

Environmental and Socio-Economic Impact of Managing Private Forest for Pulp Wood: A Case Study of Kulwalli



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Abstract: *As a captive source of pulpwood raw material, about 2,463 acres of Kulwalli private forest (leased plantation) was managed effectively by West Coast Paper Mills (WCPM) since 1962 and uplifting socio-economic activities in the vicinity by providing livelihood to most of the locals. However, due to misinterpretation of Forest Act and related notifications, the effective management of natural pulpwood resources, managing scarcity of pulp raw material, environmental restoration through afforestation, carbon sequestering and providing income opportunity to locals has been obstructed since 2009. There is a need to review private forest management policies in the interest of public considering its positive impact on environmental and socio-economic development of the surrounding area and national resource management at large.*

Introduction

The plantations are existing near the Kulwalli Village, which is very close to historic place “Chennamma Kittur” in Belgaum district of Karnataka. The place was ruled by RaniChennamma of Kittur who, fought bravely against British rule in Karnataka during 18th century. Kulwalli is a tiny Village consists of a population of about 2783 adult individual as per 2011 census with the livestock population of 3132.

The British had granted around 9978 acres of lands in Kulwalli Village of Belgaum district to Inamdars of Khodanpur for certain services rendered. These lands were classified as Class II Inams. The Bombay Personal Inams Abolition Act, 1952 was enacted and put into force w.e.f. 01.08.1953, wherein un-assessed lands were assumed by the Govt. All the lands of Khodanpur Inamdars were assessed lands as such classified U/s 5 of The Bombay Personal Inams Abolition Act, 1952. Hence the Collector Belgaum restored these assessed lands to the Inamdars vide his Order No. R.B. WTNASR - 4521 dated 30-8-54.

During 1955, the then Bombay Presidency Government, notified around 7965 acres of these lands as Private Forests under Section 35 of the Indian Forests Act, 1927 after issuing notice to the Inamdars. Inamdars are in uninterrupted unhindered possession of these lands.

During 1962 around 2463 acres of these Inam lands in hilly area and rough terrain composing of around 1618 acres of Private Forest lands and 845 acres of waste

lands were leased to WCPM for raising pulpwood plantation, initially for a period of 30 years and upon expiry of this period of 40 years the leases have been renewed by an un-registered deed. The records of rights of the lands leased to WCPM bear the name of West Coast Paper Mills Limited, Dandeli in col no 11 as Lessee. Since then these lands are in un-interrupted possession of WCPM for plantation.

West Coast Paper Mills Ltd., obtained permissions from the Karnataka Forest Department and planted Eucalyptus trees in certain survey numbers. The Eucalyptus trees so grown have been harvested and transported to the mills at Dandeli by obtaining the necessary permissions from time to time.

Eucalyptus trees have been exempted from the purview of the permissions from 1992.

Kulwalli Plantation Model

Entire plantation was surveyed along the periphery by using GPS to get precise area. The land is a rough terrain and hilly area where no other crop can be planted. According to this survey, the plantation covers an area of 8.8 sq kms with a periphery of 29.7 kms. The digital map of Kulwalli plantations was given in Fig. 1.

The area dealt with is pure plantations of Eucalyptus, Acacias, Subabul & Casuarina raised by the West Coast Paper Mills Ltd. on the leased area handed over by the Inamdar family. The plantations dealt with are of Eucalyptus, Acacia's, Subabul & Casuarina species and their clones developed by the Company based on the Company's requirement. The plantations were composed of different clones of Eucalyptus & Acacias

As on today, the details of standing plantation crop are given below in Table No. 1.

Table 1 : Details Of Standing Crop, Species Wise, as on July 2021

Survey N.	Recorded Area, acres	Planted Area, Acres					Approx. Yield, Ton
		Eucalyptus	Acacia	Subabul	Casuarina	Total	
28 TO32	706.3	477.4	20.9	2.7	NIL	501	23046
39A, 9B,37,38,40 TO 45, 54, 55	1079.4	715.7	36.8	NIL	NIL	752.5	34615
74 TO 95	677.45	501	16.6	NIL	2.9	520.5	23943
Total	2463.1	1694.1	74.3	2.7	2.9	1774	81604

Kulwalli Plantation Management : Adopting good private forest management practices

Illicit felling by the nearby villagers is the major problem prevailing in the area. As the requirement of firewood is very high and this will be reduced by providing alternate energy sources and also giving some privileges to nearby Village people to collect fire wood and bark without disturbing the plantation.

Grazing: The entire plantation is closed for grazing. Cattle's are not allowed inside the plantations for any purpose.



Figure 1: GPS map of Kulwalli plantation

suits to varying type of rainfall and edaphic conditions. The quantity of rainfall received over a year varies from 300 mm to 1800 mm over a span of 15 years with little or no variation in the nature of underlying geological formation. The plantation dealt here with may be classified into Dry Deciduous Forest 5 BD/SF1 according to Champion and Seth's classification.

Fire: Occasionally some accidental fire was reported. This problem was tackled by appointing fire watchers during dry season and clearing the fire lines inside and outside the plantation. Controlled burning along the boundary regularly done during the beginning of fire season.

