# CABLE YARDING POTENTIAL and ITS CURRENT SHARE IN TURKISH LOGGING

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**Summary**

Forestry and its derivatives are the major players in revenue generation all around the Black sea region in Turkey. Roughly one fourth of the country's land area is covered with forests, which yield a decent 42.2 million $m^3$ annual increment with a 17 million $m^3$ allowable cut. Black sea region is the leading forest area boasting a remarkable 17.7 million $m^3$ of the overall annual increment of the entire country. Since the topography along with the resident forests in this region is formed within medium to steep mountainous terrain, mechanization has always been a matter in logging all around the Blacksea region. As in the case of Black sea region forests, if the topography is highly steep or the forest soil is too delicate to house ground machinery, the harvested trees might be hauled by cable systems, balloons or helicopters. Cable yarding at this point is the only viable choice for steep terrain logging where road building is not practical and economically feasible, but the frequency of their usage is rather low compared to other logging means. In the concept of this paper, the reasons, conditions, preferences and hardship affecting the use of cable yarding possibilities in the Western Black sea region where a number of logging cooperatives are stationed, will be investigated through face to face surveying method. Why these cooperatives are not including mobile yarders in their machinery list, will be looked after. The results will help the cable yarder manufacturing companies to develop new strategies for Turkey's future forest harvesting schemes and also to educate the related parties into their further use.

Key words: Turkish forest operations, logging, cable yarding

## 1. Introduction

Forest(s) is considered as a natural resource supplying the mankind with physical and psychological various economic, ecologic, social and cultural amenities such as nutrition, fuel, shelter, breathable air/drinkable water, medicine, income, employment, relaxation etc. Continuation of this invaluable resource is only possible with the implementation of responsible forest management practices. The term sustainability originally conceived as continuation entered Turkish forestry prior to WWII when some scholars came from Germany and Austria to teach. Both in Turkey and many other parts the world, as the communities have grown, the demand for wood has also increased. This phenomenon at the beginning created an understanding of forests as the resource which could best be managed with an optimum yield and maximum economic profit (Ritter and Duaksta, 2006). This approach both in forestry education and in forest service reigned supreme up until the end of 1950s in Turkey. Although the first ever forest management plan was done in 1917, paving the way to a planned forest administration future, the decisive year was 1963, when the country's overall development plans were drafted, some targets were established for forestry sector, as well. In order to achieve those targets, the first scientifically driven forest inventory was initiated in 1963, and the entire forested area within the country had been inventoried for the following nine years until 1972. According to the initial results of this study published in 1980,

there were 20.2 mil ha. of forest area producing 28 mil$^3$ of annual increment, 23 mil$^3$ of which were set aside for wood production every year (OGM, 2006). The forest area gradually increased during the next 20 years. As of the year 2004, the total countrywide forest acreage reached to 21.2 mil. ha, during which the annual increment also increased to 36.3 mil$^3$, 16.3 mil$^3$ of which were taken as industrial output annually. Finally, according to the results of the last update, 2012, there were 21.7 mil ha forest area in Turkey yielding a decent 40 mil$^3$ annual increment and allowing a 17 mil$^3$ annual cut (OGMb, 2012) (Figure 1). Although the forest land gain of almost 1.5 mil ha in 30+ years has been praised both domestically and internationally, the relative increase can be attributed to other reasons such as, raising the awareness of forest conservation in people's conception, successful afforestation works and projects throughout the nation, the pressures over forest ecosystems have been removed due to population shifts and land use changes and through better inventory techniques, the forest areas that were not tallied in the past, have been included in the later inventories. Besides, sustainability concept in forestry has forced the forest practice in Turkey to adapt new strategies because water, soil, game and recreation related issues, which were undermined previously are at stake today , so the trend has shifted from growing/harvesting to growing/ somewhat harvesting and mostly maintaining and keeping.

