



## D2.3 – Dataset collected on ELPS and ILPS for WP3 Indicators



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| <b>Work Package</b>              | WP2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
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| <b>Abstract:</b>                 | <p>Deliverable D2.3 (primarily based on the work of T2.3, but also informed by T1.1, T2.1, T2.2 ) provides an overview of datasets/indicators identified and collected for the ELPS and ILPS case studies, conducting a preliminary assessment of their intersections in the context of the overall objective of supporting the transition of ELPS to more innovative and sustainable production systems. Because new and improved indicators from WP3 are still emerging (as detailed in D2.1), a predominant emphasis was on establishing the cross relevance of impact sub-categories for sustainability assessment across both ELPS and ILPS. This strategy was employed in an effort to put in place foundations for transferability of indicators across ILPS and ELPS in a thematically comprehensive way and to create linkages for the formulation of new and improved indicators.</p> <p>The report presents a snapshot of the data regarding ELPS &amp; ILPS gathered to date by the STEP UP consortium, offering a synthesised foundation for subsequent analytical tasks. It reveals themes in sustainability impact categories and associated sub-impact categories (social, economic, biodiversity etc. from WPs 1, 2 and 3), highlighting gaps in current data regarding ELPS &amp; ILPS, and identifying opportunities to support and accommodate new and improved indicators that are emerging in STEP UP scientific work.</p> <p>Whilst it is acknowledged that some of the new and improved sustainability indicators emerging in STEP-UP, may not be part of ELPS &amp; ILPS routinely collected data, D2.3 outlines strategies for how they may be tested for inclusion in routine data collection instruments, using the ILPS case studies as testbeds.</p> |

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| List of Abbreviations and Acronyms |                                         |
|------------------------------------|-----------------------------------------|
| ELPS                               | European Livestock Production Systems   |
| FSDN                               | Farm Sustainability Data Network        |
| FSS                                | Farm Structure Survey                   |
| GHGs                               | Greenhouse Gases                        |
| ILPS                               | Innovative Livestock Production Systems |
| n-LCA                              | Nutritional Life Cycle Analysis         |
| MAA                                | Multi-Actor Action                      |
| TCA                                | True Cost Accounting                    |
| WP                                 | Work Package                            |

Table 1: List of abbreviations and acronyms

## 1. Objective of D2.3

STEP UP's T2.3 involved *'Testing and data gathering for application of improved sustainability indicators and holistic methods to ELPS & ILPS case-studies'*. T2.3, in collaboration with WP3 and WP4, is designed to assess *'the feasibility of implementing improved sustainability indicators and methods using a subset of ELPS and ILPS case-studies, as well as gather primary data for their application. In this way, the coherence, relevance and practice-readiness of improved indicators and methods will be enhanced. The task will collate existing, readily available data from selected ELPS and ILPS case-studies and collect additional information based on direct exchanges with case-study actors. It will also explore potential issues regarding access to required data for systematic indicator calculation, adding to the conclusions of T2.1 on incongruencies, gaps and opportunities for existing datasets. The task will use the MAA to directly engage with actors in ELPS and ILPS case-studies to develop a standardised data collection approach, test indicators and methods in an iterative cycle and feedback their experiences. Online tools will be the predominant means of interacting with ELPS and ILPS case-study actors using suitable interactive platforms for individual and participatory exercises'*.

T2.3 was implemented to address these actions, yet because new and improved indicators from WP3 are still emerging (as detailed in D2.1), a predominant emphasis was on establishing the cross relevance of impact sub-categories for sustainability assessment (Figure 1) across both ELPS and ILPS. This strategy was employed in an effort to put in place foundations for transferability of indicators across ILPS and ELPS in a thematically comprehensive way and to create linkages so that they can be measured using viable indicators.

## 2. Introduction and approach to D2.3

**European Livestock Production Systems (ELPS)** encompass the traditional, conventional approaches to raising and managing livestock in Europe at farm-level. These conventional systems are characterised by established agricultural practices that have been historically prevalent in European livestock farming, underpinned by science and policy frameworks. By contrast, Innovative Livestock Production Systems (ILPS) represent departures from conventional livestock farming approaches and have introduced unconventional or novel strategies. In the context of STEP UP, ILPS are identified as innovative livestock production systems that explicitly incorporate sustainability goals. ILPS may integrate cutting-edge technologies, for instance, and novel or place-specific sustainable practices to enhance efficiency, minimise environmental impact, and improve animal welfare. ILPS introduces



alternative paradigms in livestock farming, offering tried and tested innovative solutions that may hold potential for transferability to ELPS to transition to more sustainable and resilient production methods and systems. Case-studies of ILPS (as profiled in D2.2) are worthy of investigation to explore this potential; and for this, analogous case-studies of ELPS are implicated in the study of out-scaling and up-scaling of relevant, transferable practices, methods, innovations etc. (present within ILPS)

