Definition:

$$\frac{Financial\ benefits}{Area\ of\ land}$$

Description:

Benefit: This impact area assesses benefits via their appreciation by markets. It is sensitive to socio-economic factors because commodity prices reflect demand and are also influenced by value systems and policies through effects of financial incentives and tax regulations.

Resource: Agricultural land is always a limited resource. The type of land can be specified to distinguish between different land qualities. Distinctions are often made, for example, between cropland and pasture, high nature value (HNV) farmland and other farmland, or based on soil fertility and yield potential. For this indicator, the temporal reference must always be specified. However, in case of the standard period of one year, this information is sometimes omitted in scientific publications.

Correlation with soil management:

[26] Organic farms recorded higher operating profit (operating profit + subsidies) per hectare of farmland than conventional farms
[55] Cooperatives have higher revenue per area of land than single farms
[133] The production in agriculture is associated with quality standards of lands, nature and conditions of their use
[149] Smaller farms are more efficient in land productivity
[162] Studies proved reduction of field crop yields from organic fields in comparison to conventional ones
[182] Improving the conditions of mineral nutrition by introducing balanced doses of fertilizers for all elements contributed to a sufficiently high yield
[207] Nitrogen utilization efficiency played a significant role in determining grain yield, while a negative and poor dependence of grain yield on Nitrogen uptake efficiency was observed
[241] Highest land use efficiencies (potato yield per hectare of area) were achieved in regions that produce potatoes under irrigation in summer where solar radiation is high and lowest land use efficiencies were reported for the predominantly dry land and partially dry land regions
[248] Small rice-producing farms ranging from 0.61 to 1.0 ha yielded higher energy ratios (4.14) than larger ones

Strength & weaknesses pertaining to measurement of this impact area

Financial Benefits: Financial indicators are well suited for integrating or comparing agricultural production processes with products for very different end uses. For calculating benefit-cost ratios (BCR), indicators that reflect revenue should be used. In most other cases, indicators that reflect net benefits (after deduction of charges, costs and expenses) provide a more realistic picture of benefits generated. Price volatilities make efficiency calculations valid only for a certain point in time and space.

Area of land: While area of land is a standard measure that is used as reference in most statistics and inventories, a weakness of this indicator is that other relevant information like soil type, soil fertility or management history is often not provided.
In short, one hectare of dry, sandy cropland soil is very different from one hectare of pasture on drained peat soils.

Sample Indicators

Indicator values from		Survey	
Experiment or direct measurement		Statistical- or census data	
Expert assessment		Literature values	
Model		Maps or GIS	
Stakeholder participation		Not provided	

Table 1: No Scale

Indicator	**Unit**	**Indicator values from**
[55] Production output/Area of land	$ * ha^{-1}	

Table 2: Field Scale

Indicator	Unit	Indicator values from
[207] Net income/Area of land	$ * ha^{-1}	

Table 3: Farm Scale

Indicator	Unit	Indicator values from
[26] Operational efficiency (Operational profit/Area of land)	$ * ha^{-1}	
[26] Operational efficiency (including subsidies)(Operational profit + subisidies/Area of land)	$ * ha^{-1}	
[26] Accounting profit/Area of land	$ * ha^{-1}	
[62] Total gross margin/Area of land	$ * ha^{-1}	
[149] Land productivity (Total income generated from farming during a year/Cultivated area of land)	$ * Not specified^{-1}	
[162] Additional income from fertilization (Additional yields from fertilization*price of products)/Area of land	$ * ha^{-1}	
[162] Additional profit from fertilization/Area of land	$ * ha^{-1}	
[162] Residual effect of fertilization-additional profit/Area of land	$ * ha^{-1}	
[175] Average price (Gross income/Area of land)	$ * ha^{-1}	
[175] Operating margin (Gross margin/Area of land)	$ * ha^{-1}	
[176] Value of gross product/Fodder area	$ * ha^{-1}	 , 
[176] Net agricultural income (Prices of inputs or sold products)/Fodder area	$ * ha^{-1}	 , 

