

The European Innovation Project (EIP-Agri) 'Mehrwert Berglandwirtschaft' (surplus value of mountain farming) was initiated in 2022 with the aim to develop an indicator based business model that allows private companies to invest in the surplus-value provided by mountain farms in the Austrian national park 'Kalkalpen' (NKA).



# Comparing on-farm indicators for surplus value assessment on alpine mountain farms

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## Introduction

Mountain farms are farms in 'less favoured areas' (EG Nr. 1305/2013). On the total agricultural surface of Austria of 1,294,000 ha, around 49 % of the farms are in mountain areas, which is 70 % of Austria's total land area. Alpine mountain farms provide a multitude of functions, such as Ecosystem Services (ES) and other surplus-values. The costs of food production (supply services) of mountain farms are partly remunerated through the market. However, all other ES (regulating, cultural services) or societal values provided by mountain farms are not financially valued by the market and are only partly compensated by public funding. In this research 13 regional and 35 on-farm indicators are qualitatively compared to identify and measure the surplus value of mountain farms on farm level.



Figure 1 The pilot region is the Austrian national park *Nationalpark Kalkalpen* in the region of Upper Austria, where 50 % of farms have between 0.5 - 1.5 LU ha<sup>-1</sup> (Livestock Unit) and rank with 80 - 190 difficulty points in the medium range of the Austrian compensation scheme for mountain farming.



Figure 2 The indicators are built upon the concept of ecosystem services (ES). According to the CICES classification ES are divided into three groups: (I) provisioning services, like food production, (II) regulating services like soil conservation and (III) cultural services, such as recreation (CICES 2023). Biodiversity acts as a basic service for ecosystem services, like genetic diversity of plants and animals (Schwaiger et al. 2011).

## Compared indicators

Two types of indicators have been developed basing on a literature review and existing data and on-farm assessed data, respectively.

(1) **13 Regional indicators** describe surplus values based on IACS data (International Administration and Control System).

(2) **35 On-farm Indicators** describe surplus values with on-farm assessed data (n=29) with the *FarmLife (FL)* life-cycle assessment tool (Herndl et al. 2016). In the course of farm-visits additional data has been collected for the calculation of BD Indicators (FL BD, Fritz, C. 2022) and newly developed FL ES-Indicators.

## Results und Conclusion

The results in table 1 show that the two sets of indicators for the on-farm sample produce comparable values and are therefore valid for use on farm and regional level. Data differences occur due to different years and sources. Values for 'pasture' are slightly lower in 2022 on-farm results, while the share of farms with 'rare livestock breeds' are the same. Extensive grasslands and pasture are directly comparable. Also pasture as share of basic feed matches with IACS data. The indicators will be improved by weighing them according to the farm situation and production type. The definition of farming aspects for surplus value selection and further economic valuation has to be sensitive.

## Acknowledgements

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Database and tools of comparison			
Austrian Farms			
non-mountain-farms	mountain-Farms	pilot region	on-farm sample
n=34,425	n=70,709	n=1,297	n=29

regional indicators	
<b>IACS 2021</b> International Administration and Control System  13 indicators on 4 levels: farm area landscape animals	<b>on-farm indicators 2022</b> FarmLife lifecycle, biodiversity and ecosystem services assessment  35 on-farm indicators in 4 groups: provisioning services regulating services cultural services biodiversity

Figure 3 The values of on-farm indicators are compared to regional indicators. On-farm indicator data was collected on 29 sample farms in 2022. The regional indicators are applied to all farms, the sample farms, mountain farms in the pilot region, and all Austrian mountain farms and non-mountain farms in the IACS using data from 2021.

Table 1 Comparison of median-values obtained via on-farm indicators with values obtained via regional indicators: region, mountain farms and non-mountain farms.

indicators	unit	sample	region	MF	non-MF	
		IACS n=29 2022	on-farm n=29 2021	n=1,297 2021	n=70,709 2021	n=34,425 2021
farm size	ha	24.7	24.6	15.7	11.3	19.1
livestock unit (LU)	LU ha <sup>-1</sup>	1.2	1.1	1.0	0.9	0.0
rare livestock breeds	% of farms	10,4	10,4	4,32	5,32	0,54
extensive grassland	% of farmland	7,5	7,8	10,9	18,1	0,0
pasture	% of farmland	21,6	23,2	18	1	0

## Sources

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