Task T2.3 aimed to synthesise ILPS case studies (conducted in T2.2) and 'paradigmatic' case studies representing diverse ELPS in various social, economic, geographic, and environmental contexts across Europe. (ILPS). Researchers implementing T1.1 developed a classification system that reflects the diversity of European livestock production systems, based on a comprehensive overview and analysis of diverse terrestrial livestock production systems and animal product value chains across different social, economic, geographic, and environmental contexts in Europe. The granularity of these systems is detailed to a greater extent in D1.1, but for the purposes of this deliverable, where the prerogative is to assess transferability, thematic commonalities & cross-relevance between ELPS and ILPS, sufficiently wide scope is provided by focusing on the three main overall livestock production systems classified by the work of T1.1, which are:

1. Intensive indoor systems (option for conventional/organic for pigs and poultry)
2. Intensive grazing (i.e. ruminants) or outdoor (i.e. pigs and granivores) systems
3. Semi-extensive (grazing or outdoor systems) with option for conventional/organic for ruminants, pigs, and poultry

These three main ELPS types represent 'paradigmatic case-studies' (Mills et al. 2010<sup>1</sup>) - case-studies not based on individual sites or farms, rather types of livestock production systems that are commonplace and comprehensively profiled through routine data collection instruments. While the paradigmatic cases do not relate to specific individual farms, it is also the case that many conventional farms fall within and directly relate to one or more of the three categories. This enhances the scope for assessing relevance and transferability (of sustainability practices/features and indicators used to measure them) from ILPS (which are diverse) to categories of ELPS cases, which are more generic but features of which (and relevant indicators) can be matched with counterpart ILPS.

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<sup>1</sup> (2010). Paradigmatic cases. In A. J. Mills, G. Durepos, E. Wiebe (Eds.) *Encyclopedia of case study research* (Vol. 0, pp. 645-647). SAGE Publications, Inc., <https://doi.org/10.4135/9781412957397.n242>

Table 2 below provides an overview of the overall ELPS classification based on work in T1.1.

Table 2: Typology of European livestock production system (ELPS)

| Livestock category    | Main system            | Conventional/Organic | Livestock management data                                                                                                                                                                                                                                   |
|-----------------------|------------------------|----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Dairy cattle          | Intensive indoor       | Conventional         | <ul style="list-style-type: none"> <li>• Herd size</li> <li>• Breed type</li> <li>• Milk yield</li> <li>• Productive life span</li> <li>• Feed (summer)</li> <li>• Feed (winter)</li> <li>• Concentrates</li> <li>• Grazing days</li> </ul>                 |
|                       | Intensive grazing      | Conventional/Organic |                                                                                                                                                                                                                                                             |
|                       | Semi-extensive grazing | Conventional/Organic |                                                                                                                                                                                                                                                             |
| Suckler cows          | Intensive indoor       | Conventional         | <ul style="list-style-type: none"> <li>• Herd size</li> <li>• Breed type</li> <li>• 1<sup>st</sup> calving age</li> <li>• Productive life span</li> <li>• Feed (summer)</li> <li>• Feed (winter)</li> <li>• Concentrates</li> <li>• Grazing days</li> </ul> |
|                       | Semi-extensive grazing | Conventional/Organic |                                                                                                                                                                                                                                                             |
| Finishing beef cattle | Intensive indoor       | Conventional         | <ul style="list-style-type: none"> <li>• Animal origin</li> <li>• Breed type</li> <li>• Age of animals (purchased and sold)</li> <li>• Finishing animals per year</li> <li>• Main Feed</li> <li>• Concentrates</li> <li>• Grazing days</li> </ul>           |
|                       | Semi-extensive grazing | Conventional/Organic |                                                                                                                                                                                                                                                             |
| Sheep meat            | Intensive indoor       | Conventional         | <ul style="list-style-type: none"> <li>• Flock size</li> <li>• Breed type</li> <li>• Productive lifespan</li> <li>• Main feed (summer)</li> <li>• Main feed (winter)</li> <li>• Concentrates</li> <li>• Grazing days</li> </ul>                             |
|                       | Intensive grazing      | Conventional         |                                                                                                                                                                                                                                                             |
|                       | Semi-extensive grazing | Conventional/Organic |                                                                                                                                                                                                                                                             |
| Sheep dairy           | Intensive indoor       | Conventional         | <ul style="list-style-type: none"> <li>• Flock size</li> <li>• Milk yield</li> <li>• Breed type</li> <li>• Productive lifespan</li> <li>• Main feed (summer)</li> <li>• Main feed (winter)</li> <li>• Concentrates</li> <li>• Grazing days</li> </ul>       |
|                       | Semi-extensive grazing | Conventional/Organic |                                                                                                                                                                                                                                                             |
| Dairy goats           | Intensive indoor       | Conventional         | <ul style="list-style-type: none"> <li>• Herd size</li> <li>• Milk yield</li> <li>• Breed type</li> <li>• Productive lifespan</li> <li>• Main feed (summer)</li> <li>• Main feed (winter)</li> <li>• Concentrates</li> </ul>                                |
|                       | Intensive grazing      | Conventional         |                                                                                                                                                                                                                                                             |
|                       | Semi-extensive grazing | Conventional/Organic |                                                                                                                                                                                                                                                             |