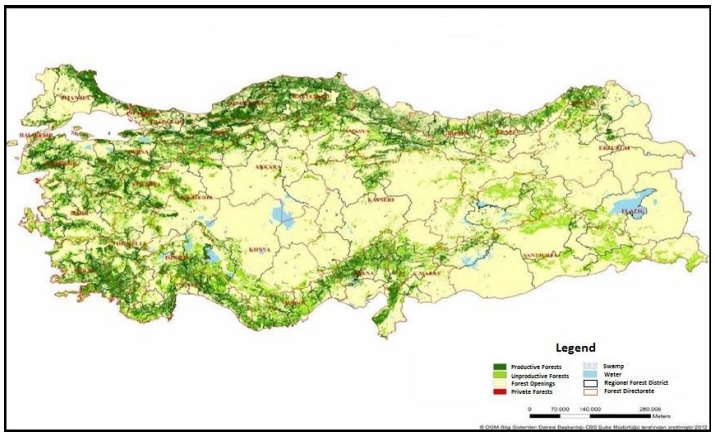


Figure 1. Turkish Forest Distribution Map (OGMb, 2012)

Turkey's forests can be found in rather mountains coastal regions where the elevation ranges from sea level to upwards of 2000+ meters, topography is very treacherous and more than 60% of the entire forest resources of the country are on these difficult terrains (OGM, 2006). In the absence of other harvesting and planting technologies formulated for low land forests, cable yarding is one long proven logging means suitable on mountainous terrain (Schonenberger, et. al. 2004). However, Turkish example is way behind of what is needed.

## 2. Forest roads and Mechanization

### 2.1. Forest roads

Turkish forestry practices as in many other parts of the world have been shaped around accessibility to forest areas consequently to timber resources. Since majority of the country's forests are located on mountainous terrain running along the Black, Aegean and Mediterranean sea coastlines, accessibility to forests and their amenities have always been the primary objective. Nationwide forest road network initiative was first devised in 1964

(Bayoglu, 1997). Since timber production had the utmost importance back then, there were no specific criteria in forest road construction, so road projects were planned and laid out, depending on the standing volume estimates in hectare (Table 1). Technical, economic and administrative activities of forest directorates were designed to take place through this road network. Up until 1974, 1168 forest road plans was drafted and materialized.

Table 1. Forest road network planning figures based upon standing timber volume in 1970s

| Standing volume ($m^3$/ha) | Road density (m/ha) | Road spacing (m) |
|---|---|---|
| ≥250 | 20 | 500 |
| 100 – 250 | 10 | 1000 |
| ≤100 | 7 | 1500 |

This first phase of the forest road planning which foresaw a 144425 km road construction began only to be implemented within productive forests. Soon, it was realized that this forest infrastructure update would not completely answer nations growing needs, so in 1980 a new legislation mandating unproductive, coppice, erosion prone, national park and recreation related areas to be also planned for accessibility. Through this new understanding, various other factors such as site, projected future stock, topography, degree of susceptibility to forest fires, etc. were also evaluated in the planning stage, however road density and spacing were again arranged, depending on the standing volume estimates in ha (DPT, 2001). 108808 km new forest road were constructed and added to the national grid, bringing the total length to 129499 km in 1998. Since the beginning of the new millennia, as the previously undermined factors were increasingly included in forest road planning, the overall target was again updated and set at 267976 km to effectively and sustainably manage the nation's forests (OGMa, 2012), as of today, more than 87% of it is in service.

Today, forest road density is nominally calculated as the ratio of forest road (m) to forest area (ha). According to the most up to date notification, the above phrase translates to "20m/ha" which is the common practice to be applied for forest roads (Notification 202, 1984). Percentage-wise, this means that both current roads and future ones to be constructed, not to exceed 1% of the total forest area (Notification 292, 2008). Forest roads are constructed as "Type B secondary". When the standard road width is taken as 5 m (4m road bed + 1 m ditch), the justification of 1% can be explained as follows (Figure 2):

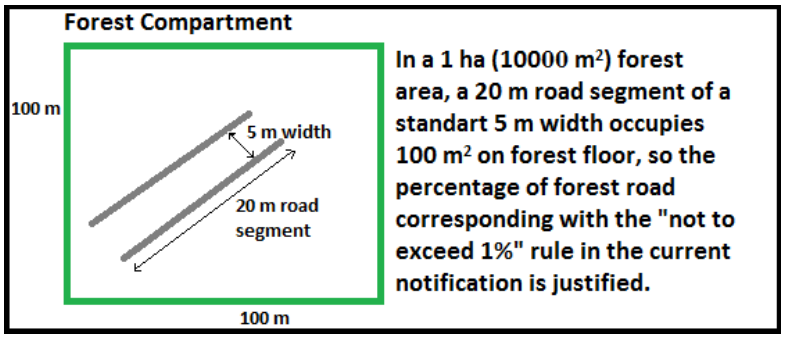


Figure 2. Current forest road construction scheme in Turkey

## 2.2. Mechanization

The first ever examples of mechanization, although confined in a rather small but very productive region in the central Blacksea region, Ayancik Forest Enterprise, were brought and constructed by a Belgium firm which signed a business undertaking scheme with the Turkish state to administer the region's forest for 50 years in 1928. Although the agreement was nullified by the Turkish government on the grounds of over exploitation of the forests in 1945, the firm constructed 32.3 km spar tree type stationary skyline and 92.8 km narrow gauge railways until annulment (URL 1, 2014) (Figure 3).