Epiphytes: No epiphytes were present on plantation trees.

Weeds and Climbers: There are very few climbers were found and less weeds were noticed in plantations. Timely weeding operations in the initial years, makes the plantation with the smaller number of weeds. There is no serious danger of weeds was noticed.

Insect Damage: White ants are often found in dry places and its menace is under control. The gall caused by *Leptocybe invasa* has seriously threatened the plantations of *Eucalyptus camaldulensis*, *E tereticornis* species and its clones.

Pulp Wood Source: Impact of over aged raw material on pulping and paper making

Efficient production of Kraft pulp is achieved with eucalypts wood having reasonably high density, slow extractives and lignin contents, high S/G ratio and high xylan with uronic acid contents. Wood containing large amounts of lignin tend to possess lignin with low S/G ratios (ratio calculated by summing up the proportions of Syringyl/Guaiacyl type lignin pyrolysis products) which are hard to process. Age significantly affects the chemistry and morphology of wood and its behaviour in kraft pulping and pulp use. Wood density, extractives content and fibre coarseness increase with age. Eucalyptus hemicelluloses are composed mainly of a xylan unusually rich in uronic acids, which is reasonably stable in kraft pulping. The xylans retained in the kraft pulp substantially improve its refinability. The increase in wood age and density increase fibre coarseness, which negatively affects pulp refinability, but increases pulp drainability (A Da Silva et al, 2008).

The detailed pulping, bleaching and paper making properties for Eucalyptus trees was conducted by Puhan, Gopichand and Patel, 1993 at Pulp & Paper Research, Institute, Jaykaypur. The studies were done under controlled environmental conditions only, but not the pulping and bleaching experiment at plant level for commercial production for the analysis of impact of age of plants (3 years, 5 years and 7 years old plants) on the pulping, bleaching and papermaking properties of pulpwood.

The study shows following inferences based on the overall age of the eucalyptus wood on pulping, bleaching and papermaking properties;

- Proximate analysis of Eucalyptus and Subabul shows that 1% NaOH solubility is minimum in 5 years old plant as compared to 3 years and 7 years plant. This is an indication of better yield during pulping/ cooking process.

- 5 years old tree shows better pulping properties in terms of kappa number, rejects and residual alkali.
- Holo-cellulose is better in 5 years old tree as compared to young or old plants, which is an indication of better pulp yield.
- Bleachability is better in terms of chemical requirement and brightness achieved after bleaching in 5 years old plant as compared to 3 year or 7 years plants.
- 5 years old plant shows better tear factor compared to 3 or 7 years old plants which is an important property for papermaking.
- The abstract of this study shows that the optimum age for the eucalyptus and Subabul pulp wood is about 5 years and more the wood age, pulp and paper quality deteriorate along with impact on overall process operations.

It is therefore can be concluded that the normal rotation of the pulp wood plantation should be about 5 years for better yield, pulping, bleaching and papermaking characteristics.

Therefore, if this plantation activities continued after 2009, then we would have got 2 rotation of crops which is about 1 lac tons every five years which is huge quantity considering pulp wood consumption and good quality of raw materials. With the use of good quality clones of the plants, per acre yield would have been much better than the assumed yield.

However, now about, 12 to 15 years old plants are standing on the Kulwalli plantation area which are guarded by WCPM security without any harvesting activities. This very old plantation will be detrimental to the pulping process and overall paper quality. The rotation of crop for pulp wood would have been more beneficial considering overall environmental, social and economic impacts.

Environmental Impact

Kulwalli plantation is on a rough undulating terrain and hilly areas. It was managed since 1962 and regular plantation were carried out and this total area made green, otherwise, it would have been a barren patch as other agricultural crops cannot be grown on this land.

Plantation on this land provided green cover in the area which has also worked as a carbon sink wherein plants sequestered carbon dioxide and fixed it into cellulose which is used for the paper making. Considering 5 years rotation cycle in the plantation, (about 500 acres or about 200 Ha) of land can be harvested every year.

According to Myers and Goreau, tropical tree plantations of pine and eucalyptus can sequester an average of 10 tons of carbon per hectare per year. 8 Therefore, the plantation can sequester an average of $10 \text{ T} \times 3.6663 = 36.6663 \text{ T CO}_2/\text{ha}/\text{year}$, or, taking an average of 1,000 trees per hectare, $\text{CO}_2/\text{tree}/\text{year}$. Therefore, Kulwalli Plantation (980 Ha area) can sequester about 36000 T carbon dioxide every year which is a huge quantum which would have helped to reduce the impact of greenhouse gases on the environment and increase the green cover (Fig.2).

During harvesting of pulp wood, the main trunk after debarking is used as pulp wood and transported to paper mill for pulping process. The lops and tops are used as fuel wood which is available as free of cost to labours working in the plantation. Also, after debarking, the bark is also used by the villagers as fire wood. On an average, the total firewood available including bark is about 5 T per acres which is huge quantity and is free of cost to villagers. This will reduce the fuel wood dependence on the nearby forest, otherwise, labours extracting firewood for their need from nearby forest is harmful to the nearby natural forest. The purchase of firewood from Markets would be an extra financial burden to the labours and villagers.



