35.9%
People reluctant	26	28.2%
Total	92	100%

Source own survey, 2017

As we can see from Table 4.2.1, 33 respondents (35.9%) of the total respondents replied that lack of area closure and high population pressure are causes of water shade management practices, and 26 respondents (28.2%) of the total selected sampled respondents said that people are reluctant is one of the factors that affect water shade management in the study area. In the above table, we understand that lack of area closure and high population pressure are the most important factors affecting water shade management practices in the study area.

Table 4.6 presents the major obstacles to an effective coordinating mechanism for water shade

No	Obstacle of an effective coordinating mechanism	frequency	percentage
1	Lack of area qualified staff	29	31.5%
2	Lack of time schedule	22	24%
3	Lack money and material resource	23	25%
4	Lack of fund to do extra work	18	19.5%
5	Total	92	100%

Source field survey, 2024

As we can see from Table 4.2.2, 19 respondents (31.5%) from the selected respondents replied that lack of area qualified staff, 23 (25% of the respondents) replied that lack of money and materials resources are the obstacles to the practice of water shade effective coordination mechanism, 22 (24% of the total respondents) replied that lack of time schedule to the practical participation of water shade in the study area, and 18 (19.5%) of the total respondents replied that lack of funds to do extra work. From the above description, we can understand that the lack of qualified staff in the study area is one of the major obstacles to an effective coordination mechanism, and the next is a is a lack of money and material resources, a lack of a time schedule, and a lack of funds to do extra work. These are in order to study area the obstacles to an effective coordination mechanism in the study area. This is the most effective coordination mechanism to participate in water shade practices and management.

Table 4.7 presents the social factors that constrain the development and management of the farms in the watershed.

No	Social factor constrains the development and management of the watershed	frequency	percentage
1	Government policy	40	43.5%
2	Traditional farming system	52	56.5%
3	Total	92	100%

Source own survey, 2024

From the above table, 4.2.3 describes the social factor for the water shade. 52 respondents (56.5%) of the total sampled population replied that the social factors that constrain the development and management of the farm in the watershed and the and the traditional farming system affect the watershed. Because the local farmers depend on the traditional farming system in the area, without a plan, they use land farming. The remaining 40 respondents (43.5%) from the total respondents replied that the cause of social factors constraining the development and management of farms in the watershed is governmental policy. Because the policy changed from time to time.

Table 4.8 Presents possible barriers that toward innovative technology.

No	Barriers that towards innovative technology	frequency	percentage
1	Poverty	32	34.8%
2	Lack of education	35	38%
3	Poor extension service	25	27.2%
4	Lack of encouragement and incentive	-	%
5	Total	92	100%

Source: own survey, 2024

According to Table 4.2.4, the local community and agricultural sector responded most negatively to the innovation of technology. From the listed barriers in the table, 35 respondents (38%) said that barriers to improving innovative technology. In the study area, most people are not educated. By this cause, people do not use and improve technology. 32 (34.8%) of the total respondents replied that poverty is the cause of improving technology. The majority of people do not have high incomes or wealth in the study area. As a result, new ideas and technologies are not improved. The poverty is based on the depression of technology. 25 (27.2%) of the total respondents said that in the study area, poor extension service is a problem for creating technology and sharing new ideas with the extension service. The different extension services share the new idea with the local society. In the study area, lack of technological share extension service is the main cause of society. Whereas the respondents replied, no one replied that the lack of encouragement was intensive in the area.

Table 4. 9 Mechanism of prolonging the rehabilitated and conservation agricultural lands

No	Mechanism that rehabilitating and conservation agricultural land	frequency	percentage
1	Giving private property right for farmer	12	13%
2	Involvement of community team member	37	40.2%
3	Controlling area through government bodies	18	19.6%
4	Assigning continuous fallow up in water shade work	25	27.2%
5	Total	92	100%

Source own field survey, 2024

According to the above table 4.2.5, 37 (40.2%) of the total selected sample respondents replied or said that involvement of community team members is the solution for the mechanism for the rehabilitation and conservation of agricultural land, and 25 (27.2%) of the total respondents replied that continuous fallow-up water shade work is the basis for the mechanism of the rehabilitation of the resource and marginal lands. Is this technique the way of sustainable developing conservation or the conservation of agricultural land? 18 (19.6%) of the total respondents said that ways of conserving and rehabilitating agricultural land are controlled by governmental bodies, and 12 (13%) of the total respondents said that ways of rehabilitating land are private property rights for the farmers. This means the farmer conserves his or her marginal land, which is protected by the individual from degradation.

