MECHANICAL HARVESTING OF WINE GRAPES

10. COST OF MECHANICAL HARVESTING AND HARVESTING BY HAND

It is very difficult to directly compare the costs of mechanical harvesting and harvesting by hand. In both cases there are different cost components to take into account. These cost components vary depending on the method of harvesting. Different aspects of harvesting by hand can be mechanised and this differs from farm to farm, which means that the cost of harvesting by hand varies.

10.1 Experience abroad

- For the total 1990 harvest in Australia, machine harvesting costs were 45 % of the cost of harvesting by hand, while it was 50 % in 1991. Depending on the yield per ha, machine harvesting was between 70 % and 79 % cheaper per ton than harvesting by hand.
- The harvesting of grapes is the second biggest cost after pruning. The high cost of harvesting by hand limits its use to only high quality grapes. Be warned that there are other associated costs with machine harvesting, which must be taken in to account. On paper it appears that mechanical harvesting is cheaper than harvesting by hand. Keep in mind though that harvesting by hand does have advantages compared to mechanical harvesting, e.g. where grapes are selected for a specific winemaking purpose. In California mechanical harvesting costs are estimated to be between 40 % and 50 % of the cost of harvesting by hand. Two to four harvester operators do the work of 60-70 hand-harvesting labourers.
- In certain parts of the states of California and New York 90 % of vineyards are mechanically harvested.
- Mechanical harvesting is not popular in Oregon because the machine cannot leave Botrytis grapes behind in the vineyard. The fears of producers in this area that the quality of their wines will be adversely affected also limits the expansion of mechanical harvesting.
- In the Central Valley of California 95 % of grapes is already mechanically harvested – it is estimated that this can increase to 99 %.
- With the harvesting of Chardonnay in the Napa Valley the following conclusions were made:
    - The total mass of grapes harvested did not differ significantly between mechanical harvesting and harvesting by hand.
    - The bunch stem mass of mechanically harvested grapes was less at pressing than that of grapes harvested by hand.
    - With the mechanically harvested vineyards, significantly fewer clusters were left on the grapevines than when harvesting by hand.
    - Losses on the ground were not significantly different between mechanical harvesters and harvesting by hand. The hand-harvesting team did not pick the late bunches, while the harvesters in contrast shook just about everything off the grapevines.

- The percentage of material other than grapes (MOG) was respectively 0.5 % when harvesting by hand and 1.3 % with mechanical harvesting.
- When all the potential points at which juice loss could take place were taken into account, the juice loss as a result of mechanical harvesting was 5.7 %.
- In this experiment the hand-harvested Chardonnay delivered the highest yield, although it was not significantly different from mechanical harvesting. During pressing, hand-harvested grapes also yielded the highest volume of juice per ton.

10.2 Local experience

- In South Africa there are suppliers of grape harvesters who have negotiated long term contracts with producers for mechanical harvesting. More than one operator is supplied, which results in longer harvesting hours. The producer must then ensure sufficient transport of the grapes to keep the harvesting process continuously going. Also included in such agreements are the maintenance, repairs and washing of the machine.
- There are also organisations which ship harvesters to South Africa during the off season in Europe so that they can work two harvests per year with their machine. In this way they increase the return on their capital investment.
- In South Africa there are producers who unite to buy harvesters jointly. They also pool their trucks to transport the grapes to the relevant cellars. The co-operation between these producers and their cellars must be such that everyone gets an equal chance to pick their grapes at the optimal degree of ripeness.

10.3 Cost of harvesting by hand

These costs are dependent on many factors:

- Permanent labour force, temporary workers or independent contractors (differs from labour brokers).
  - An independent contractor is paid to perform a specific task (e.g. harvesting of grapes) with his own labourers, supervision and equipment (e.g. containers and pruning scissors) at an agreed price. As soon as the task has been completed, the contract is completed.
  - In the case of a labour broker, only the labourers are supplied for a period, to perform certain tasks with the producer's equipment, under his instruction and supervision.
- Day work – Irrespective of the amount of grapes harvested during the day, the labourer is paid per day.
- Incentive systems – consideration and piece-work principles.
- Sectoral determination of minimum wage for Agriculture.

10.4 Methods of harvesting by hand

- There are various methods of harvesting by hand – grapes are carried to the pressing bin; 34 % of the worker's time is spent carrying crates in and out. Thus only 66 % effective time is left for the picking of grapes.
- Grapes are transported out of the vineyard to the pressing bin. The worker only has to carry the crate to the tractor standing in the row. This system results in considerable savings. With trailers which move in the vine row, the effective picking time of the worker is 75-80 %. Between 30 % and 50 % of total man hours per year are spent on the harvesting process and therefore it is important to make this process as effective as possible.

10.5 Incentive schemes

- Incentive principle: The norm for the number of containers full of grapes which could be harvested by the labourer per day is set according to previous records. Anything more than the norm is paid for additionally, to encourage the labourer to be more productive. In this way the labourer is compensated for additional work done and the producer gets the grapes to the cellar faster and at the correct degree of ripeness. Intensive supervision is however essential to prevent half full containers, wastage of bunches and berries falling on the

ground or bunches which are left behind on the grapevine.

- Piece-work principle: Here the worker is paid a fixed price from the first container. The more containers full of grapes he/she harvests, the more his/her pay per day. Remember however that the worker may never earn less than basic minimum wage and in cases where selective harvesting is practised or in cases where the grapes are very rotten and these rotten pieces must be removed, adjustments will have to be made to the worker's wage. Intensive supervision will also be essential in this case.
- There are many other variations of harvesting and payment systems for the harvest process. The harvest and payment systems used on the farming unit must be chosen by each producer for him/herself.

10.6 Actual costs of mechanical harvesting and harvesting by hand in South Africa

These figures are from a farm where both mechanical harvesting and harvesting by hand were practised.

Table 1: Actual cost comparison between mechanical harvesting and harvesting by hand. The Rand per ton values of mechanical harvesting includes the cost of diesel and in the case of harvesting by hand, the amount of money spent on labour.

	Mechanical harvesting		Harvesting by hand	
Year	Tons harvested	R/ton	Tons harvested	R/ton
2009	1636	247	1064	225
2010	700	417	602	265
2011	825	509	1030	270
2012	634	612	826	290
2013	1313	402	1500	310
2014	1840	280	1388	330

In years with low yields, the cost of mechanical harvesting per ton was considerably higher because fewer tons had been harvested per hour. In 2014 for the first time, the cost of mechanical harvesting per ton was lower than harvesting by hand.