

# CHAPTER ONE

## INTRODUCTION

### 1.1. General

In Sudan, there are different options of the forest management and communal forests are one of these options. In the last decades, the forest land is highly degraded due to misuse and poverty in rural areas. This led to high pressure on forest resources for meeting basic needs and securing livelihoods of rural people. Forest fires, pests, and climate change are other causes of degradation. Sinnar State faces negative impacts on natural resources, particularly forest lands. Abdallah (2005) found that community forestry (in its different forms) contributes significantly to the economy of the farmers. In Private communal forests, farmers prefer exotic tree species like eucalypts at the expense of the indigenous trees due to their high market demand, fast growth and relatively small area needed by a tree compared to that needed by indigenous tree species. The reliance on the exotic trees is merely based on its financial returns irrespective of the scientific management of these forests.

Sarre (1994) reported that community forestry also offers opportunity to local people, who are often blamed for the destruction of the forest, to establish a long-term source of income. Foresters have the opportunity to rediscover the grassroots of their profession. and nations have the community opportunity to develop a forest-based industry which has widespread community support. Most stress is on the importance of participation and benefit-sharing. Perhaps, like sustainable development, forestry should be seen as a process for increasing the involvement of and reward for local people, of seeking balance between outside and community interests and of increasing local responsibility for the management of the forest resource. Also, like sustainable development, community forestry should be a

learning experience for all involved parties. Whether or not it leads to better forest management is an arguable point , but in some places it may well be the last chance for forests conservation (Sarre, 1994).

Sudan remains the second largest country in Africa and third in the Arab world and the 16<sup>th</sup> worldwide, covering a whopping Land area: 1,752,187 sq km.,and has an estimated population of 30,894,000,country's population in comparison to the world: 35th, 3rd in the Arab World and 9th in Africa (Mohamed, 2011). Sudan is now changing, not only politically but geographically, ethnically, socially and religiously. Once it used to be surrounded by nine neighbors, now three of those neighbors are eclipsed by the new state, Southern Sudan. But to show the rich potentials of the Sudan, it suffices to say that the Nile basin constitutes 67.4 % of the country's total area. Due to its unique geographical location, Sudan has always been a trading and cultural bridge between northern and southern Africa as well as between the Arabian Peninsula and Africa, particularly West and East Africa. The current people of Sudan descend from a mixture of many ethnicities and groups; most notable are (Arabs/African Hamates), and 96.7% of the population is Muslim (Mohamed, 2011).Sudan is classified as a moderately forested country with about 11.6% forest and woodlands cover , of which only 3% is gazette forest reserves. Almost two thirds of the country is desert or semi-desert. The importance of forests emanates from their vital role in environmental conservation and from their economic importance in satisfying the basic needs of the society for forest products. Forests contribute about 12% of the Gross Domestic Product (GDP) in 1994.Their products in form of fuel wood, charcoal, construction poles, timber, gums, food, fodder, and native medicines are in demand at varying levels in the country. The means and intensity through which these products are obtained had and continued to have varying impacts on the

role played by forests in environmental protection and in the livelihood of the different communities (FAO, 2006).

In Sudan, the social forestry is a term applied to tree planting or natural forest management designed to meet the forestry - related basic needs of rural people. However, Sudanese Social Forestry Society defined social forestry as "the involvement of the different sectors of the society in planning, management and protection of forests (Abdel Magid and Elsiddig, 2003). Hence, Social forestry had been regulated as encompassing "any situation which intimately involves local people in a forestry activity for the direct benefit of those people". This research is an attempt to study the economic role of the different types of community forests in Sinnar State.

## **1.2. Problem statement**

In the Sudan, the forest land decreased from 68 million hectare to 21.6 million hectare as a result of separation of South Sudan (UN, 2014). However, the forest situation in Sudan will become increasingly critical as time goes on, this result from misuse of forests in rural areas in addition to the potential effects of climate change on forests. A number of studies based on forest simulation models predict substantial alteration of forest composition, forest dieback, or even loss of forest cover.

In addition, poverty in the third world's countries is endemic and Sudan is not also far from it. Statistics shows that about 60% of people are under poverty line (World Bank, 2011). Furthermore, local people needs and aspirations should be considered if resources are to be conserved. Hence, community forestry is considered to be the solution to environmental problems and community needs in Sudan and this mainly because of its major role of supplying household demands of various forest

products. Moreover, significant changes have taken place in rural community's economic conditions since the establishment of community forestry sector in Sinar State(Tawhida, 2013).Overall economic analysis of community forest will only reveal its actual contribution in household income and hence poverty alleviation.

The management and analysis of financial data can be difficult for any small enterprise but can be especially tough for community-based forest enterprises in developing countries. While these enterprises often learn quickly the technical aspects of forest management, many struggle in the process of becoming viable businesses. Specifically, few have the capacity or tools to monitor and manage their financial data, and costs associated with production and income from sales, let alone to calculate total costs per activity, the depreciation value of machinery, net income, or rate of return. Similarly, rarely do the governmental or nongovernmental organizations that provide assistance to community forest have this capacity or pertinent tools. Yet this information is critical to ensure the financial viability of these enterprises and the distribution of financial benefits to the communities involved, especially as community forestry becomes an increasingly important component of forest management around the globe.

During the last decade the understanding of the importance of forestry for local communities has been recognized and became apparent. To stimulate forestry and crop production in rural communities, new approaches should be worked out to overcome the various obstacles, which have limited the acceptance of forestry by local communities in the past. Gradually several responses to the limiting factors for forestry development in rural areas have been recognized (Phuong, 2000).

This study will conduct economic evaluation of establishment of these forests along with tangible indirect benefits users getting through different community forest activities. The findings would be useful in developing new strategies and concept to involve the poor and very poor users at the centre of the community forestry programme. The data obtained and analyzed will not only be useful for the local people themselves but also for the policy makers, forestry professionals, planners, NGOs to consider the pro-poor approach. This study is an attempt to highlight this economic role.

### **1.3. Objectives of the study:**

#### **1.3.1. General objective:**

The general objective of this study is to analyze and assesses the economic role of the different types of community forests in Sinnar State.

#### **1.3.2. Specific objectives are:**

1. To analyze the socio-economic characteristics of the members of the private and village forests in sinnar state.
2. To assess the perceptions of the rural people towards community forestry programmes
3. To evaluate the performance and benefits of private and village forests.
4. To assess the financial feasibility of community forest in the study area.
5. To draw some recommendations that will improve the present status based on the findings of the research.

## 1.4. Hypotheses

- There is no significant difference in the performance of private forests and village forests.
- There is no significant difference on total forest income among different socioeconomic groups.
- The cost of establishment of private and village forest is very low.
- Local people play a major role in managing community forests.
- There are the considerable of economic returns from community forests.

## 1.5. Organization of the thesis:-

The thesis consists of six chapters:-

**Chapter one** introduces a general background on community forests, forest product use, followed by the problem statement which highlights the understanding of present context of the participation of the people in the management and economic activities as well as the benefit sharing from the community forests, in addition to the objectives of the research and research hypotheses. **Chapter two** includes literature review related to development of community forests, participation and decision-making in community forest activities, role of community forests for poverty alleviation, income generation and employment creation, benefits from community forests, community forestry strategies, management and policies. **Chapter three** is about the study area including the location, factors of climate, vegetation cover, land use and community forestry. **Chapter four** is the methodology of data collection and analysis tools using SPSS for descriptive statistics, chi-square test, multiple regression and financial analysis. **Chapter five** includes the results and discussion. **Chapter six** is summary, conclusions and recommendations.

## **CHAPTER TWO**

### **LITERATURE REVIEW**

#### **2.1. INTRODUCTION**

##### **2.1.1. The importance of forests**

Sustainably managed forests have multiple environmental and socio-economic functions, important at the global, national and local scales, and play a vital part in sustainable development. Reliable and up-to-date information on the state of forest resources, not only on area and area change, but also on such variables as growing stock, wood and non-wood products, carbon, protected areas, use of forests for recreation and other services, biological diversity and forests' contribution to national economies is crucial to support decision-making for policies and programmers in forestry and sustainable development at all levels (FAO, 2010).

Forests importance emanates from their vital role in environmental conservation and from their economic importance in satisfying the basic needs of the society for forest products. In Sudan, the Forests contribute about 12% of the Gross Domestic Product (GDP). Their products in form of fuel wood, charcoal, construction poles, timber, gums, food, fodder, and native medicines are in demand at varying levels in the country. The means and intensity through which these products are obtained had and continued to have varying impacts on the role played by forests in environmental protection and in the livelihood of the different communities (FAO, 2006).

##### **2.1.2 Economic and social values of forests in Sudan**

Ibrahim (2000) mentioned that the Sudan forests play a vital role in the economy and welfare of the Sudanese people. The main domestic energy sources in

Sudan are wood, charcoal and other biomass materials. They constitute 80% of total energy requirements. The increasing demand for domestic fuel and timber necessitates the rehabilitation of the existing forests and expansion in forest plantation to avoid degradation of natural tree cover in the country. The deforestation in the country has been intensified for a long time, part of this destruction might be natural, but to a large extent it is a man unrestrained exploitation, which resulted from mono-crop agriculture and other factors such as customary constraints (e.g. land tenure system) Kobbail (2005). Pointed out that the forests of the Sudan constitute a sizable portion of the nation's wealth, contributing approximately (12%) of the Gross Domestic Product (GDP). In addition, forests supply the country's requirements for building material, furniture, round wood and poles for various local purposes. Sudan forests provide 84% of the country's energy requirements in the form of fuel wood. The value of fuel wood in term of tons of oil equivalent (TOE) was estimated at 1.5 billion dollars, moreover, forests provide direct employment for about 170,000 people excluding self-employed people engaged in collection of fuel wood and other products. Non wood forest products including gum Arabic that ranks high among the country's exports, fodder that contributes between 35-70% of the annual animal feed and edible tree fruits and seeds known to have saved life in the years of famines. Forests also provide direct and indirect benefits which, include environmental protection, soil amelioration, range and pasture improvement vitally important to a country largely dependent on crop and animal production. An increase of 15% in crop production is due to the use of shelterbelts ( Kobbail, 2005).

## **2.2. Definition of community forest**

Community forestry is an evolving branch of forestry whereby the local community plays a significant role in forest management and land use decision making. It involves the participation and collaboration of various stakeholders



including community, government and non-government organisations (NGO's). The level of involvement of each of these groups is dependent on the specific community forest project, the management system in use and the region. It gained prominence in the mid-1970s and examples of community forestry can now be seen in many countries including Nepal, Indonesia, Korea, Brazil, India and North America. ([https://en.wikipedia.org/wiki/Community\\_forestry](https://en.wikipedia.org/wiki/Community_forestry) - 1/4/2014)

### **2.2.1. Community forestry in Sudan**

In Sudan, local communities are known to protect and manage tree growth in the community lands and house compounds. Farm forestry and community forestry have been largely identified with the traditional gum Arabic production system. Communal management of the existing forests is reported to have taken place but has deteriorated over the past years due to the increased pressure on the resource. Only recently few programmers have started activities to encourage individuals and villagers to plant trees and establish woodlots (Kobbail, 1996). The World Bank (1986) reported that, in Sudan the community forestry seems to be an available option for increasing afforestation and people show very positive attitudes towards initiatives in community forestry, in particular in relation to private tree planting. The major factors contributing in the success of communal work are mainly scarcity of fuel wood, fodder, poles and people's awareness of desertification. Generally, tree importance, awareness and oriented extension services are the most important factors that argue people's participation in communal work. Abdel Magid (2008) stated that in Sudan, community forestry was defined as any forestry activities by individuals or groups in the community to improve their income, protect the environment, and appreciate the environmental values of forests in meeting their essential needs.

The objectives of community forestry in Sudan are to maximize the income of the rural people, to generate employment opportunities for local people, to motivate

people to take an active role in planting, management and protection of forest resources, to encourage self-reliance among the rural people, to develop the village economy and social environment of the rural people which help them settle in their villages, and to educate the local communities to shoulder their responsibilities in the natural resources conservation (Abdel Maged and Elsiddig , 2003).

### **2.2.2. Objectives of Community Forestry**

It worth to clarify the meaning of the term “objective” since it is the basic of community forestry projects. An objective, both for an individual and as organization, is defined as a state or condition which should be attained in a specific time or which can be maintained for a given period (Husch, 1987). For social forestry, production must not be the sole objective, although it is necessary to be considered (Mishra, 1996).

In community forestry, which is a new-people oriented policy, objectives should involve the rural dwellers in decision-making processes of all activities that affect their existence and raise the standard of their living in equilibrium with the environment. The objectives should aim at transforming the local people into a dynamic citizen capable of contributing to a large range of activities (Papastavru, 1984). It should be recognized that the objectives of community forestry are numerous, varied and interdependent or compatible as far as the human element is concerned. The overall objectives are:

- to increase the yield, output and income of rural societies through encouragement to adopt best methods and techniques to raise their standard of living;
- to develop a soul of economic and social life collaboration and integration within the community;

- To ensure employment and to provide them with adequate infrastructures for social development.

The role of policy makers and planners is to identify broad development objectives with clear-cut priorities to allocate the capital and labor resources for rural forestry. In this way, programs of rural forestry can be developed efficiently and ensure basic consistence and sustainability (FAO, 1986). The objectives of community forestry include three main categories: economic, social and environmental.

The economic objectives could be job training programs that integrate conservation training with business skills and basic education, development of micro businesses based on community resources which promote economic growth, and identification of long-term job and career path in environmentally related professions for local residents which contribute to the general socio-economic development of the rural people through employment generation (Tawhida, 2013).

The social objectives can be creation of a sense of community identity and pride through tree planting, an increase in the number of available open space to the community for recreation and other activities, creation of community-based organization for the planning and management of community forestry programs and integration of community tree planting activities with educational programs in local schools.

The environmental objectives represented in the use of human resources to better management of degraded and marginal lands particularly for the aim of combating deforestation and environmental degradation through the identification of environmental hazards in the community or programs to highlight local residents and to make them understand and become more aware of their impact on regional resources (Tawhida, 2013).

### **2.3. Participatory forestry**

For centuries, human populations have been able to live in harmony and balance with their natural environment, with slight or no depletion of the natural resources. During the last decades, particularly in the 70's, there was a radical shift in the fields of agricultural and rural development. This was partly due to rapid growth of the rural population and their needs. Under these conditions, forests in many places were depleted. Forest dwellers enhanced the process of the degradation by over exploitation and misuse of forests in which trees and shrubs were cut to meet the urgent requirements (Alden and Liz, 2002).

It is useless to execute or manage any communal work without the active participation of the local population. This participation has to be undertaken with a total commitment from the early phases of project design through to implementation, since the development is the responsibility of all members of the community (Mohamed and *el.al*, 1995). The active participation can be attained if the change that follows rural development and disturbs the habit of the local people has been gradual and minimal at the first stages and coincides with a substantial improvement of the standard of living (Alden and Liz, 2002). Traditional forestry projects, which are concerned with planting, growing, maintaining, felling or conserving trees, have two broad objectives, industrial or commercial and environmental or protective. Traditional forestry projects have been and still are the major activity of forestry departments of national governments and international agencies which are also directly responsible for decisions relating to the design, implementation and management of forestry project (Phuong, 2000). In recent years, however, community or social or rural development forestry projects, which have a different set of objectives and activities and different management styles from traditional forestry projects, have grown greatly in importance. Although some of the products

of such projects may overlap those of traditional forestry projects, and to some extent have a commercial or market outlets, most of them have indigenous consumption of rural people. They include fuel wood and charcoal, poles and timber, and animal fodder and food products. They may also have environmental or protective objectives similar to the traditional forestry, but they have additional objectives which make them quite dissimilar, these include increasing rural employment and raising the standards of rural poor. The essentially unique objective of the participatory forestry projects is to promote self reliance of rural people through their active participation. FAO and SIDA, (1985) mentioned that participatory forestry projects aim to satisfy economic and welfare needs based on a high level of involvement and participation of rural people consistent with physical, and socio-economic environment within which the project operates. FAO and SIDA, (1985) stated that a forestry project which covers rural people's participation has been defined as "a set of interconnected actions and works executed primarily by local community residents to improve their own welfare". There may be outside inputs such as extension, training, guidance, technical help, financing etc. but its basic focus is on the community involvement in doing something for itself. Without this involvement, a participatory forestry project will not produce its expected benefits. The achievement of different project objectives may require different types and styles of project management. In traditional forestry, projects decision will normally be taken and carried out by the project employers were as in participatory projects many of the decisions and their execution will involve both the management staff and the participants, whose views should be thought as an important issue (Baral, 2001).