Table 4.10 Present opinion of the farmers in protecting and developing watershed

No	Opinion farmers protecting and developing water shade	frequency	percentage
1	Fallowing an intensive educated and extension campaign	38	41.3%
2	Establishing legal fallow up and inspection system	54	58.7%
3	Total	92	100%

Source own field survey, 2024

As we can see in Table 4.2.6, 54 respondents (58.7%) practiced protecting and developing water shade in the area by establishing a regular fallow-up and inspection system. It is a solution for the protection and development of the watershed, and 38 (41.3%) of the total respondents that replied that an intensive education and extension campaign is a system for protecting and developing the watershed.

Table 4.11 Peoples participate watershed managements practice at the area

No	Participate water shade management practice	frequency	percentage
1	Yes	92	100%
2	No	-	%
3	Total	92	100%

Source own field survey, 2024

According to the above table 4.2.7, 92 (100%) of the respondents in the area participate in the practices of water shade management, and none of the respondents are without the practices of water shade management in the area. All respondents are participated in water shade management practices. At this point, all listed the significance of the water shade. The water shade is multi-disciplinary and has many significant and important factors for socio-economic, political, and environmental protection. And the respondents gave it more importance. It is listed as blowing.

- Protect soil erosion.
- Increase the soil moisture.
- Increase soil fertility.
- To keep climatic variety
- Create job opportunities for the unemployed.
- Increase agricultural productivity.
- Organize different management organizations to make decisions.

Table 4. 12. Describe the level of participation water shade management practice in the weak.

No	Level of participate in a weak on water shade practice	frequency	percentage
1	One day per week	46	50%
2	Two day per weeks	24	26.1%
3	Three day per weeks	13	14.1%
4	four day per weeks	9	9.8%
5	Total	92	100%

Source own survey,2024

As we can see in Table 4.2.8, 46 (50%) of the total respondents participated only one day per week in watershed management practices; 24 (26.1%) of the total respondents participated two days in the week in the practices of watershed management; 13 (14.1%) of the respondents participated three days in the practices of watershed; and 9 (9.8%) of the total respondents participated four days per week in the water shade management practices at the study area.

Table 4. 13 Description of major factors for the soil erosion

No	Factor that soil erosion	Frequency	percentage
1	Deforestation	19	47.5%
2	Improper land use	3	7.5%
3	Excessive rain falls	10	25%
4	Topographic feature	8	20%
5	Total	40	100%

Source own field survey, 2024

According to table 4.2.9 description, 19 (47.5%) of the selected respondents replied that the major factors causing soil erosion are deforestation. In the study area, people mostly cut forest for different purposes. Overuse of the forest causes soil erosion, 10(25%) respond that excessive rain falls causes upper soil movements in the form of floods, and 8(20%) of the total respondents respond that topographic features are factors that contribute to soil erosion. Soil moved from the higher slope to the lower slope area. The study area is mostly up-and-down topographic features, which cause soil erosion processed by wind, runoff, and different forces to the lower bases, and 3 (7.5%) of the total respondents respond that improper land use is a factor in the soil erosion. The above is an alternative that factors in soil erosion. And practically, soil quality and quantity are being destroyed in the study area. By the above-described purpose.

Table 4. 14 Description of the clear forest at the area

No	People clear forest	Frequency	percentage
1	Yes	92	100%
2	Not	-	-
3	Total	92	100

Source own survey, 2014

Table 4.2.10 describes that all respondents replied that people clear forests in the study area. Because they serve different purposes. The respondents respond to the question of why the forest was cleared in the area.

- For the firewood.

- For the built or constructed house.
- For the woodwork or purpose of the furniture for the house and different offices.
- For fabric purposes.

Table 4. 15 Agricultural productivities after the practice of the watershed management

No	Agricultural productivities after watershed practice	frequency	percentage
1	Moderate improved	26	65%
2	Partially improved	14	35%
3	Total	40	100%

Source field survey, 2024

As we can see from Table 4.2.11, 26 respondents (65%) responded that after the practices of watershed management, the productivity of agriculture was moderately improved. This means the practices of watersheds in the area are valuable for increasing productivity and changing agricultural developments. So, after the practices of watershed management, the resources, population demand, and agricultural productivity were nearly balanced in the area. And the remaining 14 (35%) of the total respondents respond that agricultural productivity has partially improved after the practices of the watershed management. Watershed practices have partially improved agricultural productivity over time.