Table 4: Regional Scale

Indicator	**Unit**	**Indicator values from**
[1] Value of yields (including subsidies)/Agricultural land	$ * ha^{-1}	
[1] Added value/Agricultural land	$ * ha^{-1}	
[100] Agricultural profitability (Profit contribution (revenue - costs)/Area of land)	$ * ha^{-1}	
[133] Land productivity (Value of yields/Area of land)	$ * ha^{-1}	
[182] Gross value of winter wheat/Area of land	$ * ha^{-1}	
[241] Gross profit/Area of land	$ * ha^{-1}	
[248] Net Economic gain [Monetary unit]/Area of land	$ * ha^{-1}	 , 

References

ID	Citation	[1]Soil type/ texture
1	Adamisin, P., et al. (2015). "Natural climatic conditions as a determinant of productivity and economic efficiency of agricultural entities." Agricultural Economics-Zemedelska Ekonomika 61(6): 265-274.	n/a
26	Brožová, I. and J. Vanek (2013). "Assessment of economic efficiency of conventional and organic agricultural enterprises in a chosen region." Acta Universitatis Agriculturae et Silviculturae Mendelianae Brunensis **61**(2): 297-307.	n/a
55	Dambaulova, G. K., et al. (2017). "Rural consumer cooperative and efficiency of production systems in agrarian and industrial complex." International Journal of Economic Perspectives **11**(3): 1150-1156.	n/a
62*	Dhehibi, B., et al. (2015). "Impacts of soil salinity on the productivity of Al-Musayyeb small farms in Iraq: An examination of technical, economic and allocative efficiency." Agricultural Economics Review **16**(2): 42-55.	Mainly silty loams or loamy silts
100*	Hagen, Z. (2012). "A basic design for a multicriteria approach to efficient bioenergy production at regional level." Energy, Sustainability and Society **2**(1): 1-17.	n/a
133	Kozhukhivska, R., et al. (2018). "Managing the efficiency of enterprises based on assessment of the land resource potential." Problems and Perspectives in Management **16**(2): 164-178.	Acidic soils (pH < 5.5); -Typical black soils and strongly regraded black soils occupy 53.7% of the region -Dark gray podzolized regraded soils and weakly regraded podzolized black soils occupy 28.9% -Light gray and gray podzolized soils are 7.3%

[1]**Soil type/ texture:** If provided, what are type and texture of the soils studied in the paper?

*The resource use efficiency discussed on this factsheet is not a focus of the cited paper

149*	Li, G., et al. (2013). "Re-examining the inverse relationship between farm size and efficiency: The empirical evidence in China." China Agricultural Economic Review **5**(4): 473-488.	n/a
162	Manolova, V., et al. (2015). "Economic efficiency of fertilization and its residual-effect during conversion period to organic field crop production." Bulgarian Journal of Agricultural Science **21**(5): 1022-1026.	n/a
175	Moore, A. D., et al. (2011). "Evaluation of the water use efficiency of alternative farm practices at a range of spatial and temporal scales: A conceptual framework and a modelling approach." Agricultural Systems **104**(2): 162-174.	Black vertosol soil
176	Moreau, P., et al. (2012). "Reconciling technical, economic and environmental efficiency of farming systems in vulnerable areas." Agriculture Ecosystems & Environment **147**: 89-99.	Deep loamy and shallow brown soils
182	Neshchadim, N. N., et al. (2018). "Bioenergetic assessment and economic efficiency of predecessors and fertilizer systems in the cultivation of winter wheat." International Journal of Engineering and Technology(UAE) **7**(4.38 Special Issue 38): 685-689.	Ordinary chernozem with low content of humus (4.5-5.5%)
207	Rehman, A., et al. (2011). "Grain quality, nutrient use efficiency, and bioeconomics of maize under different sowing methods and NPK levels." Chilean Journal of Agricultural Research **71**(4): 586-593.	Sandy clay loam
241	Steyn, J. M., et al. (2016). "Resource use efficiencies as indicators of ecological sustainability in potato production: A South African case study." Field Crops Research **199**: 136-149.	Loam, sandy-loam, sand
248	Talukder, B., et al. (2019). "Energy efficiency of agricultural systems in the southwest coastal zone of Bangladesh." Ecological Indicators **98**: 641-648.	n/a

*The resource use efficiency discussed on this factsheet is not a focus of the cited paper