In Sudan, among the different options of the forest polices, there was a special emphasis on the role of the forests in environmental protection and the establishment of community, private and institutional forests. Participatory forestry as a concept is

not new. It has been well established for centuries in many countries. The main functions of participatory forestry include establishment of protective forests and the creation of “village forest areas” or “urban phalloid areas” Shepherd, (1990). During the last decade the understanding of the importance of forestry for local communities has been recognized and became apparent. To stimulate forestry and crop production in rural communities, new approaches should be worked out to overcome the various obstacles, which have limited the acceptance of forestry by local communities in the past. Gradually several responses to the limiting factors for forestry development in rural areas have been recognized (Phuong, 2000). Many social forestry programs have stumbled along and eventually faded away. The downfall of these programs is partially a result of the non-integration of social forestry projects within the field of rural development and partially a result of implementers who did not seek the active participation and involvement of the local people (Alden, and Liz, 2002).

#### **2.4. Participation and decision-making in community forest activities sustainability.**

The participation is the key element of the good governance. Gaudi and Michael (2009) mentioned that participation includes three aspects of community forest activities; decision-making, benefit sharing and labor works. Cohen and Uphoff , (1977) defined participation as involvement of the people in the decision-making process, implementing programs, and sharing benefit of development programs and their involvement in efforts to evaluate such programs. Paudel (2007) used expected benefits, scope and capacity to examine the factors affecting participation in different sector development and one of them was forestry. It revealed that participation intensity primarily relates it distinct features of works and stages of planning process. Furthermore, people’s participation means that the target beneficiaries participate in all stages of the development process: decision-making for planning, in the process of

implementation, in benefits sharing, and monitoring and evaluation (Bhusal, 2001). Local people participation in forest management has found its strongest expression in the promotion of community forestry around the world (Brown et al., 2005). However, participation depends upon many socio-economic factors ( Paudel , 2007).

## **2.5. Income generation and employment creation**

Creating sufficient economic incentives to the communities for sustainable use and conservation of natural resources and equitable benefit sharing is not straightn forward and simple. A community forests is an important source of products for domestic consumption and for generation of cash income by people living in and around them. Recently, a number of interventions have been promoted on the basis of the theory that generation of income from forests can provide a positive incentive for sustainable use and contribute to conservation and in turn, contribute to poverty reduction (Baral, 2008).

## **2.6. The benefits of economies from community forestry**

Several studies have been conducted on various dimensions of community forestry that are mainly focused on social and policy aspects. In many cases, Community Forest User Groups have become the vehicle for rural development and at present Community Forest User Groupes are the main democratically elected local institutions. For many poor rural people, Community Forest User Groups also act as rural banks and source of revenue and income .especially those living in poor communities. Many livelihoods depend on the forest, which provides a wealth of economic, health and social benefits to people, termed ecosystem services. A more diverse forest is a healthier forest and one that can provide more ecosystem services. Likewise, managing forest for biodiversity is also actually managing forest for the people, and doing so can alleviate poverty (Baral , 2001).

## Examples for benefits of community forest

- . preserving cultural values
- . creating employment and incomes (e.g. ecotourism)
- . maintaining water supplies
- . enhancing resilience (diverse ecosystems and economies are more resilient to environmental shocks and climate change)
- . conserving traditional medicines
- . enhancing equity
- . empowering women through fairer distribution of more diverse goods and benefits  
( (<http://www.birdlife.org/asia/news/community-forestry-benefit-nature-and-people>)

### **2.7. Role of community forestry for poverty alleviation**

To set community forestry in some historical context , Arnold, (2001) recorded that the development management approach to forestry has changed according to prevailing discourses, which overtime have shifted focus from the forestry industry, to rural development and more recently to biodiversity. In the first stage, forest industrialization in the 1960s was designed to accelerate economic growth and promote urbanization. The plan was that growth would 'trickle down' to the poorest in rural areas. However, evidence shows that this has failed to generate skilled jobs or alleviate rural poverty. The next phase was the Rural Livelihoods Approach, rejecting the turn back to agriculture and away from urban industrialization as the means to improve rural economies. The key insight was that forests are used by poor people to top up agricultural and subsistence incomes, and to fall back on in hard times. Arnold believes this approach seems to trap poor people in the forest, producing low-input /



low return outputs which as 'inferior goods' will be displaced over time (fibre baskets, fuel-wood etc.). However, Arnold overlooks certain higher value non-timber forest products (NTFPs) such as resins, oil nuts and pharmaceutical ingredients (Baral, 2008).

The most recent phase is driven by concerns about deforestation and biodiversity loss. The common arguments that forest dwellers over-exploit the forest, leading to its degradation, and that they are driven to this action by poverty (The 'poverty-causes-deforestation' argument). Ironically, this in turn undermines their own livelihoods (effectively eroding their only asset base), leading to further forest destruction, creating a vicious circle. The solution appears to be better livelihood options, which means relocating the people outside the forest, in so-called 'buffer zones', as compensation for the loss of access to the forest. Over time, therefore, it seems that forest communities have been seen first as objects of development then as victims of development and most recently as obstacles to conservation. The approaches taken by development managers designing projects in forestry may still retain vestiges of these previous phases, none of which could be said to be particularly empowering for the forest-dwellers. The notion that forest destruction is an example of humans 'fouling their own nest' is perhaps best understood in the context of property rights and decision making. Pandit and Thapa (2004) examined property rights over natural resources using the theoretical framework of New Institutional Economics (NIE). They suggested that property rights theory is good for understanding how regimes evolve in relation to natural resources, but is less useful in predicting what outcomes may be expected for natural resources given certain changes in rights and rules. To understand these factors, one has to appreciate the wider context of political, social and economic changes that are taking place around the individual. Pandit, and Thapa, (2004), asked questions whether informal foresters are capable of behaving rationally,

partly because forestry is so complex, markets so occult and regulations so unpredictable. He concludes that where forestry is just one part of a diverse livelihood, less time will be invested in becoming more competitive, or to become more 'rational' in the neo-classical sense. Why invest time in becoming more 'efficient' when it continues to do not matter. Instead, goals other than economic goals will come to the fore. Two points of interest arise out of the discussion on property rights and rationality. Firstly, Hardin's theory about the 'tragedy of the commons' (1999) suggests that the absence of property rights creates an open-access resource, compelling users to over-use the resource even as it leads to the resource's degradation (this correlates with the 'poverty-causes-deforestation' argument). Conversely, when the poor obtain assets (for instance through tenure reform) they are encouraged to invest labor and capital into building a more sustainable livelihood Xu *et.al.* (2004), suggested that property rights are not as relevant as the institutional context in which such rights are situated. They also pointed out that if environmental awareness correlates to socio-economic development, this will influence the actor's behavior in relation to forests. However, this is not a strictly positive correlation, Kuznets's curve demonstrates that environmental destruction increases with economic progress until basic needs are met, at which point environmental awareness leads to a change in behavior, and more careful treatment of the environment (Paudel, 2007). How development managers conceptualize different types of community may have a profound influence on project design and expertise on local communities. It seems that limiting the livelihood options available to forest communities in the name of conservation has not been successful in either protecting environmental services or tackling poverty (Abdon, 2010). In the spirit of Gifford Pinchot's statement that the 'great fact about conservation is that it stands for development' have been made about how Sustainable Forest Management (SFM) may square this circle by providing sustainable livelihoods for communities. Though it is certainly a pervasive discourse less than 5% of tropical forests are

currently subject to SFM (Pandit and Thapa, 2004). Some believe that communities are inherently incapable of meeting the criteria for SFM, and that large industrial concessions are the only answer, which seems to bear turn to the industrial development model outline above. The indigenous people's advocacy groups argue that SFM is possible only when management is devolved to communities (Kanji, 2006).

## **2.8. Community forestry strategies:**

The control of tree land resource belongs either to the community (including communal groups), to private groups such as household and individual or to the public sector. Ultimately, a programme design will define tree management responsibilities. These responsibilities will characterize the type of development strategy pursued, and they are in turn likely be affected by characteristics of land and tree ownership and control. The primary management responsibility will lie with the community, individuals, or the government (Wiersum, 1991). Accordingly, various social forestry projects may be distinguished. However, in all projects there are some forms of cooperation between the local people and professional foresters. In general , social forestry projects imply involvement of two or these different parties , whereby each part may provide one or more of the various basic inputs for forest management i.e. .land, labor, capital, experience and organization (Wiersum,1991).

In identifying the objectives of programmes, which involve rural people in forest and tree management, it is essential this project outputs and intended beneficiary groups be identified and linked in an interally consistent project design. Under many circumstances there may be acompromise between the effective contribution of tree management scheme to general socio- economic development objectives and the efficient creation of specifically needs forestry outputs (Wiersum, 1991). Different approaches will likely be needed which are responsive to different

and broadly defined rural development objectives. Consequently, the relative importance of multiple objectives of local tree management schemes will, in the end, be determined by various socio-economic, political and environmental conditions.

A proper analysis of these factors is a prerequisite for development strategies, which stimulate local tree growing (Elmadin, 2006). Broadly speaking, management responsibilities, as well as the control of tree and land resources, belong to the community, private groups, or the public sector. Complex legal and institutional conditions, traditions, cultures, and systems of land tenure define the extent to which any of these groups have role in either of these areas. By combining various management possibilities with possible land or tree ownership/control arrangements, nine specific social forestry development strategies may be distinguished (Elmadin, 2006).

**Table (2.1): Social forestry management strategies:**

<b>Social forestry management strategies</b>	<b>Characteristics</b>
Community or Communal forestry	<ol style="list-style-type: none"> <li>1. Communal tree growing on community land.</li> <li>2. Tree growing on private lands organized by community institutions.</li> <li>3. Public land allocation for community forestry projects</li> </ol>
Farm forestry	<ol style="list-style-type: none"> <li>4. Private tree growing on communal lands.</li> <li>5. Privately managed tree farming, plantings around houses.</li> <li>6. Public land allocation schemes for private tree growing.</li> </ol>
Publicly – managed forestry for local community development	<ol style="list-style-type: none"> <li>7. Public plantings on communal land.</li> <li>8. Public planting on private lands.</li> <li>9. Public-managed schemes on public land with social or environmental objectives.</li> </ol>

Source: Wiersum (1991).

## **2.9. Community forestry and rural development**

Community forestry is often regarded in the literature as a positive development strategy for rural forest communities to improve livelihoods while promoting environmental conservation and increasing biodiversity. This is because ample forest lands and chronically poor people are both found in areas remote from markets where few other alternatives exist, for reasons well set out by Kobbail, (2011). Community forestry implies the existence of local, formalized organizations that take part in the management of forestlands and natural resources to varying degrees. These organizations not only make decisions affecting the use and/or management of the forest, but can also contribute significantly to community infrastructural development, as well as provide jobs through commercial activities. In Nepal, for example, some user groups are taking on governmental responsibilities by providing basic services such as road and school improvements, as well as credit and social security (McDermott and Schreckenberg (2009). In one community in Mexico, its community forest enterprise provides approximately 250 full and part-time jobs to both community members and others (Bray and Merino (2002). broadly categorized four different means of poverty reduction through forests (2005): Converting forests to farmlands or other non-forest uses; Ensuring local access to forestlands and resources for commercial or noncommercial uses; Paying forest dwellers to protect forest environmental services and Adding value to forest production through technologies that increase output.

Thus far this has discussed in greater detail the necessity of two accesses to forestlands and natural resources. This section deals with four adding value to forest Production, particularly through community, and its potential to contribute to rural development and poverty reduction through market-based enterprises. Primarily, the concern is with better connecting forest dwellers, particularly organized groups, with

markets and technologies. The World Bank recognizes that limited land and market opportunities pose “a major constraint to poverty reduction” (Dewi, and Puntodewo, 2005). Road infrastructure development is often considered a positive first step in connecting communities to markets, facilities and other such resources, resulting in a natural trickledown economic effect in the communities themselves, i.e. benefits extending beyond those directly involved in forest enterprises to other members of the community. However, roads can also bring negative development and rapid deforestation, where clear-cut forest ownership is absent, or cannot be defended. In the Mexican state of Oaxaca, for example, a forest co-management arrangement between the community and a private firm has resulted in substantial community-wide benefits. Jobs were created and sustained, and physical infrastructure – roads and public buildings – were built and improved (Klooster, 2000). However, development efforts were directed overwhelmingly at the central village, where – among other public works – streets, a community-owned sawmill, government buildings, and a health clinic were built. In stark contrast, the outlying settlements did not receive their requested funding for roads, schools, and infrastructure for electricity ( Odebode, 2005). Furthermore, the highest paying jobs generally went to workers from the central village, who consisted of one third of the total community workforce, but received one-half of the total pay (Xu *et.al.* 2004). In the community forest in Oaxaca, there were the more powerful, affluent, or otherwise privileged community members residing in the central village, in contrast to the less powerfully connected members in the outlying settlements. Development projects, and indeed the more desirable, higher paying jobs, routinely favored those in the central village. It is depressing that these unthinking biases, it is important to be aware that while economic development is vital to rural poverty reduction; it may also increase inequities among various groups within forest communities. In particular, the most marginalized groups in more stratified communities– the very poor, women and the

elderly, for example – may be “excluded, silenced or co-opted through processes that actually reinforce existing power relations and give the most benefits to those who already have the greatest influence” (Carson, and Kalyn, 2009). There are management arrangement possibilities in community forestry. Thus when considering the benefits of rural development resulting from community forest enterprises, it is important to consider both aggregate benefits and benefits to all involved groups. It is not enough to rely solely on aggregate indicators, especially in consideration of Millennium Development Goals such as poverty eradication and gender equality (Odebode, 2005).

## **2.10. Constraints to community forestry**

The most obvious constraint is that the time-scale of forestry is bound to conflict with the priorities of the rural poor, which are logically focused on meeting basic present needs. Land, labor and other resources that could be devoted to providing the food, fuel and income needed today cannot easily be diverted to the production of wood that will be available only many years to come. Forestry can continue to exist or be introduced at the community level only if it allows for the real present needs of the rural poor. In several countries, forestry is still awaiting a birth in integrated rural development programme, and in community development projects. Rao, (2006) mentioned that security of tenure of land is an important constraint. Unless the farmers (or community) are assured that the trees will remain theirs at the time of harvesting, they are unlikely to cooperate. In many situations, therefore, it may be difficult to insert forestry before a more far-reaching reform of land tenure or change in land use is affected. There are other constraints that arise; these include the bureaucratic structures associated with the process of change, such as rigid procedures, strict interpretation of rules, arrogance of petty official, and inadequate training at the lower levels. There is also a tendency for the responsibility for the



rural development effort to become fragmented, with the lack of coordination among different bodies. Tawhida (2013), also mentioned that the traditional preoccupation of forestry with conservation, and with management objectives focused on the production of wood for industry has little relevance to the needs of the rural people. This bias is reflected in the structure, staffing and budgetary priorities of forest administrations and in the training of foresters. If forestry is to contribute to the bettering of the conditions of the rural poor, a radical reorientation, extending from policy to the very technical foundations of the discipline will be needed.

Stieglitz, (2000) mentioned that community-based forest management may carry certain risks, such as the danger of contributing to unsustainable resource use. Social commitment should be taken to avoid such risks. One of the key prerequisites for such a commitment is that the mandate for management of forest resources comes not only from top down but also from the bottom up. If this mandate from the bottom up is not forthcoming, these institutions will not be in a position to fulfill their role and will remain ineffective in regulating and monitoring resources use.

## **2.11. Community forest management**

As in most parts of the world, public participation in forest management has emerged as a popular strategy towards forest conservation in Africa (FAO in Tawhida (2013)). This is being driven by acknowledgement that the centralized regimes of the 20th century have not prevented forest loss and by wider socio-political commitments towards more devolved governance of society and its resources. Within the forestry sector, frequent features are actions to broaden public roles in policy making at national level and decentralization of operational authority to local governments. There is little dispute however that the key target for forest governance reform is the forest-local community, generally poor rural households who live within or next to forests, and who could number 250 million people

continent-wide. Local participation in forest management and related institutional and strategic changes are being very widely entrenched in law, an important support in light of the contention that changing power relations over resources may be expected to generate. As elsewhere around the world, forest legislation is under a great deal of amendment in Africa having enacted or at least drafted new forest laws since 1990. In practice, progress towards community participation is impressive given that almost no activity was underway a mere decade past; today more than 30 countries have launched at least one significant ground initiative towards community participation in local forest management and over half of these have a number of projects underway. Progress is particularly advanced in Gambia, Tanzania and Cameroon, where together several thousand rural communities already manage or co-manage nearly two million hectares of forests FAO (2006).