Figure 3. Forest railway in Ayancik Forest Enterprise in 1930s

If considered independent of the forest road planning and construction, the nationwide mechanization attempt was first initiated after a FAO delegation visited Northeastern Blacksea region and forests in 1967 and recommended the use of skyline systems, so Turkish forest service acquired BACO and WYSSEN spar tree long distance skylines. Starting from the early to mid-1980s forest service started importing mobile and sled type yarders, and 4x4 skidding tractors i. e. Koller K300, Urus MIII, Gantner yarders and Mercedes Benz "MB_TRAC-800, 9000 and 1000, 1100" forest tractors and also started equipping the ordinary farm tractors with drum type winches for skidding and hauling the felled logs up slope to landings. Ever since they were imported into the country, forest service has been the owner and the authority on how and where they are employed. They have only been leased to the people doing the logging work on the field on the basis of piece rate per harvest unit. The rate was the culmination of machine(s) amortization, fuel and operator costs and still is today. Scholars from around the country produced quite a lot of work from productivity to environmental gains, explaining and validating the practicability of mechanization in Turkey (Gumus et. al, 2010, Ozturk, 2009, Eroglu, et. al., 2010). Unfortunately, this mechanization attempt has not been embraced by the people doing the logging work in the field so the forest service and the state gradually decided not to import anymore of the ever developing technology. Thus, the equipment purchased in the 1980s has kept getting older and outdated due largely in part by the logger legislation in the constitution, not having a strong logging sector like in the US, Canada or Europe and increasing forest road network expanding projects. Besides, as in many other parts of the world, people approach to cable yarding cautiously because of the facts that they are rather

expensive to own at the first place due to initial investment and high labor costs and little production when compared to other ways (Olund, 2001)

### 2.3. Logging and Loggers

Large part of Turkey's forests rests on the coastal zones; Blacksea coast having 53%, Aegean coast 23%, Mediterranean coast 10%, and the rest of the country having a mere 14%. According to the last inventory of 2012, there is an annual increment and allowable cut of 42179115 $m^3$ and 16995201 $m^3$, respectively. Thus, forestry and its derivatives generate approximately $ 1 billion annually, which is about 0.5 % of the national Gross Domestic Product (GDP) (Kayacan, 2007). Although the figure seems relatively distant from becoming a major contributor to a country's economic growth, it is directly linked to almost 7 million people called forest villagers, including the actual loggers and their immediate families (Toksoy et. al., 2005). Harvesting is the one and possibly the most important income generating profession for this part of the population living in or around forests. They inhabit the areas where forests are and work in every known forestry related operation from site preparation, planting the seedlings and tending the stands in every stage of the growth process to harvesting and transporting them to where they will be introduced as raw timber. Although there are other various means of making a living out of the forests like non-wood forest products, eco-tourism, agriculture, grazing, beekeeping, etc. they are mostly considered as seasonal, which leaves the yearlong forest production along with the logging the only permanent occupation (Altunel, 2010). Forests and forest production are so interlocked with these people that even their well-being and employment is defined in the Turkish constitution (URL 2, 2014) (Figure 4). They form forest cooperatives, which, to an outsider, can be viewed or considered as lightly mechanized logging companies because they work mostly with hand tools, i. e. chainsaw, axe, hookaroon, etc., doing all kinds of cutting, felling, limbing, debranching, debarking, cross-cutting, classification, extraction, loading and transporting (Gallis, 2006) and operate farm tractors for skidding, which can be doubled for plowing the field .

Figure 4. Forest villager, logger

Today, there are about 4000 established and currently operating forest cooperatives in Turkey. As expected, they are predominantly concentrated in forest areas (OR_KOOP, 2014) (Figure 5).

