

**Name:**

Net income per hectare.

**Definition:**

The net farm income is an indicator defined by the OECD (2001) as the difference between the value of gross output and all expenses incurred through the operation of a farm, at the farm level from agricultural activities (Gómez-Limón, 2010).

The net farm income is calculated by subtracting the expenses from the gross output that occurred during a specified accounting period. In fact, this will be, with slight differences, the concept used for the measurement of the net income of the producers.

**Method of calculation:**

Crop incomes, such as agricultural subsidies established by the Common Agricultural Policy, are necessary in order to calculate the gross farm income. On the other hand, the value of intermediate consumption or variable production costs related to agricultural activity include seeds, fertilizers, energy, labor costs, etc.

The value of this indicator is calculated as:

$$\text{Indicator} = \frac{\sum_i [(CY_i \times P_i) - VC_i] A_i + Sub}{A_T}$$

Where:

CY<sub>i</sub>: Crop yield (t/ha) of each plot

P<sub>i</sub>: Production prices / selling price of a product (€/t)

VC<sub>i</sub>: Variable crop costs (€/ha)

A<sub>i</sub>: Area assigned to the crop/plot (ha)

Sub: Agricultural subsidies (€)

A<sub>T</sub>: Total area considered (ha). Usable agricultural area (UAA).

The alternative method of calculation without taking into account the subsidies is:

$$\text{Indicator} = \frac{\sum_i [(CY_i \times P_i) - VC_i] A_i}{A_T}$$

Where:

CY<sub>i</sub>: Crop yield (t/ha) of each plot

P<sub>i</sub>: Production prices / selling price of a product (€/t)

VC<sub>i</sub>: Variable crop costs (€/ha)

A<sub>i</sub>: Area assigned to the crop/plot (ha)

Sub: Agricultural subsidies (€)

A<sub>T</sub>: Total area considered (ha). Without set aside areas.

**Interpretation:**

The study of several indicator events over time all allows a financial feasibility analysis of the farm. If repeated negative results are given, it could be concluded that the activity is not economically sustainable.

When the subsidies are added to the calculations, they may change the farm management result. A part of the subsidies will determine the farm management and consequently its productive potential though. For instance, a subsidy associated to a fallow or to a cover crop in certain area of the plot implies a yield reduction.

To compare different management systems without any subsidies influence, the same formula is applied but the subsidies and only the cultivated area is considered.

**Information source:**

Data obtained in a farmer's survey.

$CY_i$ : Crop yield (t/ha) of each plot. Data obtained in a farmers survey.

$P_i$ : Retail price of a product (€/t). Data obtained in a farmers survey.

$VC_i$ : Variable crop costs (€/ha). The costs depend on the operations on the plot and on the following inputs:

- Fuel consumption costs (Fidalgo, 2005)
- Seed costs
- Fertilizers and plant protection products costs
- Labour costs
- Machinery Equipment costs

$A_i$ : Area assigned to the crop/plot (ha). Data obtained in a farmers survey

$Sub_i$ : Agricultural subsidies (€). Data obtained in a farmers survey

$A_T$ : Total considered area (ha). Data obtained in a farmers survey.

Fuel consumption

The Spanish Institute for Energy Diversification and Saving (IDAE), based on studies of consumption of agricultural machinery, proposes the method of calculation of the consumption per hour (l/h) of tractor fuel in agricultural work as:

$$Ch = A \times T \times P \times M \times 0.6 \times (n_m / 2,400) + 0.04 \times 0.333 \times N$$

Where:

$C_h$  = consumption per hour (l/h).

$n_m$  = nominal speed of the engine (rpm)

0,333 = Average coefficient of specific fuel consumption of tractors (l/kW·h).

$N$  = Rated power of the tractor (kW).

A = Implement factor. Tabulated value which corresponds to implements of high requirements (subsoiler, mouldboard plough, chisel, spring cultivator and direct seed drill); medium requirements (plough, milling machine, cultivator, harrow, single drill, atomizer, mower conditioner, loaded trailer); and low requirements (roller, seed drill, locating fertilizer, centrifugal fertilizer, manure distributor trailer, hydraulic sprayer, rotary mower, swather rake, packer and empty trailer). The division has been made according to the consumption per hour in average conditions of each tested farming implement device.

T = Texture factor. Tabulated values which correspond loose textures to sandy loam; medium to medium loam and to clay loam; and strong to clay loam.

P = Depth factor. Tabulated values which correspond superficial work to work on the surface of the land or for depth values smaller than 5 cm; shallow depth to below average tillage conditions; medium depth; and great depth to above average tillage conditions.

M = Gear factor. Tabulated values that correspond to low gears (1<sup>st</sup>, 2<sup>nd</sup>), intermediate gears (3<sup>rd</sup>, 4<sup>th</sup>) and high gears (5<sup>th</sup>, 6<sup>th</sup> and 7<sup>th</sup>).

The consumption per hour of fuel can help us to calculate the consumption per hectare (l/ha), using the equation:  $Cha = C_h \times 10 / (a \times v)$

Where:

A = width of the farming implement device (m).