Revealed that interested parties in the management of a given forest may extend well beyond, the Forest Department and local residents. Potential other stakeholders include groups such as seasonal migrants, distantly based collectors of specific forest products, forest products merchants, miners, sellers, logging companies, pharmaceutical companies, national and international NGOs, bilateral and multilateral donors, other government ministries and departments, etc. (Elhassn, 2000). Furthermore, the assumption that forest should be managed by governmental forest services was reappraised and a need was identified to complement the strategies of forest development based on national interests with new strategies focusing on basic needs, equity and popular participation (Wily, 2002). The commonly agreed characteristics of all such approaches are that the local people are capable of undertaking a useful role in forest management, and have a legitimate right to participate. FAO (1998) and Elsiddig *et al.* (2001) mentioned that sustainability of forest management depends upon having local communities work together with government agencies, concession holders, NGOs and other institutions

involved in forest management in assessing, planning and monitoring management operations according to locally defined concerns, needs and goals. The aim is to get rural communities, government agencies and forest managers to work together. Despite initial skepticism that forest resources in poor regions could ever be managed sustainably (Mohamed, 2000) there is now a vast Collaborative Management for Sustainable Development of Natural Forests literature which suggests that suitable institutional frameworks can be designed to secure beneficial outcomes for stakeholders. Linked to this is a growing appreciation that sustainable resource management can go hand-in-hand with poverty alleviation (World Bank, 2001) reported that the effectiveness of government as a resource manager is improved when it shares powers with different user groups. It is fair to say, indeed, that there has been a revolution in the philosophy of forest resources management over the past 20 years. Co-management of government forests by a joint body of government staff and forest fringe villagers under various cost–benefit sharing arrangements is becoming the standard practice. It is said that co-managed systems are more efficient since they can utilize the local maps of poverty and ecology available with the users. It is reasonable to argue that forest user groups are depositories of information about local forest stocks and agreed procedures for access and use (Alden and Liz. 2002). Until the mid 1980s, the majority of the forestry programmes in Sudan were primarily concerned with reservation and reforestation, mostly without involving villagers in those areas. After the catastrophic drought of 1984/85 forestry authority realized without other actors participation, they would not be able to reforest and manage sufficient land to provide the needs of Sudanese people for forest products and services. This required a sharing of responsibilities and a new social contract between governments and local communities. On the other hand, there was a growing understanding among government officials that the management of forest resources need to complement the strategies of natural resource development, based on national

interests with new strategies focusing on basic needs, equity and popular participation. In fact, government and local people are becoming aware about the critical situation and its future consequences and the importance of tree conservation and protection. Assisted by good extension work organized by government institutions and foreign funded projects, people started to show interests in participating and getting involved in protection and rehabilitation of their immediate environment. People's participation in forest management and protection is proving to be more sustainable. Elain forest conservation, Elrawashda forest rehabilitation and other projects are good examples but are still pilot(Tawhida, 2013).

## **2.12. Policies and laws related to community forestry in the Sudan**

Sudan had recognized the need to regulate and control the use of the forest resources since the onset of the 20th century.

The first forest legislation was enacted in 1901 (The law of forests and bush lands) as the first law in this respect followed by consecutive amendments in 1908 and 1917 (Ibrahim, 2003). Forest policy 1932 was declared to resolve the conflict between the central and local government authorities over the management and administration of the forest resources by clearly defining functions and responsibilities of each. The policy was supported by the enactment of the Central Forest Ordinance and the Provincial Forest Ordinance 1932. The policy expressed the concepts of community forestry by advocating that farmers must be encouraged to grow trees and regard them similar to field crops (Sudan Government, 1954). The forest ordinances entrust the native administration and local chiefs to mobilize the communities to combat forest and bush fires and protect the forest resources. The enactment of the Popular Local Government law 1971 and the Regional Government law 1981 were characterized by drastic devolution of the central authority. They both transferred the power of the central authorities to local government. The two laws

were concurrent with vast agricultural expansion at the expense of forestland and the building up of the environmental crises of drought and desertification. The forest policy was amended in 1986 to restore central government control on forest resource management and address the environmental crises. In this respect, the policy emphasized the role of community forestry and popular participation in forest management and rehabilitation as follows:

- 1- Recognized and encouraged the establishment of community, private and institutional forests. The latter includes the irrigated forest plantations within the agricultural schemes.
- 2- Stressed the role of people participation in forest plantation, management and protection.
- 3- Stressed the role of forest extension.
- 4- Conceptualized the multiple uses of forests.
- 5- Included awareness raising, environmental education and guidance in all educational and social institutions.
- 6- Encouraged the local population to participate in projects preparation and implementation.
- 7- Realized of agriculture and forest integration through the introduction of the tree in the agricultural cycle by 5% in irrigated schemes and by 10% in the rainfed sector (Sudan Government, 1986).

The forest policy of 1986 based on which the forest Act 1989 and the Forest National Corporation Act 1989 (which established the FNC) were declared. The law of forest and natural resources was declared in 2002 to accommodate the constitutional, environmental, and the economic changes at national and global level (Ibrahim, 2003).

In 2005, a new forest policy proposal was formulated by the project (TCP|SUD|2903 Revision of forest policy, legislation and institutional reorganization in collaboration with FNC. Sudan). The drivers for the review of forest policy included:

-Reduction of poverty, improvement of people's livelihood, amelioration of physical environment and combating desertification.

-In administrating forest resources, the government will base its decisions and actions in perusing a balance between people's needs and conservation requirements (Abdel Magid, 2008).

### **2.13. Examples of community forests development and management by communities**

The following projects are examples of community forests projects in Sudan:

#### **2.13.1. Joint Afforestation Project. Sudan government/Sudan Council of Churches:**

The project covered the northern region (River Nile and Northern States) and continued for the period 1977 - 1985. The farmer programme included training courses on different aspects of desertification control, creation of forestry awareness, planting of irrigated eucalyptus plantations and shelter belts around the private and government agricultural schemes and establishment of farm nurseries.

#### **2.13.2. Fuel Wood Development for Energy in Sudan:**

Started in 1984. Funded by the Netherlands and implemented by FAO at the central forests administration. The project was involved in community wood lots, extension programmes, establishment of strong extension units, implement and monitor the extension activities among farmers and other largest groups (schools,

women). The project initiated a pioneer extension programme in which were replicated by many other projects. It continued for a period of three phases and was terminated in 1996 under other name, Forestry Development in Sudan.

### **2.13.3. Sudan Finland Afforestation Project:-**

This project started in 1979 and continued through a number of phases, which was terminated in 1991. The project included many activities such as extension programmes at White Nile. Agroforestry models have been established in the form of *Acacia senegal* plantations, farm nurseries and village woodlots (Goda, 1991).

### **2.13.4. Restocking of Gum Arabic Belt Projects: -**

Two projects were operating in Kordfan and Darfur states, supported by UNSO during the period 1981-1994. Their activities included training courses to farmers, establishment decentralized nurseries, and training of farmers on improved technique for planting and maintenance of *Acacia senegal* plantations. Training included taping, cleaning and grading of gums, development of communication and establishment of forestry extension services.

### **2.13.5. UNSO afforestation and reforestation project in Northern Region of the Sudan:-**

The activities covered by the project included control of sand encroachment through establishment of shelterbelts, windbreaks and land management activities with a very high degree of participation from local communities. The project started in 1986 and the activities covered 22 villages with 100 individual farmers. The project was terminated in 1995. The activities of the project include; establishment, operation and maintenance of wells and diesel pumps, production of seedlings, protection, tending and regeneration of shelterbelts, and replanting of dead trees. The project had a policy of participation and community development which means that

the villagers must provide inputs in terms of labour and lands as well as being a part of the planning and decision-making. The village committee was the most important institution in the institutional set-up, which was elected for a year at a village meeting. The village committees were the link between the project and the villagers, and are responsible for notifying the villagers on projects policy and activities. The election of women committees was done at general women meetings. Women were mostly involved in nurseries.

#### **2.13.6. Women's Forestry Project (WFP), River Nile State:**

The women's Forestry Project (WFP) grew out of SOS sahel's first project in Sudan. The village extension scheme in Shendi area of River Nile State continued from 1985 to 1993. The project covered a wide spectrum of activities aimed at protection of natural resources and improving standards of living of population through establishment of central village nurseries, woodlots and village shelterbelts by the local people. The project achieved its objectives through adoption of several strategies of people awareness and building capacity of project staff to implement effectively the community forestry programmes and to motivate the community members to participate in tree planting and conservation measures.

#### **2.13.7. Elodaya Anti-desertification Project: -**

Study was conducted in 1999. It investigated the role of people participation in desertification control in Elodaya area. It was found that Elodaya population had a high rate of participation in voluntary activities related to desertification control.

#### **2.14. Financial feasibility study of community forests:-**

The management and analysis of financial data can be difficult for any small enterprise but can be especially tough for community-based forest enterprises in developing countries. While these enterprises often learn quickly the technical



aspects of forest management, many struggle in the process of becoming viable businesses. Specifically, few have the capacity or tools to monitor and manage their financial data, and costs associated with production and income from sales, let alone to calculate total costs per activity, the depreciation value of machinery, net income, or rate of return. Similarly, rarely do the governmental or nongovernmental organizations that provide assistance to community forest have this capacity or pertinent tools. Yet this information is critical to ensure the financial viability of these enterprises and the distribution of financial benefits to the communities involved, especially as community forestry becomes an increasingly important component of forest management around the globe. Some may be surprised to realize that communities in developing countries own or control approximately 31 % of forests (Rights and Resources Initiative 2012), and in some countries, the percentage of community ownership or control is quite high. For example, in Mexico, an estimated 60 to 70 % of forests are owned by ejidos (a form of community land ownership), and in Brazil, indigenous and traditional peoples have long-term use rights to approximately one-third of the Brazilian Amazon (Pereira *et al.* 2010). Many communities continue using these forest landscapes in traditional ways, combining small-scale slash and burn agriculture with the collection of forest products for subsistence and income. Increasingly, however, communities are demanding and being granted the rights and support to develop community-based forest enterprises for the commercial sale of forest products and/or services (Rights and Resources Initiative 2012). These enterprises may be comprised of individuals, family units, or community organizations that make a concerted effort to produce and/or sell forest products or services together. It has been estimated that in many countries up to 80 % or 90 % of forest-based enterprises are small and medium forest enterprises.

## CHAPTER THREE

### STUDY AREA

#### 3.1. Location:

Sinner State lies between latitudes  $11^{\circ} 45'$  -  $14^{\circ} 3'$  N and longitude  $32^{\circ} 28'$  and  $35^{\circ} 43'$  E. The total area of the state is 40680 Km<sup>2</sup> (9.7 million feddan). The state is situated in central Sudan sharing borders with the Al Gazira State from the north, the Blue Nile State from the south, The White Nile State in the west and Al Gadarif State and Sudanese-Ethiopian borders in the east. Singa town is the capital of the state. Figure (3.1) shows the map of the study area.

#### 3.2. Climate:

The area is a part of the Savannah, mostly in the low rain-fall savannah sub-zone (low rain- fall savannah on sand) with annual precipitation of 300-600 mm/year in the northern parts, the southern part and some south western parts reach up to 800 mm or more. The rainy season starts in June and ends in October with a savannah type of distribution reaching its peak in August. Occasionally, light showers fall in May and the dry season is relatively long. Maximum temperature reaches 45°C in April and May while the minimum temperature reaches 10°C in winter (December and January). Table 3.1 During the rainy season the prevailing winds are from the south west while they are from the north east in the dry season. The relative humidity varies between 75% and 80%. (Metrological Bureau Khartoum ,2010)

**Table (3.1): Averages of temperature, relative humidity and rainfall in Sinnar state (2000-2009).**

Year	Min / temp(c <sup>o</sup> )	Max / temp(c <sup>o</sup> )	R.H(%)	Rainfall(mm)
2000	19.5	34.2	67	544.4
2001	20.7	35.5	65	326.4
2002	19.8	35.9	49	341
2003	20.3	37.8	50	504.5
2004	20.3	37.3	47	224
2005	20.7	37.7	49	191.5
2006	20.1	36.9	50	437.2
2007	20.0	36.4	53	742.4
2008	20.2	36.6	53	384.4
2009	20.5	37.5	53	309

**Source: Metrological Bureau Khartoum (2010)**

### **3.3. Administrative structure:**

The State consists of seven Localities (recently moatamada) namely; Sinnar, Eastern Sinnar, Singa, Elsuki, Abu Hojar , Eldinder and Dali and Mazmoom. Those localities consist of 21 administrative units. Table (3:2): shows the administrative structure of Sinner state.

**Table (3.2) Administrative structure of sinnar State**

<b>Locality</b>	<b>No of Administrative units</b>
Sinnar Locality	3 units
Eastern Sinnar Locality	4 units
Singe Locality	3 units
Elsuki Locality	3 units
Abu Hojar	3 units
Eldinder	3 units
Dali and Mazmoom	2 units

Source: Sinnar Town Administrative Unit, 2010



Figure (3.1): Map of the study area

### **3.4. Population:**

The total population of the state is 1.285.058 capita according to the 5th National Census of 2008 with an annual growth rate of 3.68% distributed among the localities of the state. Most of the people is concentrated in the big towns around the banks of the Blue Nile and Dinder River and in the production areas of mechanized schemes (Ministry of Finance and Economy, 1996).

### **3.5. Geology, topography and soil types of the state:**

The area was described as a middle protozonic, undifferentiated basement complex. Intrusive bodies of ultra basic and basic rocks are numerous (Adam, 2005). The state lies within the central clay plains. It consists mainly of extended flat plains with gentle slope from the mountainous area towards the north. There are some scattered mountains such as Gabal Moya, Sagadi, Kardos, Abogroud, Tozi, Bozi, Dali and Mazmoon. The soil of the state is dark heavy cracking clays, some time, called the black cotton soil. This soil appears to be alluvial in origin transported by the Blue and White Niles which have a high clay contents. It forms part of the central clay plain of the country. The parent material of this dark cracking clay soil is the weathering products of the basic igneous and metamorphic rocks. On drying, this soil shrinks considerably and a network of a wide and deep crack is developed.

The soils of Sinnar State can be grouped into six categories: (a) the flood plain along the Blue Nile and its tributaries, (b) The silt soils, (c) The mayaa, (d) Karab soils, and (e) The clay plain, which comprises more than eighty percent of the state soils. The quality of those soils varies from soil type class two to soil type class four.

### **3.6. Vegetation cover:**

The study area is classified as semi- arid zone with short grass savannah or low rainfall wood land savannah under condition of annual rainfall between 300-800 mm. This is the zone which extends across the Sudan from east to west between latitude 10° N and 14° N. This zone was further divided according to the soil type into sub-zones; low rainfall Savannah on sand and low rainfall savannah on clay, which included the study area. Ecologically Sinnar State area falls within the low rainfall woodland savanna on clay with the following distinct vegetation associations (Harrison and Jackson, 1958).

#### **3.6.1. *Acacia mellifera* (thornwood land):**

This type occurs under rainfall varying from 300–400 mm per annum on dark clay. The soil is either heavily cracking or non-cracking. This species composition is dominated by thickets of *Acacia mellifera* (kitir) associated with *Commiphora africana* (gafal) and *Boscia senegalensis* (mohkait). In the wetter sites, other species are found e.g *Acacia seyal* (talh), *Balanites aegyptiaca* (heglig), *Cadaba glandulosa*, *C. rotunda* (cadab) and in low areas *Dalbergia melanoxylon* (abanus).

#### **3.6.2. *Acacia seyal*-*Balanites* wood lands:**

This lies south of the *Acacia mellifera* thorn-wood land with a rainfall of (500-700 mm) per annum. *Acacia seyal* dominates this type associated with *Balanites aegyptiaca*. Other species found are *Acacia mellifera* in the drier parts and *Acacia senegal* (hashab) in the wetter parts. In the high rainfall areas other species like *Combretum hartmannianum* (habil), *Anogeissus leiocarpus* (sehab) and *Entada sudanica* occur.