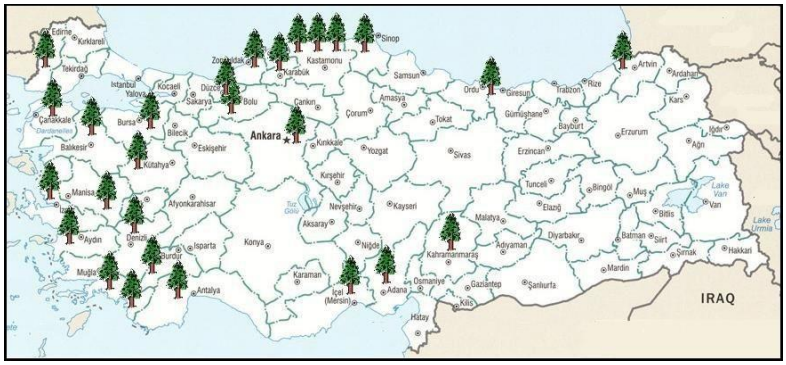


Figure 5. Regional forest cooperatives headquarters

## 3. Study area

The entire land mass of Turkey was divided into 27 regional forest districts (OGMb,2012). The study will be carried out in the heavily forested Western Blacksea region of Turkey encompassing the Kastamonu, Zonguldak and Bolu regional forest districts which have 191390115 $m^3$, 112712260 $m^3$ and 119144419 $m^3$ standing volume and 5292311$m^3$, 2774297 $m^3$ and 2885708 $m^3$ annual increment, respectively (Figure6).

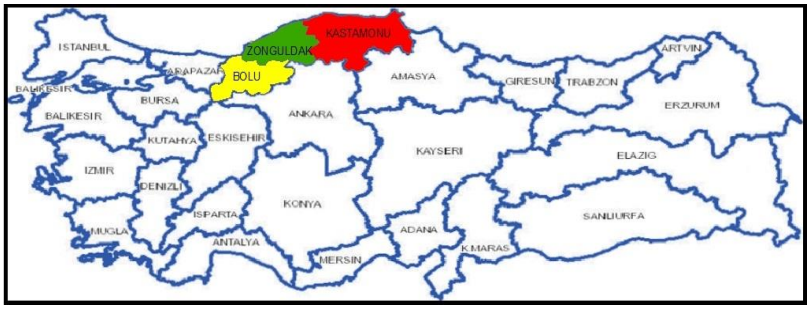


Figure 6. Western Blacksea Region, Study Area

In the 1980s when forest service started importing predominantly short to medium distance mobile yarders, they were distributed among the regional districts which the ones along the treacherous Blacksea coast took priority. As of the year 2004, from the 37 operational yarders, 7 were in this study area (Senturk et. al, 2005). Within the context of our study, when we cross checked all three regional districts, we heard from each district's officers that no yarder logging was present and will not likely to be ever present in the future. This study will look into the reasons why cable logging has become extinct in the Turkish Western Blacksea forests. Since the topography and the conditions are the same, what drove the cable logging operation out from the region once they were the effectively used means of logging.

## 4. Methodology

The forest cooperatives, Turkish logging firms, formed and operating inside the study area from 3 regional districts were called and asked the question of if they ever had any experience with cable logging in their operations. As this paper was being written, calls to 2 of the districts cooperatives were completed and produced enough feedback for us to go to them and to their respectable state foresters to apply a face to face survey/questioner to

assess the reasons from logger and official forester perspective as to why cable logging is driven out of the region and what other logging methods replace it today. When all the remaining districts cooperatives are called and the ones which the survey will be applied are determined, the field study which will question every logger and forester on the field will be executed in the Summer of 2014.

## 5. Results

During the material and literature collection of the study, especially from Kastamonu region, many logger and state forester were contacted and the immediate reasons were asked on the phone. Although interesting and globally accepted and proven answers were taken from this initial screening, the answers such as because the machines are so obsolete and outdate that they broke all the time, the forest service employed operators are not as good as the ones in the old times and, the road network is almost complete that there is no place we cannot access, made us think that the environmental protection is not in the agenda of Turkish logger. From the loggers' point of view, mechanization is limiting their work hours dropping their men count considerably, so they do not want it. As long as the harvest track is logged and the loggers get paid by the forest service, no one, willingly or unwillingly, cares about how the harvest is completed, what adversities will occur in the future due to not very ideal practices. Thus, it became evident to us that they press the forest service to expand its road network to even unsuitable places where cable logging was the only option in the past. With this initial feedback in mind, a 25 question questioner emphasizing the forestry and environment awareness was prepared. As mentioned previously, It will be applied to loggers and the official foresters a like in the Summer of 2014. It is expected that given the conditions of the remaining yarders, their removal from the region is somewhat validated, but forestry practice in these and other similarly conditioned regions of Turkey is very far from ideal, environmentally.

