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## NEWFOR – New technologies for a better mountain forest timber mobilization

### Work package 7: Cost & Benefits evaluation

#### Action 7.1: State of the art on the tools and methodologies currently used in Slovenia

Prepared by:

Matevž Triplat

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GOZDARSKI INŠTITUT SLOVENIJE  
SLOVENIAN FORESTRY INSTITUTE

The calculation tool (CT) is structured so that key data, calculating values and their graphical representation are all shown in a single data sheet. These sheets are arranged in groups of machines and their size categories. Each sheet presents completed data and calculations for a particular machine, device or equipment. On first page you can find basic information about the machine (brief description of the machine, possible operation modes and presentation of individual sets). Technical features are summarized according to the specifications of the manufacturer and in most cases refer to a serial equipment of machines. All technical features are given in international units of measurement.

On the other side of calculation sheet is intended to show costs calculations based on data shown on first sheet. The main input data for calculations are given in tabular costs (for example.: purchase price for selected machine, the percentage of the purchase price at the end of economic lifetime, economic lifetime of machine in working hours, break-even point calculated in working hours, operational utilization rate,...). The main part of calculation worksheet is a tabular presentation of direct material cost for machine according to the annual utilization hours of operating.

Our CT is mainly focused on direct material costs. Our calculations methodology follows FAO/ECE scheme recommendations and is comparable to methods used in Central Europe. Here is a list of input data and parameters that we use for costs calculations:

- Net purchase price of machine and its value at the end of economic life, which defines the liquidation value (expressed as a percentage of the purchase price of the machine).
- Depreciation of the machine is calculated at the constant rate for each year of machine utilization life. Replacement of spare parts according to usage is also taken into account of depreciation.
- Maintaining factor is presenting the costs of repair and maintenance. Its value is the sum of cost for repairs and maintenance in the economic life according to purchase price of the machine.
- Interest of investment found for average lifetime year of machine are calculated from the sum of annual interests. In practice, this means taking account of profit on invested capital in the cost of mechanical work.
- Insurance cost, fees, vehicle registration and cost required for a garage is presented in factor of insurance, which is expressed as a percentage of the purchase price of the machine.
- Break-even point or uptime operational degree is assumed according to the period of desuetude and economic lifetime in operating hour per year. It represents the minimal annual utilization of machine in average, so it does not desuetude. If the machine is utilized under the break-even point, then the depreciation is calculated on the basis of the technological age





limitations.

- For fuel cost we took average price of mineral oil (including all taxes). Consumption of lubricants for engine is basically defined as the percentage of fuel costs. Fuel consumption for each machine is specific and is taken from manufacturer's data, research data or experimental data from users.

CT does not consider cost of establishing and dismantling cable installations, movements of the machines between the working plots. It also does not consider the cost of supportive work time or disturbance time (including workers meal time). Congestion of the machines for field repairs and maintenance are treated by factor of repairs and maintenance over the lifetime of machine.

In future we are looking forward to develop online application for calculations of all forestry costs. Our development is based in the way of making a user friendly tool, where users will be able to set its own input data and get our the exact cost calculations for each used technique.

Picture 1: Example of calculation sheets

Kalkulacije stroškov gozdarske mehanizacije 2009  
Traktor kolesnik za delo v gozdu  
Deutz Fahr Agroplus F 90

**Proizvajalec/zastopnik**

Same Deutz-Fahr Deutschland GmbH, Deutz-Fahr Strasse 1, 89415 Lauingen, Nemčija. /

**Namen uporabe in opis**

Kmetijstvo in gozdarska opravila (vlačenje, prevoz s priklopnim vozilom).

**Tehnične značilnosti**

Zmogljivejši traktor namenjen splošni kmetijski rabi, ki pa je zaradi svojih zmogljivosti ob ustreznih nadgradnjah uporaben tudi za delo v gozdu. Vodno hlajeni 4 litrski Deutz (Euro II) 1000.4WT. Moč pri 2200 obr./min 70 kW (87 konjskih sil). Konstantno število obratov 1400—1600/min. Glavni rezervoar za gorivo 45 l + dodatni rezervoar 40 l. Največji vrtilni moment 348 kN. Rezerva navoja 31%. Zavore hidravlične diskaste. Rezervoar hidravličnega olja 12 l, pretok hidravlične črpalke 54 l/min, pritisk 180 bar. Kot zavijanja s priklopnikom 60%, radij zavijanja 3,25 m, pretok hidravlične črpalke 26 l/min. Obrežitev zadnjega priključka 3000 kg, zadnjega 1500 kg. Možnih več različnih dimenzij pnevmatik: spredaj od 260/65 R16 do 340/65R18 (tudi R20), zadaj pa od 360/70R24 do 440/65R28. Medosna razdalja 2070 mm, dolžina 3765 mm. Višina brez klimatskega agregata 2168 mm, z agregatom 2288 mm. Višina prehod 260 mm. Teža 2740 mm, spredaj 1120 kg, zadaj 1620kg. Največja obrežba spredaj 880 kg, zadaj 1280 kg. Največja skupna dovoljena obrežba 2160 kg. Osnova obremenitev: spredaj 2000 kg, zadaj 2900 kg. Skupaj osna obremenitev 4900 kg.



Stran 93 *Strokovna in znanstvena dela 215*

Vhodni podatki		Izkoriščenost stroja (ou/leto)	Neposredni materialni stroški (EUR/ou)	Stalni stroški (EUR/ou)	Spremenljivi stroški (EUR/ou)
Nabavna cena (EUR)	41.808				
Likvidacijska vrednost (%)	10	300	34,98	25,41	9,56
Življenjska doba (ou)	8000	400	29,74	19,88	9,85
Amortizacijska doba (let)	8	500	26,78	16,75	10,03
Povprečno število delovnih ur na leto	1333	600	24,97	14,82	10,14
Razmerje (ou/du)	0,75	700	23,80	13,58	10,23
		800	23,05	12,76	10,29
		900	22,57	12,23	10,34
		1000	22,28	11,90	10,37
		1100	22,05	11,68	10,37
		1200	21,86	11,49	10,37
		1300	21,70	11,33	10,37
		1400	21,56	11,19	10,37
		1500	21,45	11,07	10,37
		1600	21,34	10,97	10,37
		1700	21,25	10,88	10,37
		1800	21,17	10,79	10,37
		1900	21,10	10,72	10,37
		2000	21,03	10,66	10,37
		2100	20,97	10,60	10,37
		2200	20,92	10,54	10,37
		2300	20,87	10,49	10,37
		2400	20,82	10,45	10,37

  

Povprečno število delovnih ur na leto	1333	+ 50 %	- 50 %
Neposredni materialni stroški (EUR/du)	16,71	16,08	20,08
Primerjalna cena (EUR/du)	26,19	25,56	29,56
Lastna cena (EUR/du)	32,85	32,23	36,23

  

Traktor kolesnik za delo v gozdu Deutz Fahr Agroplus F 90

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