### 3.6.3. *Acacia nilotica* riverain forests:

Along the Blue Nile and its tributaries, *Acacia nilotica* (sunt) is dominant. On the soils near the river, *the Acacia savanna* is replaced by nonthorny woodland and *Adansonia digitata* (tebladi) is dominant (Harrison and Jackson, 1958). It worth mentioning that the natural forests resources, locally known as Dahara forest are the dominant type forest resources in the study area. Tables (3.2 and 3.3) show the status of the forest sector in the state.

**Table (3.3): Types, numbers and areas of reserved forests in Sinnar state**

Forest type	Number	Area(fed)
Central forests	181	5976340.0
State forests	69	580111.0
Community and private forests	235	355869.0
<b>Total</b>	<b>485</b>	<b>1.208.332.67</b>

**Source: FNC, 2014.**

**Table (3:4): The Community forests in Sinner state five circles**

Circle	Private forests		Village forests	
	Number	Area (fed)	Number	Area (fed)
Sinnar	9	231.14	31	139.399
Singa	5	2148.01	35	39.437.870
Dinder	51	3347.4	61	83.702.006
Elsuki	23	203.23	17	55.154.090
Wad elnaya	-	-	3	2721.085
<b>Total</b>	<b>88</b>	<b>5929.78</b>	<b>147</b>	<b>14233.169</b>

**Source: FNC, 2014.**

### **3.7. Water resources:**

The study area has different sources of water, they include:

- Rivers: The Blue Nile is the main water source in the state together with its tributaries. The annual input of the Blue Nile is the main source of irrigation for Gazeira, Rahad and agricultural pump schemes beside electricity generation for domestic and industrial usages. River Dinder is a seasonal river that floods during the rainy season (June-September) and it comprises substantial water reserve, which is be used for different purposes.
- Rainfall: rainfall is considered an important factor for rainfed mechanized agriculture although the rainfall season is a short one (June-September), the quantity of the rainfall ranges between 300 and 600 mm/annum with an obvious fluctuation in its quantity and distribution.
- Valleys and khors: There is a large network of seasonal valleys and khors in the state like Alaatshan, Alaagaleen and khor Aenekleba.
- Hafeer water: Hafeer is a man-made depression specially made for gathering the rainwater during the rainy season and it is considered as a main source for drinking water in areas with low water tables in the western part of the state (Dali, Mazmoom, Sagadi and Kardos) where there are no rivers or seasonal water streams. There are about 65 hafeers in the state with an annual storage capacity of about 1.5 million m<sup>3</sup>.
- Water table: The percent of water table is closely associated with the geological structure prevailing and hence 40% of the western part of the state is covered by the basement complex so most of the soils don't possess the phenomenon of keeping high water table, which exists only on soils with fissures.



### **3.8. Land use pattern:**

Sinnar state was historically characterized by heterogeneity in land uses. The whole state area and Singa locality in particular was covered by natural forests of different tree species. Early inhabitants of the area have been using the land in different ways: cultivating subsistence crops in traditional small holding (Bildat) during the rainy seasons, and utilizing the products of natural forests during the dry season (for income generation from firewood, charcoal, building poles, collection of gum, fruits, fibers, and other non –wood forest products) and benefiting as from game animals in term of bush, meat purchase of game animals, game leather ...etc mostly in an illegal form (Bakheet, 2005). According to the official records, the area under rain fed cultivation covers around 4742000 feddan. The purpose of deforesting land in the area is the need for the cultivation of sorghum and sesame especially in the mechanized rain-fed schemes.

Agricultural land in Singa locality is used under three main farming systems:

- a) Mechanized rain-fed schemes (the main farming system).
- b) Traditional rain-fed schemes (Bildat) which is almost a copy of mechanized rain-fed schemes but in smaller area.
- c) Irrigated sector, most of the farmers adopt pure agricultural crops as a land- use system, 12% of the farmers practices the agro- pastoral system where they cultivate crops and at the end of the crop cycle animals are allowed to enter the land, 11% of the farmers adopt the agro forestry system, other farming form is the agrosilvopastoral where crops are cultivated in a land with scattered trees and after harvesting animals are allowed to enter (Bakheet, 2005).

In the past, the locality was covered by dense forests, the current farming systems indicate a practice of deforestation. Sorghum represents the main stable food

cultivated in both irrigated and rain-fed schemes while cotton and sesame are cash crops mainly in the irrigated and mechanized rain- fed schemes.

### **3.9. Community forestry in the study area:**

Sinnar State is considered as a pioneer state in the adoption of community forestry in its different forms. The wide spread of the activities of community forestry is attributed to the fact that the state had been an attractive site for NGOs where several organizations worked in the state in the field of community forestry (Elmazal, 2011). This situation created a keen and well-trained staff who continued the message after the phase-out of these projects. According to the annual report of the Forests National Corporation (FNC) of 2014, the number of private and village forests reached about 235 This figure reflects the wide spread of the adoption of community forestry to the extent that the state could be the first ranking state with respect to areas covered by community and private forests. Because of the wide spread of the activity and the devastating area of the state, Sinnar State was selected for this research.

## **CHAPTER FOUR**

### **RESEARCH METHODOLOGY**

#### **4.1. Background**

This chapter describes the scope of the research, the target groups and sample selection. Moreover, the data collection tool (questionnaire) as well as the procedures and methods employed for data analysis. To collect data needed for this part of the study, a pilot visit was made to Sinnar State in April 2014. The visit was very important because it was possible to collect some basic data from the institutional sources to help in constructing the skeleton of the study, establishing the sampling techniques and deciding upon the appropriate sample size. The field work started at the first of December 2015 and terminated by the end of December 2015

#### **4.2. Methods of data collection**

##### **4.2.1. Primary data collection**

The primary data were collected by a questionnaire (appendix 1 and 2) as well as group discussion (appendix 3) to gather information from village and private forests leaders and key informants. The respondents were informed that their contribution was on a voluntary basis and it was to support the community forests projects in the area.

##### **4.2. 2. Secondary data collection**

Sources of the secondary data used in this study included previous inventories, projects documents, researches, published and unpublished papers, references, statistics and relevant internet sites. The secondary data were also collected from the reports, records and archives of the relevant institutions such as FNC head office in

Khartoum, Faculty of Forestry Sciences, Khartoum University and (FNC) office in Singa.

### **4.3. The main contents of the questionnaire**

The questionnaire was designed to obtain information about the socio - economic characteristics of the community forest, description of the management system of the community forests in the study area, the awareness of the respondents about the importance of the forests in their life and its impacts in their life style and standard, and the training and extension services provided for the local people in the study area.

### **4. 4. Construction of the questionnaire:**

The construction of the questionnaire was made according to the guidelines of [https://en.wikipedia.org/wiki/Questionnaire\\_construction](https://en.wikipedia.org/wiki/Questionnaire_construction).

- Be certain that each question was relevant and necessary to the topic
- Ask the questions that the respondents can and are willing to answer
- Express each question as simply as possible
- State questions in specific concrete terms
- Obtain criticisms of all prepared items by a colleague or a friend.
- State the items in the language that respondents use in everyday conversation.

Two types of questions were used in the questionnaire: closed-end questions, with mostly multiple choices or yes and no style of answers, and dichotomous questions in step-wise style, each answer leading to a specific set of follow up questions with no open-ended questions except where it is inevitable. These types of

questions were used in the questionnaire in order to make the least demand upon respondents; to permit quick and efficient collection of data; and to enable easy, quick and accurate analysis of answers. The combination of question and associated response categories sometimes help respondents to understand the questions more clearly and it is more useful in obtaining answers to sensitive questions. Open-ended questions were avoided, except where it was inevitable, because of their negative drawbacks which are represented in the difficulty of constructing questions at the proper level of generality and because the responses are difficult to analyze and summarize. They may also impose considerable burden on respondents and interviewees and they are more likely to produce irrelevant and worthless data.

#### **4.4.1. Organization of data in the questionnaire:**

Guidelines considered were: begin with simple and easy to answer questions, place sensitive or more complex questions late in the questionnaire, place the items in logical order and try to create an interesting mix of items within the questionnaire.

#### **4.4.2. Sample size and selection of respondents in this study:**

Random sampling technique was employed for this study. This technique has the advantage of maintaining the representation of the desired variables. Besides it makes it easier to compare variables and helps reduce the sampling error. Since a representative sample could be obtained from the accessible population, findings from the sample could be generalized (Glover 2005). For statistically adequate sample size, the study followed what is mentioned by Roscoe (1975) who stated that selecting a sample size of 30 ensures the benefits of central limits of theorem (the phenomenon in which sample values tend to be normally distributed around the population value). He argues that for most behavioral researches a sample size of 10% will be adequate. In this study, 33 forests represent 22% of the total village

forest (147 forests) in study area. And 23 from forest represent 26% of the total private forest which are 88 forests. This sample size were selected to cover Sinnar State except the Dali locality, because the objective and products form community forest were different.

#### **4.5. Methods of analysis:-**

The statistical analysis commenced through exploratory manipulations of the data obtained in the study area. This process was accomplished by critically examining the data through the use of simple techniques of analysis. The main tools are the construction of simple tables and selected cross-tabulation which allow tentative answers for many questions of the survey. Data collected were coded, computerized and analyzed on a personal computer (lap top) using the Statistical Package for Social Sciences (SPSS) for windows, version 18. Descriptive statistics is a useful analytical tool enabling the researcher to examine the characteristics, behavior and experiences of the study participant (Hastie, *et al*, 2001). In this study, descriptive statistics including frequencies and cross tabulations were used to obtain the percentages to interpret the qualitative information collected from the respondents. 95.0% Confidence Interval.

##### **4.5.1. Chi-square test:-**

This is a statistical tool used to compare observed sample frequency with expected frequency, to determine whether or not the difference between them is statically significant.

##### **4.5.2. T – Test:-**

The test statistic in the t-test is known as the t-statistic. The t-test looks at the t-statistic, t-distribution and degrees of freedom to determine a p value (probability)

that can be used to determine whether the population means differ. The t-test is one of a number of hypothesis tests.

A statistical examination of two population means, a two-sample t-test examines whether two samples are different and is commonly used when the variances of two normal distributions are unknown and when an experiment uses a small sample size (<http://www.investopedia.com/terms>).

### **4.5.3. Multiple Regression Analysis:**

Multiple regression analysis is a powerful technique used for predicting the unknown value of a variable from the known value of two or more variables, also called the predictors. More precisely, multiple regression analysis helps us to predict the value of Y for given values of  $X_1, X_2, \dots, X_n$ .

#### **4.5.3.1. The linear Multiple Regression Model**

Specification of the linear model used in the study.

The multiple regression equation of Y on  $X_1, X_2, \dots, X_n$  is given by:

$$Y = b_0 + b_1 X_1 + b_2 X_2 + \dots + b_n X_n$$

Confidence of level 95%

#### **4.5.3.2. Equation of private forests variables included are:-**

**Y** = Return per feddan (SDG).

**X<sub>1</sub>** = Area (feddan)

**X<sub>2</sub>** = Cost of fencing (SDG)

**X<sub>3</sub>** = Cost of guarding (SDG/fed)

$X_4$  = Taxes (SDG)

#### **4.5.3.3. Equation of village forests variables included are:-**

$Y$  = Return per feddan(SDG).

$X_1$  = Cost of guarding (SDG/fed)

$X_2$  = Taxes (SDG/fed)

$X_3$  = Area (feddan)

$X_4$  = production of fire wood ( $m^3$ )

#### **4.6. Interpreting Regression Coefficients**

Here  $b_0$  is the intercept and  $b_1, b_2, b_3 \dots b_n$  are analogous to the slope in linear regression equation and are also called regression coefficients. They can be interpreted the same way as slope. Thus if  $b_i = 2.5$ , it would indicate that  $Y$  will increase by 2.5 units if  $X_i$  increased by 1 unit.

The appropriateness of the multiple regression models as a whole can be tested by the F-test in the ANOVA table. A significant F indicates a linear relationship between  $Y$  and at least one of the  $X$ 's.

Regression analysis was also used as an analytical tool in this study. In this statistical approach, stepwise multiple linear regression analysis was used to explain the influence of some selected variables expected to affect the dependent variable. The variables included in the model.

The correlation of determination ( $R^2$ ) was computed. This measures the strength of the linear relationship between the dependant and independent variable(s).



## **4.7. Dependent and Independent Variables**

By multiple regressions, we mean models with just one dependent and two or more independent (explanatory) variables. The variable whose value is to be predicted is known as the dependent variable and the ones whose known values are used for prediction are known independent (explanatory) variables.

## **4.8. Feasibility study of establishment of community forestry in Sinnar state**

### **4.8.1. Background**

*Acacia nilotica* is restricted to well drain seasonally flooded reverine habitat from Senegal and Northern Nigeria to Sudan Arabia and India (Ahmad and Mohammad, 2005). In Sudan, *Acacia nilotica* forests are the most important forests managed under proper working plans since the late forties under 15 to 20 years rotation, primarily for the production of railway sleepers since the wood is heavy and durable. Other uses are fuel wood, fodder and tanin production. The railway sleepers are produced in the governmental forests under a rotation extended to 20 years and above. For the fuel wood and commercial logs produced in both communal and governmental seed-origin forests, the rotation is 13-15 years (Inventory department, FNC, Singa 2014).

### **4.8.2. Data used in the feasibility study:-**

1. Collection of data on the establishment and silvicultural operation costs for the two types of forests
2. Collection of data on the production and revenue from the two types of forests.

The commercial thinning always begins in the fourth year and continues in 7th, 10th, and 13th years, so there are four thinning process.

Methods used for assessment of profitability of *Acacia nilotica* forests in the area:

Costs and revenues were calculated per feddan (4200m<sup>2</sup>).

Establishment and maintenance costs and revenues of both group forests and community forests in the area were calculated.

To provide financial analysis for both the private forest and village forests, the following steps were applied:-

1. Establishment, land preparation, seeds, planting, thinning, beating- up costs were calculated for the first two years.
2. Guarding cost calculated from the year of establishment until the end of the project duration (rotation).
3. The production of fire wood / feddan was obtained in (m<sup>3</sup>) in years 4, 7, 10, 13, 15 (production from commercial thinning) and also the price of (m<sup>3</sup>) of firewood in forest owners in the villages.
4. The production of wood logs in the final felling was obtained in log / Fadden and also pries were used.
5. The discount factor used for calculating the present values of costs and revenues was 12%, this is the factor used in development projects.
6. Net Present Value (NPV), Profitability Index (PI), Payback period (PBP), Internal Rate of Return (IRR) for the community forest were then calculated to enable the researcher to compare between the two projects.

Investment decisions are significantly more complex and are affected by a number of intangible factors. These factors (generally) referred to as "imperfect"

market condition include imperfections (or often the absence) of crucial market-information on the presence of non- financial costs and benefits and the effects of government intervention.

None the less, despite these imperfections, financial criteria are generally the main quantitative tools that are used to assess the relative merits of different investments.

Discounted cash flow (DCF) technique provides the analytical basis for many forestry investment decisions. For forest plantation investments, the comparative financial tool that is probably most commonly used is the Internal Rate of Return (IRR) analysis (Yousif, 2003).

**4.9. Calculating Discounted Cash Flows:**

Discounted cash flows analysis is based on the theory of compound interest. It essentially to an investor to calculate the total value of all future costs and revenues associated with a project as though they were all incurred immediately (referred to as the Net Present Value or NPV of the project). This is done by projecting the net income (revenues – costs) for each period of the investment and then converting each of these figures into a present value. using programmer excel in analaiyis

a. Net present value (NPV) is the sum of these adjusted values over the whole life of the project.

$$a. NPV = \frac{C_1}{(1+i)^1} + \frac{C_2}{(1+i)^2} + \frac{C_3}{(1+i)^3} + \frac{C_n}{(1+i)^n} - C_0 \dots \dots \dots (1)$$

C<sub>1</sub>, C<sub>2</sub>, C<sub>3</sub>...C<sub>n</sub> = the projected net income in a period.

i= discount rate



## CHAPTER FIVE

### RESULTS AND DISCUSSION

#### 5.1. Socio-economic characteristics of the owners of private forests

Education is an important indicator in determining the status of the community and its devolvement. In this study, the education level of the private forest owners was classified into five categories which were illiterate, khalwa (Islamic school to learn holly Quran), primary, secondary and higher education. In general, it was found that there was significant difference ( $P < 0.01$ ) in education level among respondents than in previous years , this was due to improvement of life style in the community, this proved the economic contribution of forestry in the community.