## 6. References

Acikgoz Altunel, T., 2010, Socioeconomic Dimension of Non-Wood Forest Products in Turkey and in the World, Unpublished Phd Dissertation, Istanbul University, p. 252.

Devlet Planlama Teskilati (DPT), 2001, Eigth five year development plan, Forestry specialization report (2001-2006), ISBN 975 . 19 . 2555 – X, p. 533 (in Turkish).

Bayoglu, S., 1997, Orman Transport Tesis ve Taşıtları (Forest Roads), Istanbul Universitesi, Orman Fakültesi, ISSN 975-404-430-9, Istanbul, p. 446.

Eroglu, H., Sariyildiz, T., Kucuk M., Sancal E., 2010, Effects of Logging Techniques on Physical Properties of Forest Soils in Oriental Spruce Stands, Suleyman Demirel Universitesi, Orman Fakultesi Dergisi, Seri A, Sayı 1, ISSN: 1302-7085, pp. 30-42. (in Turkish).

Gallis, C., 2006, Work-Related Prevelance of Musculoskeletal Symptoms Among Greek Forest Workers, International Journal of Industrial Ergonomics 36, pp. 731-736.

Gumus, S., Acar, H. 2010, Evaluation of Consecutive Skyline and Gravity Skidding Systems in primary forest transportation on steep terrain, Journal of Environmental Biology, January 2010, 31, India, pp. 213-218.

Kayacan, B., 2007, Forestry Sector in the National Economy: Results of Descriptive Input_Output Analysis. Ulusal Ekonomide Ormancılık Sektörü: Tanımsal Girdi_Çıktı Analiz Bulguları, Milli Productivite Dergisi, Verimlilik Dergisi, 2007/1, Ankara, pp 147-176.

Notification 202, 1984, Forest Road Planning and Construction Manual, Ministry of Agriculture, Forestry and Rural Affairs, Forest Service, Department of Construction, Ankara, Turkey, p. 497, (in Turkish).

Notification 292, 2008, Forest Road Planning, Construction and Maintenance, Ministry of Environment and Forestry, Forest Service, Department of Construction and Transportation, Ankara, p. 338, (in Turkish).

OGM, 2006, Orman Varlığımız, T.C. Çevre ve Orman Bakanlığı, Orman Genel Müdürlüğü, Ankara, p. 59 (in Turkish)

OGMa, 2012, OGM Faaliyetleri 2011, 2012, T.C. Orman ve Su Isleri Bakanligi, Orman Genel Mudurlugu, Ankara, p 145, (in Turkish).

OGMb, 2012, Turkiye Orman Varligi, T.C. Orman ve Su Isleri Bakanligi, Orman Genel Mudurlugu, Ankara, p 25, (in Turkish).

Olund, D., 2001, The Future of Cable Logging, The International Mountain Logging and 11th Pacific Northwest Skyline Symposium, pp. 263-267.

OR_KOOP, 2014, Türkiye Ormancılık Kooperatifleri Merkez Birliği, p 88 (in Turkish).

Ozturk, T., 2009, Productivity of timber extraction by URUS MIII cable crane from selective spruce forests, African Journal of Agricultural Research, Vol. 4(9), September 2009, pp. 852 - 858.

Ritter, E., & Dauksta, D., 2006. Ancient values and contemporary interpretations of European forest culture—reconsidering our understanding of sustainability in forestry. In *Proceedings of IUFRO 3.08 Conference, Galway, Ireland*. pp. 18-23.

Senturk, N., Ozturk, T., 2005, Evaluation of Timber Extraction Machines in Turkey, American Journal of Environmental Science, 1 (1), ISSN 1553-345x, pp. 81-85

Schonenberger, W., Brang, P., 2004, Site Specific Silviculture/Silviculture in Mountain Forest, Elsevier Ltd. Pp. 1085-1094.

Toksoy, D., Ayaz, H., Sen. G. Ozden, S., Forest-Villagers Relationship in Eastern Black sea Region, Doğu Karadeniz Bölgesinde Orman Köylü İlişkileri, Kafkas Üniversitesi, Artvin Orman Fakültesi Dergisi, 6 (1-2), 2005, pp. 70-85 (in Turkish).

URL1. http://kentvedemiryolu.com/icerik.php?id=580, Kent ve Demiryolu, accesses on June the 10th, 2014

URL 2. Forest Law #6831, "*web.ogm.gov.tr/.../6831_**Orman**%20**kanunu**.doc" (in Turkish), accessed on June the 9th, 2014.*