

ADDITIONAL TOPICS CHAPTER 6

Experiments demonstrate the law of diminishing returns

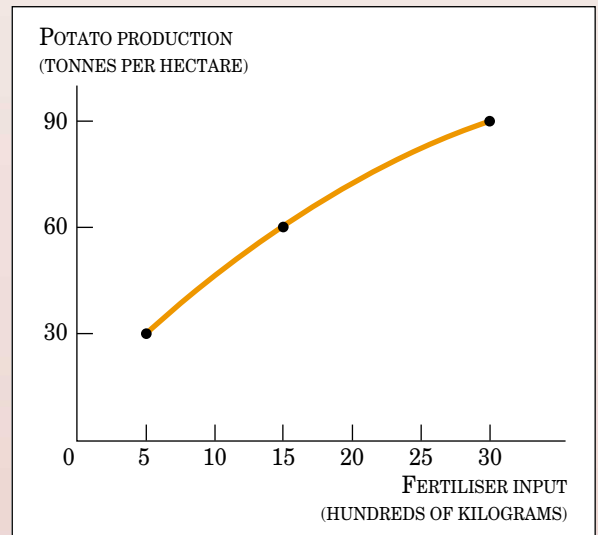
Diminishing returns to labour means that the marginal product of labour declines as more workers are added to a fixed amount of land or capital. More generally, diminishing returns occur any time one factor of production increases while some other factor is fixed. Diminishing returns applies in so many situations — from the use of fertiliser in the production of potatoes to the use of labour in the production of French fries that economists sometimes refer to it as the *law* of diminishing returns.

Experiments provide evidence on diminishing returns. The table shows data on potato production obtained from experiments. The variable input to the production of potatoes is fertiliser; land, capital, labour and other inputs to production are fixed in the experiments.

POTATO PRODUCTION (TONNES PER HECTARE)	FERTILISER INPUT (HUNDREDS OF KILOGRAMS)	VARIABLE COSTS (DOLLARS AT \$1 PER KILOGRAM)	MARGINAL COST (DOLLARS)
30	5	500	—
60	15	1500	1000
90	30	3000	1500

The first column of the table shows the number of tonnes of potatoes that can be obtained from one hectare; observe how potato production increases as more fertiliser is used. Observe the decreasing marginal product of fertiliser: additional kilograms of fertiliser result in smaller increases in potato production. A plot of this relationship is shown in the graph.

What do these data imply about the marginal cost of potatoes? Assuming that fertiliser costs \$1 per kilogram, the variable costs of potato production are shown in the third column. Variable costs are given by the price of fertiliser times the amount of fertiliser used in production.



Marginal cost can be computed from the change in variable costs. (Fixed costs, which do not change and therefore do not matter in the calculation of marginal cost, are not shown.) With three observations on variable cost, we can compute two values for the marginal cost of potato production as shown in the table. Observe how marginal cost increases with the amount of potato production.