**Table (5. 1): Education of the private forests owners**

<b>Type</b>	<b>Frequency</b>	<b>Percent</b>
Illiterate	1	4.2
Khalwa	4	16.7
Primary	9	41.7
Secondary	5	20.9
University	3	12.3
Higher ed.	1	4.2
Total	23	100.0

Source: Field survey, 2014

The results in table (5.2) show that there is a high significant difference ( $p < 0.001$ ) between the jobs of private forest owners, 47.6% were farmers, while 30.4% were employers, but in most cases the jobs were related to agricultural activities, These results confirmed that Sinnar State depends on economies of agriculture and forests.

**Table (5.2): Jobs of the private forests owners**

<b>Type</b>	<b>Percent</b>
Employment	30.4
Agriculture	47.6
Trade	13.0
free jobs	-
Others	4.3
Sig	**

Source: Field survey, 2014

The results in table (5.3) indicate that there is a high significant difference at ( $P < 0.001$ ) in income per years of private forest owners. The majority (53.2%) of them gained between 10-20 thousand SDG per a year. While (25.2%) gained between 30-40 thousand SDG. The variations in respondents income may be due to that some of them have different income generating activities beside forests while others depended only on forestry.

**Table (5. 3): Income of the private forests owners**

Range (SDG)	Frequency	Percent
10000 – 20000	13	53.2
21000 – 30000	2	8.7
31000 – 40000	5	25.2
41000 -...	3	12.9
Total	23	100.0
Sig	**	

Source: Field survey, 2014

## 5.2. Origin of community forests

In the study, a community forest is a forest that is grown in the water point areas such as valleys, (Mayaa) and lagoons, in which the water stays to about 3-4 months. This helps the growth of some species like acacia trees , such as *Acacia nilotica* because this type of trees bears water immersion, Therefore it is found that some of this grow normally on low areas. In the study area, most of the respondents in private and village forests (80%) said that tree type in their forests is *Acacia nilotica*.

The results in table (5.4) reveal that there were significant differences in types of forests in private forests, where 17.4% were natural forests, 52.2% cultivated forests and 30.4% were mixed forests. While in the villages forests there was no significant differences that 29.1% were natural forests, 32.3% cultivated forests and 38.7% mixed forests.

This may be attributed to significant awareness of the private forests owners toward forests cultivation that 52.2% of their forests were cultivated in addition they know the economic value of the forests and the forests provide the villages with services like social services, building school and electricity.

The importance of raising the awareness of forests cultivation in private and village forests is essential, because they are the main sources of wood, food, forage etc.

Moreover, in this study area there is intensive care of the private and villages forests indicating the economic profitability of them.

**Table (5. 4): Origin of private and villages forests**

<b>Origin</b>	<b>Private forests (%)</b>	<b>Village forests (%)</b>
Natural	17.4	29.1
Cultivated	52.2	32.3
Mixture	30.4	38.7
Total	100.0	100.0
Sig	*	Not sig

Source: Field survey (2014)

### **5.3. Establishment of forests between 1980 to 2010**

The results in table (5.5) show a significant increase of private and villages forests in the period from 1991 to 2000 by 50.5% in private forests and 67.7% in village sector. This may be due to forests extension programs activities that were adapted by FNC and related NGOs. The results also indicate that both village and private forests decreased by 9.7% and 20.1%, respectively in the last 10 years in period 2000-2010. This may be due to the expansion of agricultural schemes which



encouraged by the government reducing forests reserved, moreover, this may be due to the investment in forest trees takes long time.

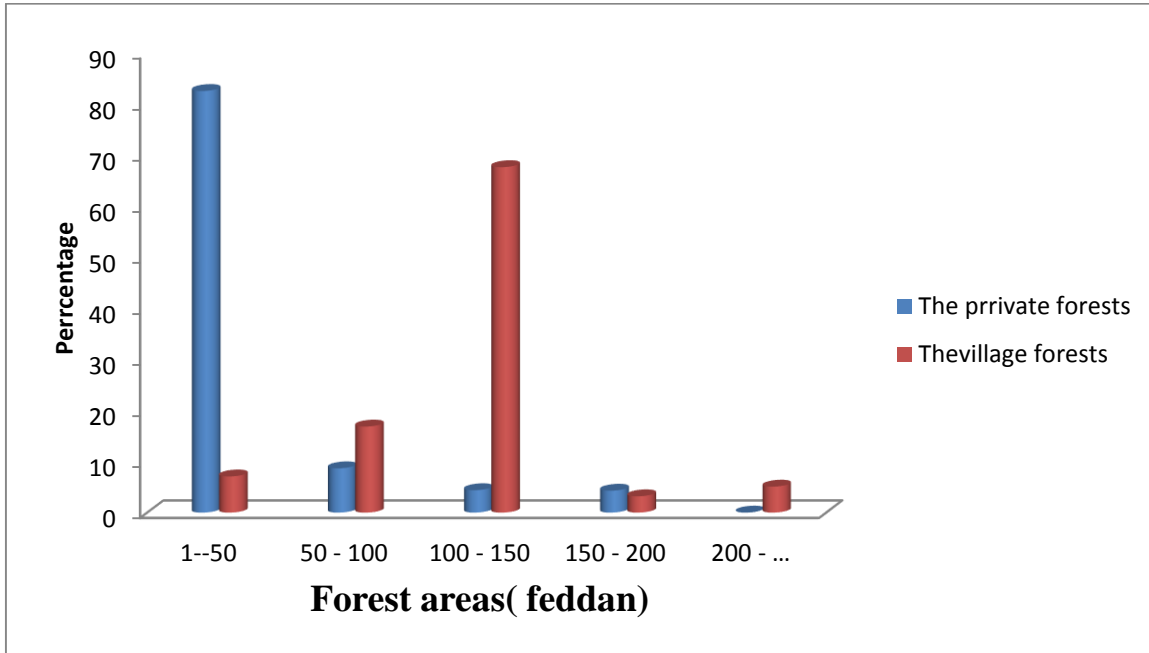
**Table (5. 5): Private and Villages forests established during the period 1980-2010**

<b>Period</b>	<b>Private forests (%)</b>	<b>Villages forests (%)</b>
1970 - 1980	7.1	2.1
1981-1990	17.3	20.5
1991-2000	50.5	67.7
2001-2010	25.1	<b>9.7</b>
Total	100.0	100.0
sig	*	**

Source: Field survey (2014)

#### **5.4. Average forest area in feddan in the private and village forests**

The results in figure (5.1) show wide variation in forest areas owned by the two groups .The areas in the private forests were small, 82.6% of the respondents reported that the maximum area ranged from one feddan to 50 feddan , this may be attributed to that small areas are easy to fence and guard .While in villages forests the areas ranged between 100 – 200 feddans (figure 1) . This seems to be logical, because the forests reserved for villages to support necessary services, The sources of large forest areas in villages were private ownership, agricultural projects, and government lands.

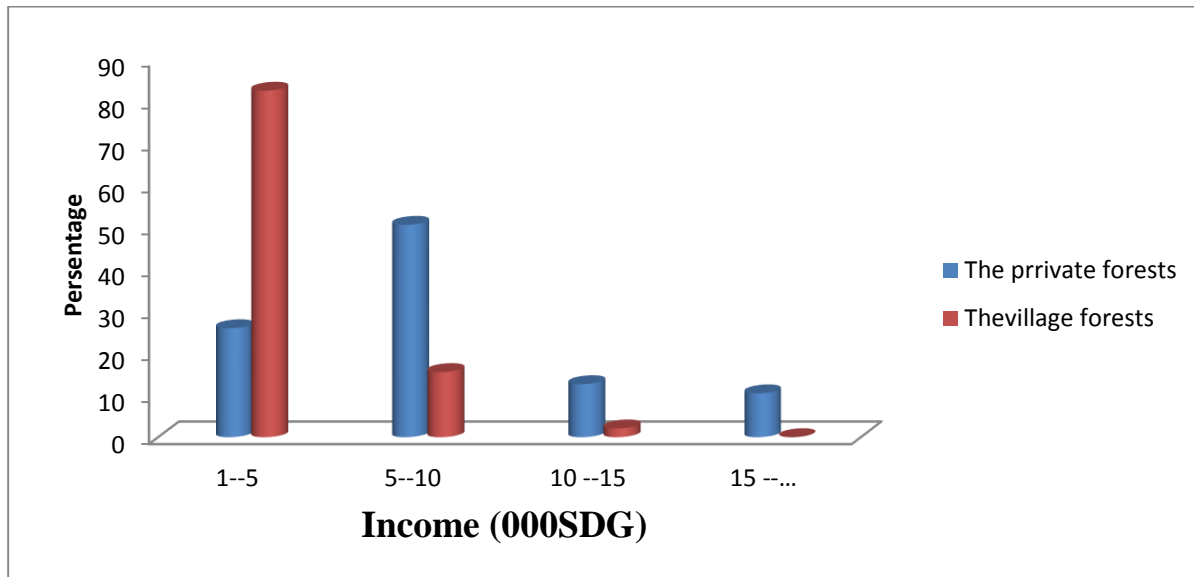


**Figure (5. 1): Forest areas in private and villages forests in feddan**

Sources: field survey (2014)

### 5.5. Average income per feddan in the private and village forests

Figure (5.2) shows very high differences in income per feddan in the private and villages forests, 50.7% of the respondents income in the private forests ranged between 5000 -10000 SDG, The high income in private forests may be good control due to small areas resulting in good protection and management. 82.6% of the respondents of villages forests said that their income from forests were between 1000 – 5000 SDG per feddan. The low income from village forests per feddan compared to private forests, may be attributed to mismanagement, lack of protection and early harvesting of forests to meet the needs of the villages.



**Figure (5.2): Income of private and villages forests per feddan**

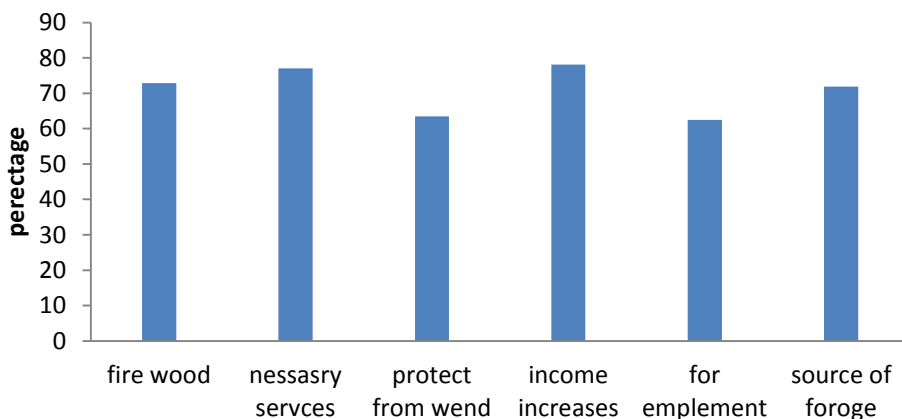
Source: Field survey (2014)

### **5.6. The objectives of villages and private forests establishment in the study area**

Figure (5.3) shows the objectives of villages and private forests as perceived by the local people in the study area. 77% of interviewed sample stated that the main objective of village and private forests was rural development, through provision of services (water, electricity, and building of schools, health care and centers). 80% of respondents said that their objective were income increases , 74.4% fire wood, 64% protection from wind , 64.5% for employment and 74% as source of forage. Moreover, beside that the local people may raise their capacities through managing village and private forests by themselves, awareness and skills in the participatory and co-operation approaches in village communities. Kobbail, (2005) reported that the aim of villages and private forests should involve the rural dwellers in decision making processes of all activities that affect their existence and raise the standard of their

living in balance with the environment. The objectives should aim at transforming the local people into dynamic citizens capable of contributing to a large range of activities particularly the management of their resources. Headley, (2003) added that the objectives of community forest fall into three main categories, economic, social, and environment objectives. This agrees with FAO, (2005) which stated that the involvement of local community and development activities strengthen their social relations due to mutual exchange of roles and work in group.

The concept of community forestry or ‘‘forestry for local communities ‘‘ aims at a forestry contribution to rural development by furnishing the forest products and services required for rural development as biomass for energy, wood for construction and tools, food for human nutrition, livestock, fodder and raw materials for small - scale industries. In the study area, the community forests play an important role in the income and life style of the households.



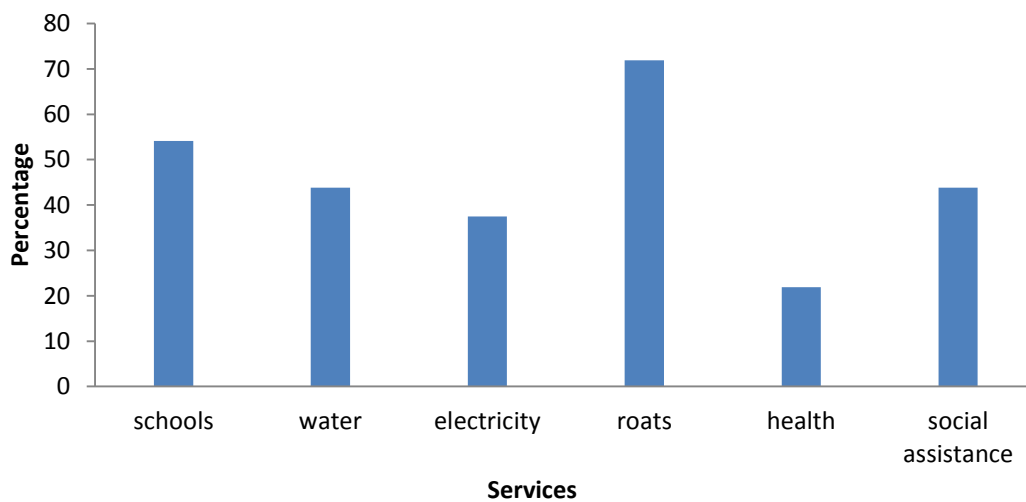
**Figure (5.3): Objectives of village and private forests establishment in the study area**

Source: Field survey (2014)

### 5.7. Uses of returns from the villages and private forests

The respondents reported that the decision of forests harvesting is always based on the need for cash to solve problems in the village with special consideration to the age and volume of trees. Only under exceptional cases, the FNC allows harvesting before reaching their rotation. Some respondents indicated that usually the trees are harvested after reaching their rotation.

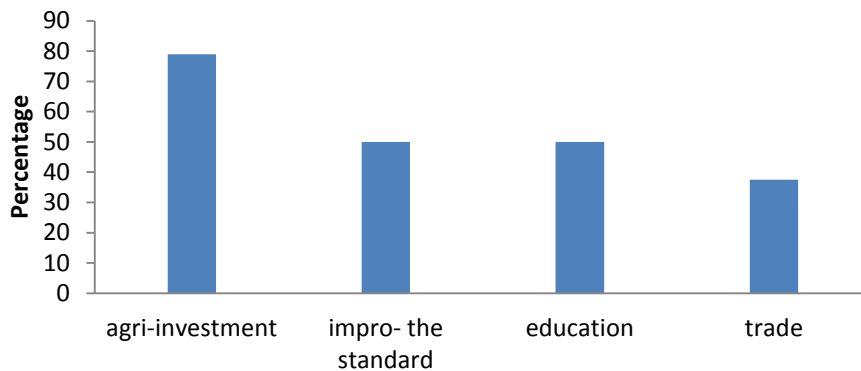
The majority of the respondents in the village forests said that they use the income from forests in improving essential services for the society such as building schools, founder’s water station, electricity, establishment health centers, opening roads. More than 70% of the respondents said that they use most of the return for opening roads, and 55% for schools, this reflects the importance of roads and schools in the life of local communities. Moreover, the roads can facilitate the movement and help to revive the economic situation. Some of the revenue is given to poor families in the area.



**Figure (5.4): Uses of returns from the villages forests**

Source: Field survey (2014)

The results in figure (5.5) reveal the uses of private forests income ,80% of the respondents in private forests used the income for reforestation, cultivating other lands, orchards, animal husbandry , improving standing living of family ,education and trade. These were the main objectives of investment in forests.