Table 4.16 Benefits of watershed management practices for community

Benefits of watershed management practices for the community	To the sustainable development of agricultural productivity
	To changing farming system of traditional to modern or technological based farm system
	To increasing soil fertility for the vulnerable area
	To increasing ground water recharge or moisture

Source field survey, 2024

Table 4.2.12 describes how watershed management benefits the community. Watershed management is increasing agricultural productivity, changing farming, increasing soil fertility, and increasing water holding capacity in the soil. The management of watersheds involves

sustainable social, political, economic, and cultural developments for the community, the development of a new system of farmland, and improving land use for different purposes.

4.2.2 Role of community participation in watershed management practices

Community-based watershed management practice is a process of involving local communities and local governance structures in formulating and implementing a course of action involving the water and land resources or watershed, with emphasis on the linkages between the upstream and downstream parts of a watershed.

Table 4. 17 Role of community participation in watershed management practices

Role of community participation on watershed management practices	To protection of natural resources from the different vulnerabilities and risk.
	Practically to change degraded area participating on watershed practices

Source field survey, 2024

As we see in the table, the role of community participation in watersheds is to protect environments and practically protect natural resources from social, economic, political, and ecological vulnerability and to conserve natural resources and environmental degradation through practically secured watershed practices.

4.2.3 Challenges and opportunities of watershed management practices

Degradation caused by unsustainable exploitation of natural resources is usually the key problem. It leads to poverty, food insecurity and social conflict. The negative socio-economic consequences of unsustainable resources use are insignificant.

Table 4. 18 Challenges of watershed managements in practices officials

Challenges of watershed management Practices in woreda	Its time take practices
	Shortage of skilled man powers and budget for the practices
	Low adoption and uses of technology
	Poor social sector support to the practices of watershed managements
	Low supporter nongovernmental organization in watershed management practices

Source field survey, 2024

As we can see above in Table 4.2.14, the table describes the challenge of watershed management practices in the sector. The challenges are listed in detail in the above table, like its long time take, shortage of manpower and budgets, low adoption of the technology, low support from nongovernmental organizations, which are most likely to cause limitations in the watershed management practices, depression from time to time, and all social sector carelessness at the time practices of watershed management are challenges of the sectors in the study area.

Table 4. 19 The opportunities of watershed management practices for community

Opportunities of watershed management for the community in area	Decrease soil erosion irrigation, fallow up and planting trees
	Create job opportunity for the society in the area.
	Increase fertility of soil
	Introduce new farming system for the society
	Protect soil and climate condition from the different risks
	Change of the environmental quality by increase biodiversity and conservation.

Source own survey, 2024

As we can see in the in the above table, it describes the opportunities for practice or watershed for the communities. The opportunities listed reduce soil erosion, create job opportunities, increase fertility in the soil, introduce new farming systems, and increase biodiversity and environmental quality to improve sustainable agricultural development and increase the land management system of the study area as well as for the country.

4.3 Description of extents governmental and non-governmental organization support watershed management progress programs in study area

The agriculture sector replied that governmental and non-governmental organizations support watershed management practices and programs. The government that supports the extension of different materials, skilled manpower, budget, expands strategies, and supports technological tools supports watershed management practices in the study area, and non-governmental organizations known to support different communities by the different developmental programs in different countries and regions. So, in this study area, support the local community through the agricultural breed, banknotes (money) in the form of donations (funds), and improve the new system to protect natural resources. Supporting watershed management in the study area and agricultural and rural development sectors.

CHAPTER FIVE

5. CONCLUSION AND RECOMMENDECTIONS

5.1 Conclusions

The clearing of forests and disturbance of their eco-systems exposed the fertile top soil to erosion, which in turn decreased the quality of agricultural land. For the rehabilitation of degraded land, a few soil conservation management practices are practiced by the farmers. However, due to a lack of clear guidance and technical support, the implementation of soil conservation management practices, both biological and physical, is not as effective as needed. Population crowding in the area is one of the problems that might accelerate the low productivity of the watershed. From this, the future fate of watershed management practices in the area will be under question. The government has taken corrective or supportive measures for the above-mentioned problem in the area. Beside this, what to say is that, still now, the farmer has been backwards, but they always participate in watershed management practices. That their way of practicing is still traditional means they don't accustom. To modern way of practicing, the household must adopt watershed management practices side by side with other farming in order to increase the performance of the future fate of their economy, like biological measures like grass-strip, crop rotation strip-cropping, a forestation in steep slope areas, area closure, and physical measures like contour plough diversion and absorption terrace, bench terrace, and so on. And the opportunities of watershed management are to sustainably increase environmental quality, increase biodiversity, protect soil moisture, and develop agricultural productivity. The study area, as well as the country

5.2 Recommendations

According to the data analyzed and the conclusions made by the researcher, the studies show that the task had a lot of problems, which will hinder the productivity of the watershed for households in the area. From this, all the responsible bodies, such as MOARD's, NGOs, MERETMS, LLPPA, and the community, must participate in order to alleviate the already existing problems. The policy of the Ethiopian government system is that the government must

pay special attention to following things in order to increase or change the wellbeing of the HH through different policy measures.