V = working speed (km/h). It can be estimated according to the following table:

IMPLEMENT FACTOR (A)		TEXTURE (T)		DEPTH (P)		GEAR (M)		V(km/h) 1500-2000-2500 rpm
Low requirement	0.56	Medium	1.00	Superficial	1.00	Low	0.84	1.5-2.7-3.8
						Intermediate	0.96	3.6-4.7-5.9
						High	1.11	5.7-6.8-8.0
				Shallow	0.89	Low	0.82	1.5-2.7-3.8
						Intermediate	1.10	3.6-4.7-5.9
						High	1.26	5.7-6.8-8.0
				Medium	1.02	Low	0.84	1.5-2.7-3.8
						Intermediate	1.02	3.6-4.7-5.9
						High	1.29	5.7-6.8-8.0
				Great	1.14	Low	0.79	1.5-2.7-3.8
						Intermediate	1.02	3.6-4.7-5.9
						High	1.21	5.7-6.8-8.0
Medium requirement	0.82	Loose	0.92	Superficial	1.00	Low		1.5-2.7-3.8
						Intermediate		3.6-4.7-5.9
						High	0.96	5.7-6.8-8.0
				Shallow	0.75	Low		1.5-2.7-3.8
						Intermediate	0.96	3.6-4.7-5.9
						High	1.02	5.7-6.8-8.0
				Medium	1.08	Low		1.5-2.7-3.8
						Intermediate	0.94	3.6-4.7-5.9
						High	1.05	5.7-6.8-8.0

IMPLEMENT FACTOR (A)		TEXTURE (T)		DEPTH (P)		GEAR (M)		V(km/h) 1500-2000-2500 rpm		
		Medium	1.02	Great	1.26	Low		1.5-2.7-3.8		
						Intermediate	0.92	3.6-4.7-5.9		
						High	1.08	5.7-6.8-8.0		
				Superficial	1.00	Low	0.71	1.5-2.7-3.8		
						Intermediate	1.04	3.6-4.7-5.9		
						High	1.23	5.7-6.8-8.0		
						Shallow	0.79	Low	0.85	1.5-2.7-3.8
								Intermediate	0.98	3.6-4.7-5.9
								High	1.11	5.7-6.8-8.0
		Medium	1.08	Low	0.74	1.5-2.7-3.8				
				Intermediate	1.06	3.6-4.7-5.9				
				High	1.08	5.7-6.8-8.0				
		Great	1.11	Low	0.78	1.5-2.7-3.8				
				Intermediate	1.04	3.6-4.7-5.9				
				High	1.17	5.7-6.8-8.0				
		Strong	1.17	Superficial	1.00	Low	0.46	1.5-2.7-3.8		
						Intermediate		3.6-4.7-5.9		
						High		5.7-6.8-8.0		
				Shallow		Low		1.5-2.7-3.8		
						Intermediate		3.6-4.7-5.9		
						High		5.7-6.8-8.0		
				Medium	0.92	Low	1.00	1.5-2.7-3.8		
						Intermediate		3.6-4.7-5.9		
						High		5.7-6.8-8.0		
				Great	1.14	Low		1.5-2.7-3.8		
						Intermediate	1.00	3.6-4.7-5.9		
						High		5.7-6.8-8.0		
High requirement	1.02	Loose	0.96	Superficial		Low		1.5-2.7-3.8		
						Intermediate		3.6-4.7-5.9		
						High		5.7-6.8-8.0		
				Shallow	0.86	Low	0.69	1.5-2.7-3.8		
						Intermediate	0.98	3.6-4.7-5.9		
						High	1.29	5.7-6.8-8.0		
				Medium	1.04	Low	0.98	1.5-2.7-3.8		
						Intermediate	1.02	3.6-4.7-5.9		
						High	0.87	5.7-6.8-8.0		
		Great	1.23	Low		1.5-2.7-3.8				
				Intermediate	0.94	3.6-4.7-5.9				
				High	1.11	5.7-6.8-8.0				
		Medium	0.96	Superficial	1.00	Low		1.5-2.7-3.8		
						Intermediate	0.70	3.6-4.7-5.9		
						High	1.05	5.7-6.8-8.0		

IMPLEMENT FACTOR (A)		TEXTURE (T)		DEPTH (P)		GEAR (M)		V(km/h) 1500-2000-2500 rpm
				Shallow	0.93	Low	0.70	1.5-2.7-3.8
						Intermediate	1.02	3.6-4.7-5.9
						High	1.20	5.7-6.8-8.0
				Medium	1.00	Low	0.75	1.5-2.7-3.8
						Intermediate	1.02	3.6-4.7-5.9
						High	1.17	5.7-6.8-8.0
				Great	1.14	Low	0.67	1.5-2.7-3.8
						Intermediate	1.04	3.6-4.7-5.9
						High	1.26	5.7-6.8-8.0
		Strong	1.29	Superficial		Low		1.5-2.7-3.8
						Intermediate		3.6-4.7-5.9
						High		5.7-6.8-8.0
				Shallow		Low		1.5-2.7-3.8
						Intermediate		3.6-4.7-5.9
						High		5.7-6.8-8.0
				Medium	1.00	Low	0.60	1.5-2.7-3.8
						Intermediate	1.12	3.6-4.7-5.9
						High	1.05	5.7-6.8-8.0
				Great	1.11	Low		1.5-2.7-3.8
						Intermediate		3.6-4.7-5.9
						High	0.99	5.7-6.8-8.0

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