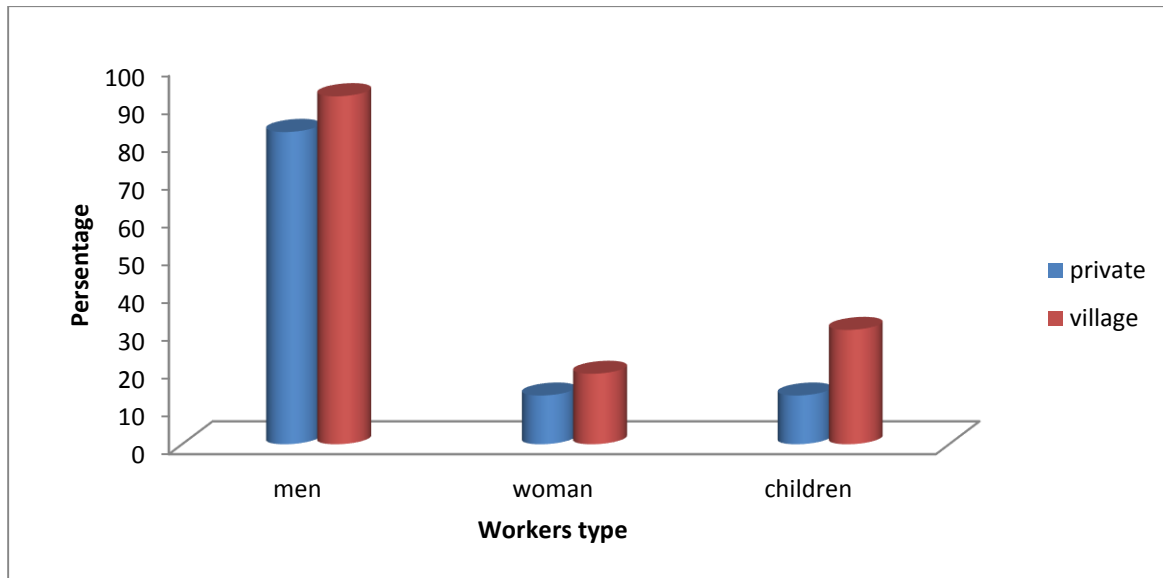
**Figure (5.5): Uses of returns of the private forests**

Source: Field survey (2014)

### 5.8. The participation of gender in private and villages forests

Figure (5.6) shows a very high by significant difference at ( $P < 0.001$ ) that most respondents 97% and 86.2% in private and village forests respectively, said that the participation of men was high in silvicultural operations, this may be due to that in the rural areas of the Sudan, man is the main supplier of income and responsible for supply of food and most essential requirements of living for his family. The low contribution of women group in participation may be mainly due to the nature of activities of silvicultural operations like guarding and harvesting. The role of women in the rural areas is to supply water, collection of fuel wood, cooking, looking after children and carrying out other domestic affairs (Kobbail, 2011). The children also have their contribution in both private and villages forests activities, but in the past

few years the number decreased because many of them go to school for education. Headly (2003), said that, it has been widely accepted that participation of local people is prerequisite for sustainable forests management and it is recognized that involvement of local people in forests management must provide real benefits based on local and national participation.



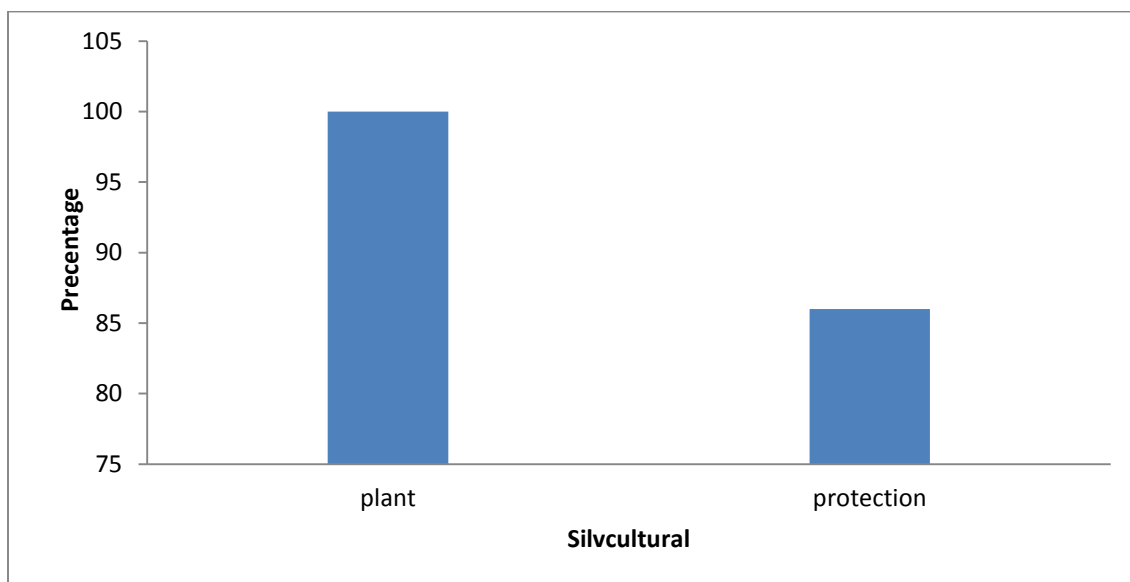
**Figure (5.6): Participation of gender in private and village forests**

Source: Field survey (2014)

### 5.9. Silvicultural operations in community forests

The results in figure (5.7) reveal that all of the respondents in villages forests said that all silvicultural operations, such as trees planting by spreading in water cores and thinning for production, are done by local people themselves in the co-operative activity known locally as ‘Nafir’. They organize their activities in a way that assist them in meeting their own needs from the forests. All silvicultural operations are included in two operations namely planting and protection; In fact, all these activities have been implemented by villagers under supervision of FNC which provides them

with seeds. The reason may be due to that the local communities have sense that forests are owned by them and the income can serve their community in terms of basic services such as schools, water, electricity, roads and health, Tawhada, (2013) reported that silvicultural is a part of community forest management, and management of community forest is the responsibility of the villagers (forest committees). The silvicultural operations are done under the supervision of the FNC in the locality. Even the local community has indigenous silvicultural knowledge in land preparation, furrowing, weeding, thing, coppicing etc.

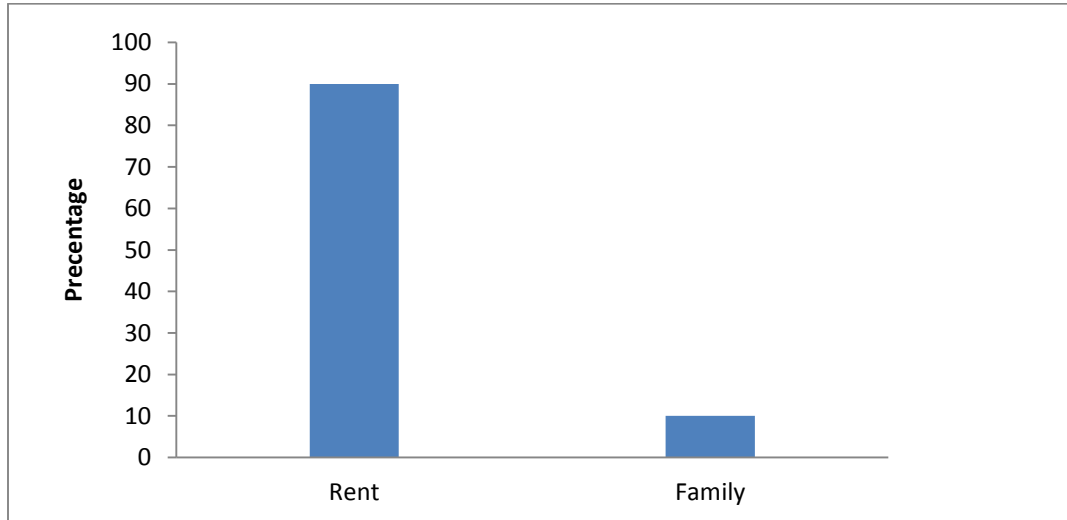


**Figure (5.7): Silvicultural operations in villagers forests**

Source: Field survey (2014)

The results in figure (5.8) indicate that most of the respondents (90%) of the private forests said that all silvicultural operations were done by men such as planting seeds by spreading in water, (beating up) and thinning for growth, and 10% of the respondents said they do some operations by their families, this may be due to that forests are owned by individuals.





**Figure (5.8): Source of labor for Silvicultural operations in private forests**

Sources: field survey (2014)

### **5.10. Harvesting of private and village forests**

All of the respondents in private and village forests in the study area said that forests harvesting is controlled by the government. The forests are harvested under the supervision of the FNC to ensure the application of scientific methods, reasonable tools of tree felling. The decision regarding harvesting of communal forests is usually taken by the village's forests committee and approved by FNC, while private forests decisions are taken by the owner and then approved by FNC. The supervision of FNC on harvesting process may increase awareness of forests owners to follow the right methods in forests management, harvesting and marketing. Moreover. It creates trust between FNC and local communities, it is clear that the decision of harvest is always taken by the forest committee and approved by the FNC.

### **5.11. Marketing of community forests private and village forests:**

The Market analysis and development approach assists people to achieve a sustainable livelihood level in which their incomes are increased and local forest management is

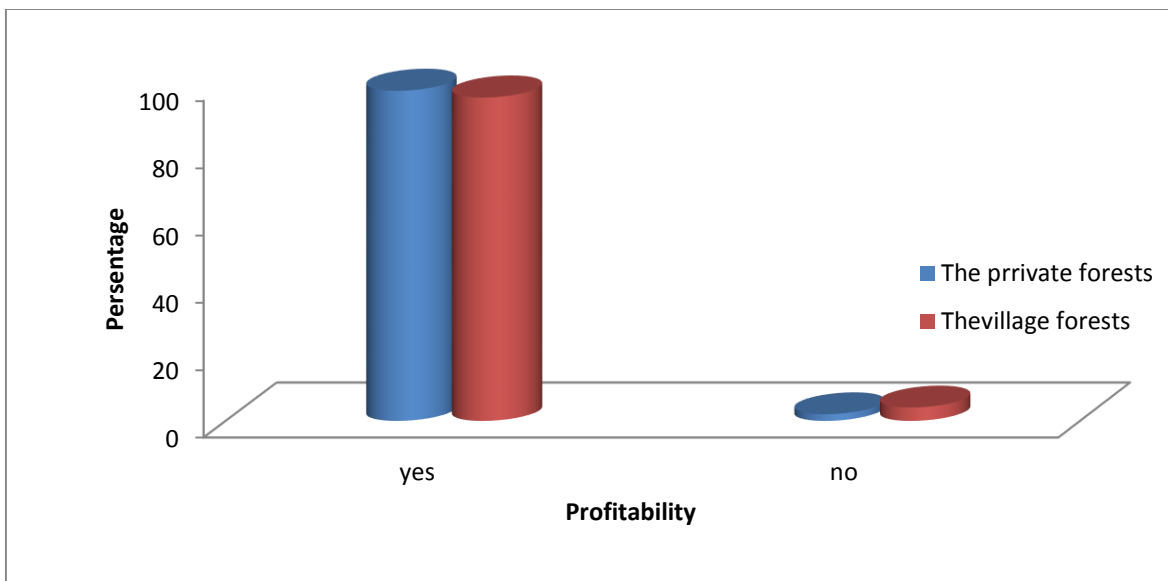
improved. It enables local people to identify potential products and develop markets that will provide income and benefits without degrading the resource base (Lecup & Nicholson, 2000). For that reason the research important to the marketing process in the study area. For the villagers to practice a proper and profitable marketing, they should be aware of the theory of supply and demand in the local markets. In the study area, the forests committees used to sell the timber as standing trees in order to minimize the cost. The community forests product is marketed either in an open auction or by the mediators. Asserted of the respondents mentioned that the product is always sold in an open auction. This is the mechanism which is followed in the governmental forests in the area and throughout the country where the product is large.

The respondents of stated that the harvest of community forests in the study area is sold through mediators. This system is suitable for the small scale production and the announcement is always site specific (covers a limited area). Interviewed group asserted that the FNC plays a substantial role in the marketing process through enlightening the villagers about the market prices.

### **5.12. Profitability of community forests**

Despite the challenges that communities have in making collective decisions and gaining access to technical expertise, communities are able to compete with the private sector as ongoing enterprise and to generate profits in a sustainable manner (Antinori, 2004). Respondents in the study area were interviewed whether community forestry represents profitable form and able to survive in the future. Figure (5.9) shows that about 97% of the respondents accentuated that the community forests are profitable. This means that they generate revenues covering total labor and materials costs with profit margin. Those respondents mentioned that the revenue from community forests is invested in the provision of the basic social services; revenue is used to support the village fund (contingency asset). On the

other hand, the respondents stated that the community forests as an investment is not costly, so irrespective of the size of the revenue they believe that it is profitable.



**Figure (5.9): Profitability of community forests**

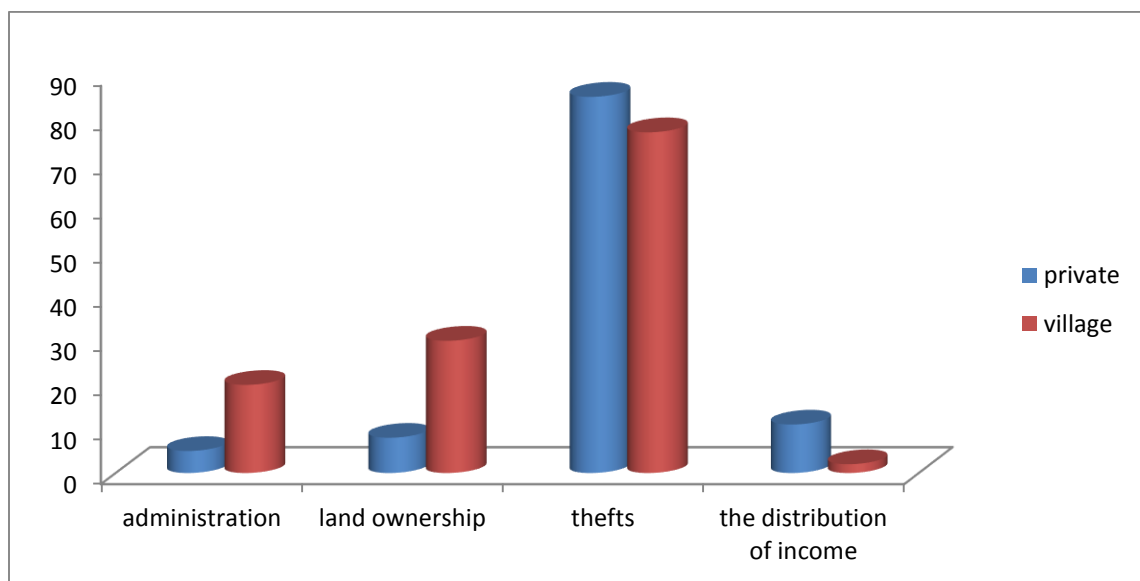
Source: field survey (2014)

These findings confirmed what was mentioned by Pokharel and Nurse (2004) that community forests contribute in rural poverty alleviation by providing the population with more sustainable livelihoods in the long term. The cost of community forests operations in the study area is difficult to be assessed in monetary terms because it is mostly executed by social collaboration “Nafir” and this is why some respondents mentioned that community forestry activities are not costly. Community forests are economically and environmentally more profitable when compared with a situation without community forests, highlighting an improvement in the community’s livelihoods while providing the basis for more sustainable management of forest resources. However, the profitability of community forestry is highly conditional on a number of factors, in particular, the technical and managerial

capacities of the communities as well as access and use to natural, infrastructural, financial and information and legal resources.

### 5.13. Threat confronting community forests in the study area:

Despite the efficient participation and management system of Community forests in the study area, some threats are facing the community forests. This is shown in figure (5.10) where 85.0% and 77% of respondents private and village forests on Consecutive asserted that the main threat facing the Community forests is thefts



**Figure (5.10) constraints confronting community forests in the study area:**

The most obvious constraint facing community forestry is that the time-scale of forestry is bound to contradictions with the priorities of the rural poor. These priorities are logically focused on meeting their present needs for land, labor and other resources that could be devoted for providing food, fuel and income needed today. Security of land tenure is an important constraint. About 30.8% village forests and 11% private forests of the respondents indicated that the establishment of the

communal forests in the study area is associated with social conflicts and disputes, while 27.5% showed occurrence of conflicts regarding the management of the village forests during the early stages of establishment of the communal forests. Because the administration in the village forests is general.