- The relatively less-practiced management should be applied widely, and technical support from the agricultural market is advisable.
- The degraded land with very steep slopes and marginal lands that are not productive for agricultural purposes should be protected from the interference of humans and animals.
- Solving deforestation through a forestation and reforestation mechanism in the area.
- The relatively less practiced physical and biological soil conservation measures should be applied properly and widely used.
- Practicing a modern farming system in order to reduce the velocity of run-off and increase production capacity in order to increase food security and increase income for the community as well as the country.
- Collaborated in coordinated work with government, non-government, and community members might work to integrate to make better future chances of watershed management.
- The environmental returns have become low due to damage to environmental protection, which has disappointed and affected the motivation of farm houses to use watersheds, which will have a valuable contribution to increasing production and productivity in the study area.

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WOLKITE UNIVERSITY

COLLEGE OF SOCIAL SCIENCE AND HUMANITIES



DEPARTMENT OF GEOGRAPHY AND ENVIRONMENTAL STUDIES

Appendix

Questionnaires

Dear respondent, these questionnaires are prepared to get relevant data for the academic purpose of partial fulfillment of a bachelor of arts degree in geography and environmental studies that is intended to assess the challenge and opportunities of watershed management practices in Kochere woreda. In this study, your contribution plays a major role in the success of the study. Each and every point listed below is very important to achieving our goal of studying. Therefore, we are kindly requesting that you fill out these questions honestly and accurately. For the people who cannot speak or listen to the English language, it will be translated into Amharic in order for them to give an appropriate answer to the question.

PART ONE: - Background of the information of the respondents

1, Sex; male, Female

2 Age; 15-25, 26-35, 36-45 46-60+

3 Educational status; 0 class, grade 1-4, grade5-8 grade 9-12

College

4 marital status; single, married, divorce, windowed

5. Religion; - Catholic, Orthodox, Protestant, Muslim

6 family size of respondents; male-----, female-----, total-----

7 Type of occupation of respondents;

- A. Agriculture
- B Trade
- C both trade and agriculture
- D service

PART TWO: - Give information about factors that effect on watershed management practices

1, what are the factors you think that they can affect watershed management practices in your area?

- A. lack of area closure
- D, lack of maintained
- B, high population pressure
- C, people reluctant
- E, others -----

2, what are the major factors to the soil erosion in your area?

- A. deforestation
- B. excessive rain fall
- B. improper land use
- D. topographic feature of the area

3, What are the major obstacles for an effective coordinating mechanism?

- A, lack of area qualified staff
- C lack of resource
- B lack of time schedule
- D lack of fund to do extra work
- E if any-----

4, what social factors constrain the development and management of the farmers in the watershed area?

- A. governmental strategy
- B. traditional farming system
- C. if any-----

5, What are the possible barriers to wards innovative technology?

- A. Poverty
- B. lack of education
- C. Poor extension service
- D. lack of encouragement incentive

6, what are the mechanism of prolonging the rehabilitated and reclaimed marginal land through conservation measurement?

- A. giving privet property right for farmers
- B. involvement of community team member
- C. controlling the area through governmental bodies
- D. assigning continue fallow up in watershed work

PART THREE: Describe the role of society in watershed management practice in the study area.

6 what opinions of farmers in protecting and developing watershed?

- A. Fallowing an intensive education and extension company
- B. Establishing a legal follow up and inspection system

7 people in your area participate on watershed management practices

- A yes
- B. No

8 If your response for question number seven (7) is yes, list the significances of watershed management practices-----

9 how often do you participate on watershed management practice in a weak

- A one day per week
- B two days per week
- C three days per week
- D four days per week

11 People clear forest in your area?

A yes

B No

12 if you, your answer for the question number eleven(11) yes, why?-----

13 how can see attitude of the farmers towards soil and natural resource conservation in watershed area?

A. It's good

B. It's not good.

14 after the practices of watershed management agricultural productivity is in the area

A. Moderate improved

B. partially improved

PART FOUR: - Interview question woreda agriculture and rural development sector.

1, What are the challenges on watershed management practices in sectors?-----

2, What is the role of community participate on watershed management practices?-----

3 What do you think about community benefits from watershed management practices?-----

4. List the opportunities of watershed managements to the community and developments of natural resources?-----

5. To what extent governmental and non-governmental organization support watershed management progress program ?-----

