

# Best economic rotation of various farm grown tree species



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# 1. TITLE: DETERMINING THE BEST ECONOMIC ROTATION OF VARIOUS FARM GROWN TREE SPECIES.

## 2. Abstract

The innovative knowledge relating to the excellent economic rotation of *Dalbergia sissoo* (Shisham), *Acacia nilotica* (kikar) and *Albizzia lebbeck* (Shareen) grown in the farmlands of Pakistan, is still inadequate and erratic. It should be calculated on tehsil level as the growing rate of trees differ from area to area controlled by climate. According to this requirement, the present study has been planned. Tehsil Kot Addu of District Muzaffargarh will be chosen for this study. 5 villages of Tehsil Kot Addu will be selected randomly. From selected villages five fields having an area of five acre will be selected through random selection technique. Common type trees growing there will be assigned successive numbers. Tree height & diameter at breast height (DBH) will be measured. The price of every standing tree will find out from the land owner. The data will be arranged in tabular form, organized and discounted at appropriate discount rate. Return on investment (R. O. I), Benefit cost ratio (B. C. R) and Net present worth (N. P. W) will be used as economic tools. Various rotations of trees will be checked to discover the economic rotation of each tree species.

## V. INTRODUCTION

Forest plants supply basic necessities of life (food, fiber & shelter) to a great size of people. The population of the world is increasing day by day and is predicted to be about 10 billion in the mid of 21<sup>st</sup> century. As a result, wood and wood products demand will also increase manifold (UNO, 1995).

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In Pakistan there is deficiency of about 29 million cubic meters of timber. The rate of deforestation is increasing continuously at a rate of 2.5% annually. Population increase rate is 1.90% per annum, if the same situation continues, urban population will be doubled in the next 20 years and will surely lead to more deforestation for making way for humanity (Government of Pakistan, 2005).

It has been narrated that eighty to ninety percent of rural need of home fuel demands are fulfilled by fire wood, in the primitive countries. Forests have a huge importance in Pakistan's economy by supplying timber, fire wood and shelter for animals (Nouman *et al.*, 2006).

It has been narrated that, total houses of Pakistan in 2006 were 22.8 million, from which Punjab has 54.85% (12.280 million houses). Out of the total houses (22.38 Million) just 20% (4.476 million) units had been provided natural gas while 80% (17.904 million) were depending on the other energy resources as fuel wood, dried animals dung, residues of crop, Liquid Petroleum Gas (LPG), kerosene oil and charcoal (partial burnt wood) etc (Government of Pakistan, 2009). Nearly 32% energy demand is met by the wood biomass (FAO, 2009). As stated by Energy-Pakistan (2011) all the energy extracted from the informal energy means like mechanized waste, charcoal, residues of crops, cow dung, metropolitan waste and fire wood was  $28 \times 10^6$  ton in 2008, from which  $26.5 \times 10^5$  ton (95%) was acquired from fuel wood.

This alarming situation had highlighted by (Government of Pakistan, 2005) which proposed that our forest resources will be destroyed in next 15 years

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due to huge deforestation for fuel wood and timber. Pakistan is at the 110<sup>th</sup> country in the world by his forest resources as announced in 2011 by United Nations General Assembly (Chaudhry, 2011).

The world's forest cover is about 30% whereas Pakistan has only 4.8% (4.2 million hectares) out of 88 million hectares (Anonymous, 2005). On the other hand, it is only 2% as stated by (FAO, 2011). Thus, Pakistan has the scant quality forest resources along with minimum ratio as compared to the world (Mcketta, 1990). Pakistan has 0.001ha per capita forest resources while in the world it is devoted 1.00 ha per capita (FAO, 2011) including small contribution of forest sector to our economy.

