Vineyard mechanisation in Douro Demarcated Region.

Introduction
The vineyard mechanisation is more than the chose of traction units and the right technical and economical equipments best fitted to each situation, but it is necessary to keep the best functionality. So, with this purpose, we have been doing, in the project "Vineyard mechanisation in RDD" scope, some engine performance tests, namely the characteristics curves determination.

Material and methods
In this tests it is used a electronic dynamometer, mark Froment, model XT - 200, connected by a acquisition board to a computer, that allow saving the power take off regime, the power and the torque developed by the engine.; this stopper is trailer mounted which makes is dislocation easier.

Figure 1- Electronic dynamometer used in tests
a- parking brake b- prop stands or corner steadies c- jockey wheel with level adjuster d- seven pin trailer plug for highway lighting e- coupling to suit 50 mm ball f- canopy g- side curtains large h- side curtains small i- end curtain j- speedlite lamp.
Source: Instruction manual of "Froment Tractor Test Center". (1991).

The methodology use consist, basically, in the connection between tractor and the dynamometer and, after the engine warm up, put it running to the maximum speed, beginning now, to increase gradually its charge; this charge is introduced using a hand held control unit (figure 2) that show the developed power and the engine regime.

Figure 2- Hand held control unit
a- digital readout speed b- digital read out speed selector switch 540 or 1000 rpm c- digital read out power d- digital readout selector switch hp, cv, or kW e- fine load control f- coarse load control.
Source: Instruction manual of "Froment Tractor Test Center". (1991).

The power and torque related data, according the engine regime, as it is graphic representation, are saved in a hand computer. The computer screen, besides the tractor information (tractor details) and the introduced program variables, that will be used by the dynamometer (dynamometer setup), presents a resume of the measured data and the settled ones (summary of tests).
The dynamometer relationship data (dynamometer data) are only presented during the tests, which allow knowing the power, regime and torque at each moment.
The data saved in a file has the "dat" extension, which allow to import it by a worksheet to analyse later; the power take off regime is convert in engine regime and the torque is divided by ten, to make easier the graphic interpretation.

Results
The dynamometer data reached are, at the maximum engine regime, the power and torque sufficient to overcome the transmission friction, at the nominal regime, the power (nominal power) and the corresponding torque, the maximum torque and corresponding regime (the power isn't useful in this situation) and the regime correspondent to the normalised power take off speed and its power.
Besides the presented data the software allow to determine the torque backup ratio (RB, in %), the speed decrease ratio (SDR, in %), the relationship between RB and SDR, named gain factor (GF).
The worksheet, where each line represents a tractor and the columns the variables, the data are compare each others (tractors of same mark and model) and with the new tractors which, together with the characteristics curves, allow to diagnose the engine performance.

Conclusions
The existence of a important area that can be mechanised justify to go on with the support projects for the vineyard mechanisation and keep the studies that has the purpose the mechanisation level improvement.
The studies and projects done in the last twenty years allowed, in a general way, define mechanisation strategies for the different installations types but, for the definition of specific situations, it is necessary to make a strictly analyse, which presuppose a technical attendance and financial resources.
The equipments definitions, technical and economical best fit for each situation, need a good equipment maintenance, why its functionality must be keep. So, with this purpose, the project AGRO 163 "Vineyard mechanisation in RDD " has been appreciating the equipments performances, namely the traction and spray units, to rectify casuals deficiencies.