Figure 2: Plantation at Kulwalli Land

Social Impact

There are 11 villages adjoining to the Kulwalli plantation and total population is about 6,250 as per the 2011 census. The main source of income in the area is agriculture. All people are dependent on agriculture as there is no industry or other source of income available in the radius of about 25 km.

Since the beginning of plantation in Kulwalli, the manpower deployment during peak time was about 450 man-days per day for the various activities like nursery, plantation, pruning, fire protection, harvesting, wood shifting, loading, security etc. The locals from above villages only available for these activities and were earning for their livelihood.

Kulwalli plantation had provided continuous source of income to many people over the years since 1962 and they were dependent on this for monitory income as well as for firewood. As agriculture related activities are limited to only for a season, this plantation was available for villagers as an alternative job opportunity for plantation and harvesting related activities. The local residents dependent on this plantation now migrated to other cities / villages in search of job opportunities and forced to leave their ancestral homes and marginal farm lands (Fig.3).



Figure 3: Involvement of Local Villagers for Plantation and Other activities

Economic impact

While working for the plantation, harvesting and other related activities in Kulwalli site, the wages were paid to local people and the amount was working out to Rs 175 to 200 lacs per annum during peak time, which is huge amount for the rural economy which is now stopped as all plantation and harvesting related activities are halted.

Since 2009 onwards, only about 30 security guards are on the job in Kulwalli plantation area as all other activities are stopped due to stay by the Hon'ble Supreme Court. This has lost the job opportunity for the locals to the tune of Rs 200 lacs per annum which would have helped the local economy and stopped the migration of labours towards the cities in search of jobs.

In Indian context, the availability of good raw material for pulp and paper making is a major issue. There is shortfall of good raw material for the pulping. This Kulwalli plantation is a good source of pulping raw material which is available to the mills at the vicinity. If this source would have been made available to WCPM, the imported chips which WCPM have imported to meet the wood requirement, would have been avoided and forex would have need saved. If we consider 20,000 T per annum, then about Rs 20 Crores/annum would have been saved and it could be available to locals for their livelihood.

Results and Discussion

Considering the triple bottom line concept of sustainability, Economic, Environmental and Social impact of the Kulwalli plantation, as a nation, we are losing on all fronts of sustainability. Kulwalli plantation was managed sustainably and there was no problem to any of the stakeholder.

However, due to misinterpretation of the Forest Act and its objectives, the plantation and harvesting activities have been stopped since 2009 at Kulwalli which is huge loss to locals considering their only source of income as there is no other revenue source available. If plantation and harvesting at Kulwalli continued after 2009, about 2 lac tons of wood have been made available to paper industry along with all social and economic benefits to locals. There are open land areas available wherein plantation activities would have been done, however, due to stoppage of all activities the open land which was suitable for plantation is now barren land. The intent and objective of management is to develop sustainable plantation for pulpwood and uplift rural economy but can't achieved unless supported by the favourable policies of Government.

Due to stoppage of activities in this large patch of land, local labours have migrated and continue to migrate to cities in search of jobs and increasing load on cities.

Even today the standing crop is ready for harvesting which is about 81,000 MT (Table 1) which will provide employment opportunity for the locals and further growth of the trees will sequester more carbon. This will help the rural economy and sustainable environment as well.

This is against the Hon'ble Prime Ministers' vision of Atmanirbhar Bharat as we are economically dependent on the others countries for pulp wood which is easily available at our doorstep. There is a need to review the potential of our own systems to develop plantations and generate social and economic benefits to the locals. It is possible only when the government agencies and industry work towards the common goals without compromising the requirements of the legal framework.

Conclusions

Kulwalli plantation is to be considered as Farm Forestry rather than a private forest, as this plantation is on the leased land which is complying all regulatory requirements. This undulated barren land was suitable for only plantation purpose and cannot be used for any other crop.

Acts and rules and legal framework is for the benefit of stakeholders. Considering the benefits to all stakeholders, there is a need to debate requirements under Forest Act and suitably amend it looking into how best it can give benefits to all. Even considering the prolonged legal matter pending in the court of law, the activities to be allowed in view of overall benefits to stakeholder rather than losing the valuable resources of the stakeholders.

References

1. Kulwalli plantation documents available with WCPM, Dandeli.
2. P.C. Puhan, K.Gopichand and M. Patel; Growth and pulping of subabul and eucalyptus at 3, 5, and 7 years; IPPTA J., Vol. 5, No. 4, .41 – 46, (1993).
3. A Da Silva Magatonet al, TAPPI J., p. 32, Aug. (2008).
4. Tropical Forests and the Greenhouse Effect: A Management Response," Norman Myers and Thomas J. Goreau, Discovery Bay Marine Laboratory, University of the West Indies, Discovery Bay, Jamaica, 1991. <http://www.ciesin.columbia.edu/docs/002-163/002-163.html>, (1991).