Cultivation of trees with agricultural crops is an old method of obtaining various benefits from the same piece of land. Kalinganire *et al.*, (2008) stated that Farm forestry is a beneficial combination of trees or woody plants with agricultural crops at the same land piece either in a chronological or longitudinal arrangement in such a way that both cost-effective and biological collaboration occurs between them. In Pakistan about 60% of timber and 90% of total fuel wood needs are acquired by the tree plants grown on farmlands. (Rahim and Hasnain, 2010). Land owners grow tree plants on their farms and they harvest them without any proper/optimum rotation. This may cause economic loss because inflation and market price strongly affects the farmer's economic benefits. The present research has been planned to determine the optimum economic rotation of various farm grown tree species. It may lead the farmers to maximum benefit. All this needs to carry out at the gross root level (District & Tehsil level) because the

tree growth rate strongly differs from place to place. Present research is lacking in literature. There is no any information available in the literature related to the best economic rotation of different farm grown tree species in Pakistan, Punjab at tehsil level. So, this study was planned with these two objectives.

- To find out the best economic rotation of various farm grown tree species in Kot Addu.
- To determine the level of profitability of farmers/ tree growers in Kot Addu.

#### VIREVIEW OF THE LITERATURE

Farm forestry has numerous benefits so farmers raise various woody plants along with agricultural crops for obtaining shelter for animals, fire wood and timber. Trees also beneficial as bio remedial measures for the control of pollution and erosion (Zubair and Garforth, 2005). Farmers prefer *Acacia nilotica* because it is a fast growing species and easily propagated. Similarly, *Dalbergia sissoo* and *Albizia lebbek* are very important for production of fuel wood and timber. Naturally grown trees make haphazard landscape in farms but genius farmers adjust the tree plants on suitable place like boundaries of fields. In addition, *Acacia nilotica* render the economic benefits at the age of 10-15 years to the farmers. Timber merchants confer in order to reach an agreement with the farmer regarding to the price of fuel wood and timber wood.

Nouman *et al.* , 2006) reported that Daphar irrigated plantations were running in the profit with a benefit cost ratio of 1. 29. High mortality rate of

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tree plants lead to less income in first 10 years. But next twenty years lead to greater income due to greater number of tree plants. In the study, the rotation of *Dalbergia sissoo* was 20 year (Azhar *et al.*, 2011).

In 3 Tehsils of District Faisalabad viz; Samundari, Jaranwala, & Faisalabad linear and compact plantations of *Eucalyptus camaldulensis* were evaluated. Economic benefits of those 3 plantations were considered. For *Eucalyptus camaldulensis* linear and block plantations of Short rotations (5-6 years) were most profitable (Majid, 1995) .

Friday *et al.*, 2000) determined the net present worth of 50 acres teak ( *Tectonagrandis* ) plantation. He determined that 35 years rotation was more profitable than 40 or more years rotation.

Posavec *et al.*, 2004) determined the best economic rotation in Croatia for even aged tree stand. The net present value of 20 years and 150 years of trees was calculated. He stated that 20-130 years stand was continuously increasing because the mean annual increment for the stand was increased. But the net value for the age of 130-150 decreased because of decrease in mean annual increment of the stand for the same period.

Tanvir *et al.*, 2002) stated that in different zones of Central Punjab *Eucalyptus camaldulensis* gained maximum volume /mean annual increment in 8<sup>th</sup> year of its growth. Although Maximum increase in volume was in 7<sup>th</sup> year. But the worth of tree don't rise in the ratio to the volume/year. Although the price per tree gradually increased with increase in volume per year but price per cubic foot decreased continuously after 8<sup>th</sup> year .

Therefore, his suggestion is to harvest the tree plants during early age (within 7 year) in order to get maximum income.

Economic evaluation of *Eucalyptus camaldulensis* plantation was carried out. It was determined that the plantations established for the betterment of soil provide more socio economic and environmental values at the age of 11 years. If the plantation is harvested after the economic age then it will surely lead the farmers to economic loss. On the other hand, *Eucalyptus camaldulensis* plantation grown for the purpose of pulp wood production achieved the maximum growth at 5-8 years of age. At this age, there is maximum net present worth and mean annual increment of the plantation. After this economic age, there is a decrease in mean annual increment, so, the owner of the plantation is directed to the economic loss (Niskanen, 1997).

Chaudhry *et al.*, 2003) determined the comparative growth of Poplar under pure stand and agroforestry system. He reported that rotation of Poplar in intercropping agroforestry system was more economic at 4<sup>th</sup> and 6<sup>th</sup> years of age as compared to the pure *Populus deltoids* stand. It was further reported that 8 year rotation age of Poplar was uneconomical for both systems of plantations.