Believe that the villagers live in harmony with their communal forests and that they manage them satisfactorily although there are some conflicts regarding the distribution of benefits.

#### 5.14. T-test analysis

In general, t-test examines whether the means of two samples from private and village forests are different, and is commonly used when the variances of two normal distributions are unknown.

**Table (5.6): Independent samples t- test of some production factor private and village forests**

Item	Private		Village		t-value	Sig(2-tailed)
	Mean	Std	Mean	std		
Return	6478.52	2214.60	2999	1917.75	6.17	***
Guarding	82.45	29.62	49.39	21.83	4.73	***
Taxes	520.87	205.60	390.26	460.07	1.27	-
Area	40.83	28.51	129.45	102.84	-4.57	***
production	35.96	15.48	21.61	7.66	4.09	***
Price	183.91	45.25	157.03	58.69	1.83	*

\* Significant at 10% level of significance.

\*\*\* very Highly significant at 1%

The results in table (5.7) indicate very high significant differences (p<0.000) for returns, guarding, area and production, and significant differences (p<0.05) for the price.

**5.15. The Multiple regression equation of the private forests**

Multiple regression model was used to analyze the effect of some explanatory variables on the returns of private and village forests, In case of private forests the dependent variable was the returns per feddan and the explanatory variables were the area in feddan , cost of fencing , cost of guarding and taxes .

**Table (5.7.a) : Results the Multiple regression of private forests**

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	4437.637	1211.809		3.662	.002
Area(fed)	-12.396	10.141	-.180	-1.222	.237
Cost of fencing	5.347	12.948	.072	.413	.684
Cost of guarding	-14.277	7.072	-.309	-2.019	.059
Cost of taxes	6.137	1.830	.642	3.353	.004

95.0% Confidence Interval

$$Y = b_0 + b_1 X_1 + b_2 X_2 + \dots + b_n X_n$$

**The equation: -  $Y = 4437.637 - 12.396 X_1 + 5.347X_2 - 14.277 X_3 + 6.137X_4$**

**Y=** Return per feddan.

**X<sub>1</sub>** = Area (feddan)

**X<sub>2</sub>** =Cost of fencing (SDG)

**X<sub>3</sub>** = Cost of guarding (SDG)

**X<sub>4</sub>** = Taxes (SDG)

**Table (5.7.b): Shows ANOVA results of the multiple regression of private forests**

**ANOVA<sup>b</sup>**

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	56178734.985	4	14044683.746	8.797	.000 <sup>a</sup>
	Residual	28737071.624	18	1596503.979		
	Total	84915806.609	22			

**Table (5.7.c): Shows model summary results of the Multiple regression of private forests**

**Model Summary<sup>b</sup>**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.813 <sup>a</sup>	.662	.586	1263.528

The model was highly significant and the coefficient of determination ( $R^2$ ) was 0.662 meaning that the variables included in the model explained 66% of variations revenues in private forests, the remaining 34% of the variations in revenues are explained by other factors.

The regression results presented in table (5.8.a) show that the coefficients of area, cost of fencing, cost of guarding and taxes were -12.4, 5.3, -14.3, and 6.1, respectively. These coefficients of the explanatory variables are according to expectations and economic theory except for the taxes because there was autocorrelation between taxes and revenue.

The coefficients of the explanatory variables are explained as follow:-

Increasing the area of private forests by one unit will decrease the revenue by -12.4 units. This is expected because large areas increase the costs incurred and the expected increase in revenue will be less than the incurred costs.

Increasing the cost of fencing by one unit will increase the revenue by 5.3 units. This is expected because fencing will protect the forests from damages by people and animals.

Increasing the cost of guarding by one unit will reduce the revenue by - 14.2unit .As mentioned above there was auto correlation between the revenue and taxes resulting in an unexpected result (appendix 4).

### 5.16. The Multiple regression equation of the village forests

The dependent variable in Return regression model was assigned to return (SDG/feddan).The independent variables were cost of guarding (SDG/feddan), taxes(SDG/feddan) , area /feddan , fire wood production(M<sup>3</sup> /feddan) .

**Table (5.8.a) : Results of the Multiple regression of village forests**

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	1953.976	929.805		2.101	.045
Cost of guarding	-36.311	14.154	-.413	-2.565	.016
Cost of taxes	2.221	.566	.533	3.921	.001
Area(fed)	3.450	2.995	.185	1.152	.260
Production(m <sup>3</sup> )	70.596	34.211	.282	2.064	.049

95.0% Confidence Interval

$$Y = b_0 + b_1 X_1 + b_2 X_2 + \dots + b_n X_n$$

$$Y = 1953.976 - 36.311X_1 + 2.221X_2 + 3.450X_3 + 70.596 X_4$$



**Y** = Return per feddan.

**X<sub>1</sub>** = Cost of guarding (SDG)

**X<sub>2</sub>** = Taxes (SDG)

**X<sub>3</sub>** = Area (feddan)

**X<sub>4</sub>** = production of fire wood (feddan)

**Table (5.8.b): Shows ANOVA results of the multiple regression of village forests**

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	67805392.356	4	16951348.089	10.363	.000 <sup>a</sup>
	Residual	42527683.515	26	1635680.135		
	Total	1.103E8	30			

**Table (5.8.c): Shows model summary results of the Multiple regression of village forests**

Mode	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					
					R Square Change	F Change	df1	df2	Sig. Change	F
1	.784 <sup>a</sup>	.615	.555	1278.937	.615	10.363	4	26	.000	

The model was highly significant and the coefficient of determination was 0.615 meaning that the variables included in the model explained 62% of variations of revenues in village forests, the remaining 38% of the variations in revenues are explained by other factors.

The regression results presented in table (5.9) show that the coefficients cost of

guarding, taxes, area (feddan) and production were -36.3, 2.2, 3.5, and 70.6, respectively. These coefficients of the explanatory variables are according to expectations and economic theory except for the taxes because there was autocorrelation between taxes and revenue.

The coefficients of the explanatory variables are explained as follow:-

Increasing the cost of guarding by one unit will reduce the revenue by -36.3 unit .as mentioned above there was auto correlation between the revenue and taxes resulting in an unexpected result (appendix 5). In addition to the guarding and taxes of the highly cost factors, Thereby reducing revenues.

Increasing the area of village forests by one unit increases the revenue by 3.45 units. Because the increased area lead to increased production.

Increasing fire wood production per feddan of village forests by one unit will increase the revenue by 70.6 units.The increase production direct to increase revenue that fact.

## 5.17. Financial feasibility study

This part of the analysis presents the feasibility studies of establishing private forests and village forests.

### 5.17.1. A private forest

**Table (5.9): financial analysis of private forests**

Year	Total Costs	Total Revenue	Discount factor (0.12)	PVC (SDG)	PVR (SDG)	NPV (SDG)	B/C ratio
0	245.3	0	1.000	245.30	0.00		
1	93.2	0	0.893	83.21	0.00		
2	109.2	0	0.797	87.05	0.00		
3	85.1	0	0.712	60.57	0.00		
4	85.1	1000	0.636	54.08	635.52		
5	85.1	0	0.567	48.29	0.00		
6	85.1	0	0.507	43.11	0.00		
7	85.1	1500	0.452	38.49	678.52		
8	85.1	0	0.404	34.37	0.00		
9	85.1	0	0.361	30.69	0.00		
10	85.1	1700	0.322	27.40	547.35		
11	85.1	0	0.287	24.46	0.00		
12	85.1	0	0.257	21.84	0.00		
13	85.1	1600	0.229	19.50	366.68		
14	85.1	0	0.205	17.41	0.00		
15	85.1	6487.52	0.183	15.55	1185.25		
				851.35	3413.32	2561.97	4.01

The discount of ratio 12%

Net present value (NPV) = 2561.97

Benefit/ cost ratio =B/C = 4.01

Payback period basic private forest = 7

IRR = 16.50 %

The results of the analysis show that the private forests are profitable at the prevailing rate of development project (12%).

Sensitivity analysis was conducted to test the feasibility under an increase in cost by 5% and a fall in the revenue 5% for private forests.

**Table (5.10): Sensitivity analysis of the private forest**

Year	Total Costs		Total Revenue		Discount factor	PVC+5%	PVR - 5%	NPV +5% C	NPV- 5% R	NPV+-
		c+5%		R - 5%	0.12					
0	245.3	257.6	0	0	1.000	257.57	0			
1	93.2	97.9	0	0	0.893	87.38	0			
2	109.2	114.7	0	0	0.797	91.41	0			
3	85.1	89.4	0	0	0.712	63.60	0			
4	85.1	89.4	1000	950	0.636	56.79	603.74			
5	85.1	89.4	0	0	0.567	50.70	0			
6	85.1	89.4	0	0	0.507	45.27	0			
7	85.1	89.4	1500	1425	0.452	40.42	644.60			
8	85.1	89.4	0	0	0.404	36.09	0			
9	85.1	89.4	0	0	0.361	32.22	0			
10	85.1	89.4	1700	1615	0.322	28.77	519.99			
11	85.1	89.4	0	0	0.287	25.69	0			
12	85.1	89.4	0	0	0.257	22.94	0			
13	85.1	89.4	1600	1520	0.229	20.48	348.34			
14	85.1	89.4	0	0	0.205	18.28	0			
15	85.1	89.4	6487.52	6163.14	0.183	16.32	1125.98			
						893.92	3242.65	2519.40	2391.31	2348.74

-Benefit cost ratio =B/C ratio =3.63

- IRR = 16.15 %

The results in table (5.11) show that a private forest was feasible even under increases of costs (5%) and decreases of revenue (5%).

## Financial feasibility of village forests

This part of the analysis presents the feasibility studies of establishing a village forests.

### 5.17.2. Village forest

**Table (5.11): Financial analysis of a village forests**

Year	Total Costs	Total Revenue	Discount factor (0.12)	PVC (SDG)	PVR(SDG)	NPV(SDG)	B/C ratio
0	54.4	0	1.000	54.4	0.0		
1	53.9	0	0.893	48.1	0.0		
2	59.9	0	0.797	47.8	0.0		
3	45.9	0	0.712	32.7	0.0		
4	45.9	505	0.636	29.2	320.9		
5	45.9	0	0.567	26.0	0.0		
6	45.9	0	0.507	23.3	0.0		
7	45.9	750	0.452	20.8	339.3		
8	45.9	0	0.404	18.5	0.0		
9	45.9	0	0.361	16.6	0.0		
10	45.9	1000	0.322	14.8	322.0		
11	45.9	0	0.287	13.2	0.0		
12	45.9	0	0.257	11.8	0.0		
13	45.9	900	0.229	10.5	206.3		
14	45.9	0	0.205	9.4	0.0		
15	45.9	2999	0.183	8.4	547.9		
				385.3	1736.3	1351.0	4.50

The discount of ratio 12%

Net present value (NPV) = 1351

Benefit cost ratio = B/C ration= 4.50

Payback period basic private forest = 1

IRR = 13.08 %

The results of the analysis show that the village forests were profitable at (12%).



Sensitivity analysis was conducted to test the feasibility under an increase in cost by 5% and a fall in the revenue by 5% for village forests.

**Table (5.12): Sensitivity analysis of the village forests**

Year	Total Costs	Total Revenue	Discount factor		PVC+5%		PVR - 5%	NPV +C 5%	NPV- R5%	NPV+ - 5%
	1.05		0.12	C+5%		R -5%				
0	54.4	0	1.000	57.12	57.12	0	0			
1	53.9	0	0.893	56.595	50.53	0	0			
2	59.9	0	0.797	62.895	50.14	0	0			
3	45.9	0	0.712	48.195	34.30	0	0			
4	45.9	505	0.636	48.195	30.63	479.75	304.89			
5	45.9	0	0.567	48.195	27.35	0	0			
6	45.9	0	0.507	48.195	24.42	0	0			
7	45.9	750	0.452	48.195	21.80	712.7	322.30			
8	45.9	0	0.404	48.195	19.47	0	0			
9	45.9	0	0.361	48.195	17.38	0	0			
10	45.9	1000	0.322	48.195	15.52	950	305.87			
11	45.9	0	0.287	48.195	13.85	0	0			
12	45.9	0	0.257	48.195	12.37	0	0			
13	45.9	900	0.229	48.195	11.05	855	195.94			
14	45.9	0	0.205	48.195	9.86	0	0			
15	45.9	2999	0.183	48.195	8.81	2849.5	520.51			
					404.59		1649.52	1331.75	1264.2	1244.93

Benefit cost ratio =B/C ratio = 4.08

IRR = 12.87 %

The results of the sensitivity analysis show that the village forest was profitable even under increases of cost (5%) and decreases of revenue (5%).

The feasibility of the private and village forests shows that the two types of forests were profitable under the specified discount rate for development projects, Additional benefits of private and village forests include the following :-

1. Providing local communities with their needs for fire wood ,charcoal , and building materials
2. Provision of fodders for animals
3. Protection of villages from winds and storms
4. Increasing the areas of forests in the state

## CHAPTER SIX

### CONCLUSIONS AND RECOMMENDATIONS

#### 6.1. Main Findings and conclusions

- The analysis of Socio-economic characteristics of the owners of community forests shows that the education level was gradually high, that 41.7% of respondents has primary education, and 20.9% were secondary educated. The result revealed that 47.6% were farmers, while 30.4% were employees, and the majority of respondents (53.2%) gained between 10-20 thousand SDG per a year, while (25.2%) gained between 30-40 thousand SDG.
- The results showed an increase of private and village forests in the period from 1991 to 2000 by 50.5% in private forests and 67.7% in village forests.
- The results showed that *acacia nilotica* as dominated in community forest.
- All the community members participated genuinely in the different activities, that all sectors of the community (men, women and children) were organized in working groups according to their characteristics.
- Average income (SDG/ per feddan) was very high in the private, relative to villages forests.
- The results showed objectives of villages and private forests as perceived by the local people in the study area. 77% of interviewed sample stated that the main objective of village and private forests was rural development, 80% of respondents said that their objective were income increases , 74.4% fire wood, 64% protection from wind , 64.5% for employment and 74% as source of forage.

- The study showed that community forestry contributed to rural development by using return from forests and forest products in services i.e. building schools, foundation, water station, electricity, establishment health centers, opening roads. More than 70% of the respondents said that they use most of the return for opening roads.
- The study revealed that participation and management of communal forests by the villagers increases their awareness to forest protection and improvement.
- Rural people acceptance to these community forests is very clear and they perceive the best type of management for running these forests which is owned and managed by them.
- That about 97% of the respondents accentuated that the community forests are profitable.
- There were remarkable differences found among selected the private forests and village forests in term of returns, guarding, area and production.

The regression analysis showed the below results:

- In the private forests; area per feddan and cost of guarding have negatively affect return while cost of fencing and taxes have positive effect. The model was highly significant ( $R^2=66\%$ ,  $(p<0.000)$ ).
- In the village forests cost of guarding was negatively affect return, while the taxes, area per feddan and production  $m^3$  were positively affect return. The model was highly significant ( $R^2=61\%$ ,  $(p<0.000)$ ).
- The result of financial feasibility analysis of the private forests were NPV =2561.97, B/C =4.01, PIP = 7 years and IRR =16.50%.

- The result also showed that NPV =1351, B/C =4.50, PIP = one years and IRR =13.08%.

## **6.2. Recommendations:**

- To ensure sustainability formal and clear regulations governing the community forests are needed and the villagers should be aware of them.
- Income generation activities should be encouraged, as they provide immediate and considerable income.
- Emphasis should be given to proper marketing channels to all forests products in addition to reduction in taxes.
- Find outlets to finance the forest owners.
- Involvement of poor people and creation of employment opportunities should be encouraged to improve livelihoods and reduce poverty.
- Procedures for reserving forests should be simplified.
- Further studies investigating total indirect benefits including ecosystem services and multiplier effects of community forests as well as respective impacts on rural livelihoods and poverty alleviation are recommended.

