

## MECHANIZATION PROBLEMS ON HARVESTING IN TURKEY

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### ABSTRACT

The objective of this study is to summarize major problems of mechanized timber harvesting in Turkey. Mechanization of timber harvesting plays a significant role on providing standard quality of raw material into market, preventing soil damage, and increase total harvesting productivity. Mechanized harvesting techniques are widely used in central European countries. Almost 80 percent of harvesting activities are mechanized in many European countries while this value is only 5 percent in Turkey. Timber harvesting in Turkey is still carried out by manual methods due to economical, social, and environmental constraints, Lack of well developed forest road network is also another factor affecting adversely development of mechanized harvesting in the country.

**Key words:** Mechanization, Harvesting, Logging.

### 1. INTRODUCTION

Timber harvesting is transportation of useable wood and non-wood products from forests to where such materials will be converted in finished products. It is important that value of the products should be maximized while the cost is minimized within the consideration of environmental and other constraints.

The main goal of the mechanization in production is productivity. Productivity is a technical-mathematical term and it can be defined as a ratio among output (amount of obtained product in a production process) and input (used and/or consumed resources for these amount of product) (Seçkin 1985).

The Turkish Forests covers 20.2 million hectares which is 26% of the country. These forests is constituted 8.9 million hectares productive and 11.3 million hectares unproductive forests. Annual production capacities are approximately 7.5 million m<sup>3</sup> and 12.9 stere wood from high quality forests and coppice forests, respectively. Mechanization on harvesting has began with use long distance winch skylines in our country in 1949. Wyssen, Baco and Hintereger marked 21 set skylines widely used in the northeast forests of Turkey. FAO experts from Wettstein and Nipkow organized workshops for Turkish Foresters. Furthermore, attain to standard of production in developed countries has been going on in Turkey. It is believed that mechanization of timber harvesting will be improving in near future in Turkey. Mechanical park has been improved from the point of view type and amount. These amount has reached to 27 mobil

skylines, 43 skidding winches, 85 forklifts, 55 loaders 152 tractors, and 71 trucks as of 1982.

Park at the production machinery has also improved having 35 tractors (4x4 and assembled shovel), 286 skidding winches, 6 tractors with equipment of snow cleaner, 63 forklifts, 53 loaders, 47 skylines, 260 agricultural tractors, 12 agricultural tractors with shovel, 11 barking machines, and 7 chippers as of 1998. In spite of existence of substantial number of harvesters, the amount of modern harvesting processor in Turkey is not sufficient. Different type and marked machine hasn't taken into consideration to improve mechanization and a poor standardization in harvesting is another problem in our country.

Besides, these production machine generally uses subjective and out of aim because of technical inexperience. Also closing of repair shops due to suffer harm effected situation of production machine. To repair, to maintenance and to obtain spare part of these machine are forced (Hasdemir and Çıtırk 1997).

Overall ratio of mechanization is relatively low. Approximate percentages of handskidding, animal skidding, tractor logging, and cable harvesting are 72%, 15%, 6%, and 5%, respectively (Erdağ 1993). These values also suggest that timber harvesting techniques in Turkey should be improved by mechanization.

Today, mechanized timber harvesting is successfully used in many European countries and it increases both productivity and efficiency of total harvesting

operation. Various parameters, namely road network, topography, raw material characteristics, market demand, labor cost, initial equipment cost, long and short term objectives should be analyzed to have mechanized harvesting procedure. Based on the above factors the for mechanized timber harvesting in Turkey was initiated in the form of distance winch skyline around 1949. However, these applications did not last for a long period of time due lack of well designed forest roads, ineffective administration, and poor technical organization (Hasdemir 1992).

Significance of mechanized timber harvesting was also emphasized in a symposium entitled "Mechanization of Forestry and its, Productivity" held in 1985 in Turkey. Current mechanized harvesting applications. New approaches were introduced at the above symposium. However there has been very little development in the area since then.

Recently, Turkish Forest Service established a comprehensive project reintroduce mechanization in harvesting operations. The project is still going on and would contribute some improvement in harvesting techniques in Turkey.

## 2. SITUATION OF MECHANIZED TIMBER HARVESTING

### 2.1. Primary Transportation

Primary transportation is moving timber from the harvesting site to the landing area. Cutting, bucking, skidding, landing, and unlanding are some of the major activities of primary transportation. Based on the results of several studies, non-mechanized (manual) cutting and skidding are relatively inefficient and more expensive than that of mechanized techniques. Primary transportation is generally 25-50 percent of total cost of the harvesting activities (Aykut et al. 1997). Therefore, application of mechanization of skidding such as introduction of grapple skidder or using feller-buncher in cutting phase of harvesting will not only reduce total cost but also increase productivity

Some of the central European countries such as Germany, and Switzerland have been using tree height log cutting method with combination of mechanized harvesting techniques (Erdaio 1986). This would be applied to harvesting in Turkey as long as forest road conditions are improved. Otherwise application of mechanized harvest methods used in developed European countries may results in a certain adverse

effect as total harvesting operation in terms of cost and using labor force.

### 2.2. Secondary Transportation

Secondary transportation which can be defined as moving of material from landing area to its final stop. Mechanization of harvesting with secondary transportation mode was introduced relatively new in Turkish forestry animal carriage left its place to rubber tired tractors (Bayoplu 1988). However, again forest road network puts some pressure on the development of mechanization during secondary transportation.

## 3. CONCLUSIONS AND RECOMMENDATIONS

Within the scope of this brief study, the following remarks can be concluded about applications of mechanized timber harvesting techniques in Turkey.

First of all, harvesting plans should be analyzed based on today's forest conditions before any solid decisions are made.

Road conditions must be improved with regard topographic and silvicultural factors. Slope of primary and secondary roads should be clearly analyzed and combined with harvesting area and final destinations.

Turkey is a developing country, it may look as efficient way to use manual harvesting methods at the time. However, it is important that consider long term-harvesting plans which will require mechanization so that total harvesting cost will be reduced in long term. Therefore, initial investments should be considered for mechanization.

Forest villagers should be included in logging plan, and their involvement may play important in long form in mechanized harvesting. Government should arrange credit to finance initial cost of mechanized harvest equipment owned by local forest villagers. Training of villager should be achieved in the form of short workshop, (Hasdemir 1992).

Forest main repair shops should be opened over again in Turkey.

Level of mechanization should be determined for all of the country and then machine park should be standardized.

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