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## APPENDEX (1)

### Questionnaire 1

#### Submitted to the private forests

استبيان الغابات الخاصة:

مستوي التعليم ؟

أ.أمي  ب.خلوى  ج. ابتدائي  د. ثانوي  هـ. جامعي  و. فوق الجامعي

نوع الوظيفة ؟

أ.وظيفة  ب.زراعة  ج.رعي  د. تجارة  هـ. إعمال حرة  هـ. أخري اذكره

متوسط الدخل السنوي ؟

ما نوع الغابة ؟

أ. طبيعية  ب.مستزرعة  ج. خليط

متى أسست الغابة ؟

كم تبلغ مساحتها ؟

ما نوع الأشجار الموجودة بالغابة ؟

ما عمر الأشجار الموجودة بالغابة ؟

ما الغرض من إنشاء الغابة ؟

كم متوسط ثمن شراء فدان الأرض بالمنطقة ؟

كم متوسط ثمن إيجار فدان الأرض بالمنطقة ؟

كم يكلف تسوير الأرض ؟



التكلفة بالجنيه/الفدان	نوع التسوير
	سلك شائك
	زربية شوكة
	أخرى

كم تكلف زراعة فدان الأرض حسب نوع الأشجار ؟

نوع الأشجار	شتول	بذور	تكلفة الفدان /بالجنيه

كم تكلف حراثة الأرض (جنيه/فدان) ؟

كم تكلف نظافة الفدان من الحشائش (جنيه/فدان) ؟

هل هنالك خطة عمل لإدارة الغابة ؟

أ. نعم  ب. لا

ماهي العمليات الموضوععة في خطة العمل ؟

متي يبدأ الشلخ الأول ؟

كم يكلف الشلخ الأول جنبه/ الفدان ؟

كم مرة تم شلخ الغابة ؟

ما نوع المنتج الذي يتم تسويقه ؟

أ. حطب حريق  ب. أعمدة مباني  ج. خشب صناعات

د. ثمار (قرض)  هـ. ادوية  و. اخرى

كم ثمن المتر المكعب من الخشب إذا كان واقف أو مرصوص حسب ونوع ؟

نوع الاشجار	ثمن المتر المكعب الواقف	ثمن المتر المكعب لمرصوص

كم ثمن العمود ؟

كم تكلف عملية قطع الأشجار جنية/الفدان او جنية/الفدان او جنية؟الفدان؟

كم يكلف ترحيل الأخشاب المقطوعة إلي خط النار ورصها جنية/م3 او جنية/عمود؟

كم يكلف الترحيل إلي السوق جنية/م3 ؟

ما تكلفة استحقاق المشرف علي عملية التسويق ؟

كم تكلف الحراسة في السنة ؟

كم تدفع ضرائب في السنة ج/الفدان او ج/ م3 ؟

كم تدفع جبايات في السنة ج/الفدان او ج/ م3 ؟

كيف تتم عملية التسويق ؟

أ. بواسطة عطاءات  ب. تسويق مباشر

ج. تدخل جهات أخرى مثل الهيئة القومية للغابات  د. أخرى

كم متوسط العائد السنوي من الغابة ؟

الي اين يذهب العائد من الغابات ؟

ما هي الأعمال الأخرى التي تمارس داخل الغابة ؟

أ. زراعة محاصيل  ب. زراعة موالح  ج. صيد اسماك وتجفيفها

د. مناحل  هـ. تربية حيوان  و. أخرى

كم الدخل من هذه الاعمال في السنة ؟

نوع العمل	متوسط الدخل
زراعة محاصيل	
زراعة موالح	
صيد اسماك	
مناحل	
تربية حيوان	

هل الغابة تزيد من دخلك إذا كانت الإجابة بنعم اذكر الأسباب ؟

نعم  لا

هل تشارك في ادارة الغابات الشعبية بمنطقتك ؟

نعم  لا

مانوع المشاركة التي تقوم بها ؟

زراعة  حصاد  حماية  اخري اذكرها

من يقوم بالعمل داخل الغابة ؟

أ. رجال  ب. نساء  ج. الأطفال

ماهي مقترحاتك لتحسين موارد الغابات بالمنطقة ؟

أ.وضع خطط عمل لهذه الغابات  ب. نجاح عملية التسويق

ج. وضع سياسات تمويلية لقيام هذه الغابات  د. آخري

ما هي المشاكل المعوقات التي تعيق إدارة الغابات الشعبية ؟

أ. نزاع حول الإدارة  ب. نزاعات حول الأرض  ج. توزيع الدخل

د. إعمال داخل الغابة مثل ( الرعي – المناحل ..... الخ )  هـ. السرقات

فيما تستخدم أخشاب الغابات بمنطقتك ؟

أ. حطب حريق  ب. أعمدة مباني

ج. أثاثات منزلية  د. آخري

هل تعتقد الطلب علي الاخشاب في زيادة او نقصان واذا كانت الاجابة بنعم او لا وضح السبب

أ. زيادة ؟

نعم  لا

ب. نقصان ؟

نعم  لا

هل تعتقد أن زراعة الغابات الشعبية مربحة إذا كانت الإجابة بنعم وضح السبب ؟

أ. نعم  لا

## APPENDEX (2)

### Questionnaire 2

#### Submitted to the village forests

اسم القرية ؟

اسم الغابة؟

متي تأسست الغابة الشعبية ؟

أصل الغابة ؟

أ. طبيعية  ب. مزروعة  ج. خليط

كم تبلغ مساحتها (بالفدان ) ؟

ما نوع الأشجار بالغابة ؟

أ. سنط  ب. كافور  ج. طلع  د. هشاب

هـ. هجليج  و. اخري اذكرها

من أين تم أخذ الموافقة علي إقامة الغابة الشعبية ؟

أ. من الحكومة الاتحادية  ب. حكومة الولاية  ج. المحلية

د. لجان شعبية  هـ. اخري اذكرها

كم كانت رسوم التسجيل (بالجنيه ) ؟

ماهو مصدر تكاليف إنشاء الغابة الشعبية ؟

أ. من منظمات حكومية  ب. منظمات غير حكومية  ج. تبرع من أهل القرية

د. الإدارات الأهلية  هـ. جهات خاصة  و. أخري

ماهو مصدر ارض الغابة الشعبية ؟

أ. شراء  ب. إيجار  ج. حكومي

د.حيازة  ه. اخري اذكرى

ما الهدف من إقامة هذه الغابة ؟

أ. توفير احتياجات المواطنين من حطب الوقود  ب. توفير خدمات ضرورية

ج. مصدر للأعلاف  د. الحماية من عوامل المناخ  ه. زيادة الدخل

و. توفير فرص عمل  ز. أخري اذكرها

كم كانت تكلفة نظافة الأرض ؟

كم كانت تكلفة حراثة الارض بالجنيه /الفدان ؟

ما هو نوع التقاوي المستعملة ؟

أ. بذور  ب. شتول

كم تكلف زراعة الفدان حسب نوع الاشجار المراد زراعتها ؟

نوع الأشجار	شتول	بذور	تكالفتها بالجنيه/الفدان

ما نوع الري المستخدم ؟

أ. طبيعي  ب. صناعي

كم عدد الريات في الشهر او في السنة ؟

كم يكلف الري في الشهر او في السنة بالجنيه /الفدان او بالجنيه للغابة ؟

هل هنالك خطة عمل لإدارة الغابة ؟

أ.نعم  ب. لا

إذا كانت الإجابة بنعم وضح نوع الخطة

كيف يكون شكل العمل داخل الغابة الشعبية ؟

النشاط	شكل العمل				تكالفته بالجنيه/فدان
	مقطوعية	يومية	نفير	اخري	

من أين يأخذ العامل أجره عمله ؟

أ. لجنة الغابة  ب. اللجنة شعبية  ج. جهة مانحة  د. اخري

كم تكلف حراسة الغابة في السنة ؟

ما نوع المنتج المستهدف من الغابة ؟

أ. حطب حريق  ب. أعمدة مباني  ج. ثمار وأدوية  د. أخري اذكرها

كيف يتم تسويق منتجات الغابات الشعبية بمنطقتك ؟

أ. عطاءات  ب. تسويق مباشر

ج. الهيئة القومية للغابات  د. جهات اخري

كيفية بيع انتاج الاخشاب من الغابة ؟

أ. واقف  ب. مرصوص

كم تكلف عملية قطع الأشجار ؟

أ. الفدان ؟

ب. 3م (مرصوص) ؟

كم ثمن المتر المكعب من الخشب إذا كان واقفا أو مرصوصا حسب ونوع ؟

نوع الأشجار	ثمن المتر المكعب الوقف	ثمن المتر المكعب مرصوص

كم يكلف ترحيل الأخشاب المقطوعة إلى خط النار ورسها (بالجنيه /م3) ؟

اين تباع الاخشاب ؟

أ. محليا  ب. السوق

كم يكلف الترحيل إلى السوق (بالجنيه /م3) ؟

من المشرف علي عملية التسويق ؟

ما تكلفة استحقاق المشرف علي عملية التسويق ؟

كم تكلف الضرائب في السنة بالجنيه /الفدان او بالجنيه/م 3؟

كم تكلف الجبايات في السنة بالجنيه /الفدان او بالجنيه/م 3 ؟

ما هو مصدر الدخل من الغابة الشعبية ؟

ا. شلخ  ب. حصاد نهائي  ج. منتجات غير خشبية  د. اخري

كم متوسط الدخل السنوي من الغابات الشعبية ؟

الي اين يذهب الدخل من الغابات الشعبية بالمنطقة ؟

من هو المتصرف في الدخل الذي يعود من الغابة الشعبية ؟

أ. لجنة الغابة  ب. أهل القرية  ج. الإدارة الأهلية  د. أخرى

ما هي الخدمات التي يتم الإنفاق عليها من إيرادات الغابات الشعبية ؟

أ. مدارس  ب. ماء  ج. كهرباء  د. طرق  هـ. مساعدة  
الفقراء في القرية  و. المساهمة المناسبات الاجتماعية  ز. أخرى اذكرها

كم كانت تكلفة انشاء تلك الخدمات ؟

هل الغابة الشعبية تزيد من دخلك إذا كانت الإجابة بنعم وضح السبب ؟

أ.نعم  ب. لا

كيف تلبي احتياجاتك من الغابة ؟

أ.بإذن  ب. بدون إذن

ما نوع النشاطات الاخرى التي تتم داخل الغابة الشعبية ؟

أ. زراعة محاصيل وموالمح بين الأشجار  ب. صيد اسماك وتجفيفها   
ج. مناخل  د. الرعي  هـ. أخرى

كم متوسط الدخل السنوي من تلك الأعمال ؟

ما هي المعوقات التي تعيق إدارة الغابات الشعبية ؟

أ. نزاع حول الإدارة  ب. نزاعات حول الأرض

ج. توزيع الدخل  د. إعمال داخل الغابة مثل ( الرعي - المناحل ..... الخ )

ما هي المنافع غير المباشرة التي تحصل عليها من الغابات الشعبية ؟

أ. استجمام - ترفيه  ب. تلطيف الجو  ج. الحماية من مجاري المياه   
د. أخرى اذكرها

ما نوع الأسواق التي يتم فيها بيع سلع الغابات الشعبية ؟

أ. أسواق القرية  ب. أسواق المدن  ج. أخرى

الطلب علي السلعة من الغابات الشعبية هل هو ؟

أ. موسمي  ب. دائم  ج. متقطع

هل تشارك في ادارة الغابات الشعبية بمنطقتك ؟

أ. نعم  ب. لا

مانوع المشاركة التي تقوم بها ؟

أ. زراعة  ب. حصاد  ج. حماية  د. أخرى اذكرها

من يقوم بالعمل داخل الغابة ؟

أ. رجال  ب. النساء  ج. الأطفال

ما هي استخدامات أخشاب الغابات الشعبية بمنطقتك ؟

أ. حطب حريق  ب. أعمدة مباني  ج. أثاثات منزلية  د. أخرى

ما هي مقترحاتك لتحسين واستدامة موارد الغابات الشعبية ؟

أ. وضع خطط عمل لهذه الغابات  ب. تخطيط عمليات التسويق

ج. وضع سياسات تمويلية لقيام هذه الغابات  د. تأمين المشاركة الشعبية  ه. أخرى

هل الغابة الشعبية مربحة إذا كانت الإجابة بنعم وضح السبب ؟



## **APPENDEX (3)**

### **Check list For Group discussion**

- Income generation activities.
- The importance of Community forestry in the villagers' life and environmental roles of forests.
- Employment opportunities
- Participation in community forests activities.
- The role of FNC.
- The role of civil administration and the local leaders in mobilizing the community.
- The efficiency of community forests committees.
- Benefits sharing mechanisms and revenue exploitation.
- The future sight, hopes and expectations
- Others

## Appendix (4)

### The private forests Correlations

#### Correlations

		Return	Area/fed	fencing	guarding	Taxes
Pearson Correlation	Return	1.000	.095	.486	-.513-	.755
	Area/feddan	.095	1.000	.053	-.294-	.280
	Cost of fencing	.486	.053	1.000	-.121-	.600
	Cost of guarding	-.513-	-.294-	-.121-	1.000	-.387-
	Taxes	.755	.280	.600	-.387-	1.000
Sig. (1-tailed)	Return	.	.334	.009	.006	.000
	Area/feddan	.334	.	.405	.087	.098
	Cost of fencing	.009	.405	.	.292	.001
	Cost of guarding	.006	.087	.292	.	.034
	Taxes	.000	.098	.001	.034	.
N	Return	23	23	23	23	23
	Area/feddan	23	23	23	23	23
	fencing	23	23	23	23	23
	Guarding	23	23	23	23	23
	Taxes	23	23	23	23	23

## Appendix (5)

### The village forests Correlations

#### Correlations

		Return	guardin g	Taxes	Area/fed	Production/ feddan m <sup>3</sup>
Pearson Correlation	Return	1.000	-.284-	.649	-.021-	.551
	Cost of Guarding	-.284-	1.000	.057	.646	-.072-
	Taxes	.649	.057	1.000	.091	.435
	Area/feddan	-.021-	.646	.091	1.000	.042
	Production/ feddan m <sup>3</sup>	.551	-.072-	.435	.042	1.000
Sig. (1-tailed)	Return	.	.061	<b>.000</b>	.454	.001
	Cost of Guarding	.061	.	.380	.000	.349
	Taxes	<b>.000</b>	.380	.	.312	.007
	Area/feddan	.454	.000	.312	.	.412
	Production/ feddan m <sup>3</sup>	.001	.349	.007	.412	.
N	Return	31	31	31	31	31
	Cost of Guarding	31	31	31	31	31
	Taxes	31	31	31	31	31
	Area/feddan	31	31	31	31	31
	Production/ feddan m <sup>3</sup>	31	31	31	31	31

## Appendix (6)

### Private forest: costs and revenues/feddan (SDG)

year	operation	Cost /fed	Revenue/fed
0	Land Registered	80.2	
	Land clean	100	
	fencing	65.1	
	Sum	245.3	0
1	seeds	8	
	guarding	85.2	
	Sum	93.2	
2	guarding	85.2	
	seeds	4	
	fencing	20	
	sum	109.2	
3	guarding	85.1	
4	guarding	85.1	
	First thinning		1000
5	guarding	85.1	
6	guarding	85.1	
7	guarding	85.1	
	thinning		1500
8	guarding	85.1	
9	guarding	85.1	
10	guarding	85.1	
	Thinning		1700
11	guarding	85.1	
12	guarding	85.1	
13	guarding	85.1	
	thinning		1600
14	guarding	85.1	
15	guarding	85,1	
	Final felling		6261.13

## Appendix (7)

### Village forest: costs and revenues/feddan (SDG)

year	operation	Cost /fad	Revenue/fad
0	land registered	54.4	0
1	seeds	8	
	guarding	45.9	
	sum	53.9	
2	guarding	45.9	
	seeds	4	
	Sum	59.9	
3	guarding	45.9	
4	guarding	45.9	
	First thinning		505
5	guarding	45.9	
6	guarding	45.9	
7	guarding	45.9	
	Thinning		750
8	guarding	45.9	
9	guarding	45.9	
10	guarding	45.9	
	Thinning	45.9	1000
11	guarding	45.9	
12	guarding	45.9	
13	guarding	45.9	
	Thinning		900
14	guarding	45.9	
15	guarding	45.9	
	Final felling		2999