|             |                        |                      |                                                                                                                                                                                                                                                                                                                                                                                                                  |
|-------------|------------------------|----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|             |                        |                      | <ul style="list-style-type: none"> <li>Grazing days</li> </ul>                                                                                                                                                                                                                                                                                                                                                   |
| Pigs        | Intensive indoor       | Conventional/Organic | <ul style="list-style-type: none"> <li>Breed type</li> <li>Sows per farm</li> <li>Sows in crates</li> <li>Mortality rates</li> <li>Forage</li> <li>Housing types</li> <li>Productive lifespan</li> <li>Main feed (summer)</li> <li>Main feed (winter)</li> <li>Concentrates</li> <li>% protein in concentrates</li> <li>Human edible feed in concentrates</li> <li>Grazing days</li> <li>Bedding type</li> </ul> |
|             | Intensive outdoor      | Conventional/Organic |                                                                                                                                                                                                                                                                                                                                                                                                                  |
|             | Semi-extensive outdoor | Conventional         |                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Laying hens | Intensive indoor       | Conventional         | <ul style="list-style-type: none"> <li>Breed type</li> <li>Egg production</li> <li>Production length</li> <li>Hens per shed</li> <li>Grazing days</li> <li>Concentrate feeds</li> <li>Housing type</li> <li>Animal density in housing</li> <li>Animal density outside</li> </ul>                                                                                                                                 |
|             | Intensive outdoor      | Conventional/Organic |                                                                                                                                                                                                                                                                                                                                                                                                                  |
|             | Semi-extensive outdoor | Conventional         |                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Broilers    | Intensive indoor       | Conventional/Organic | <ul style="list-style-type: none"> <li>Breed type</li> <li>Daily liveweight gain</li> <li>Weight of broiler sold</li> <li>Finishing cycles per year</li> <li>Finishing animals per cycle</li> <li>Grazing days</li> <li>Concentrate feeds</li> <li>Housing type</li> <li>Animal density in housing</li> <li>Animal density outside</li> </ul>                                                                    |

Source: David Yañez-Ruiz and Inés Rivelli (STEP UP D1.1)

**Innovative Livestock Production Systems (ILPS)** case-studies represent operational, ‘real life’ farms. The criteria for their selection (as ILPS) were identified by considering a multidisciplinary assessment of sustainability indicators and metrics, identified in the literature as important for strengthening the sustainability of conventional ELPS, and all livestock production systems across Europe (D2.2). ILPS were identified and selected to represent a broad range of sustainability indicators, new and experimental ‘pipeline’ sustainability indicators, and wide-ranging features of the ILPS (governance structures, livestock types etc.) (detailed in D2.2). Based on iterative processes of engagement with members of the multidisciplinary STEP-UP consortium, stakeholders (such as the Animal Task Force) and relevant ILPS representatives, D2.2 has produced a report detailing the characteristics of each



case-study ILPS. Table 2<sup>2</sup> provides an overview of the selected ILPS case studies (their production systems and livestock species). With an emphasis on the main production systems represented within them (several are mixed livestock enterprises) and Table 3 further classifies ILPS according to the 9 main livestock categories established in D1.1 - Typology of Current European Livestock Systems.

Table 3: Production systems represented in Innovative Livestock production Systems (ILPS)

| Name of ILPS                             | Production system                     | Livestock species |       |      |       |             |         |      |
|------------------------------------------|---------------------------------------|-------------------|-------|------|-------|-------------|---------|------|
|                                          |                                       | Pig               | Dairy | Beef | Sheep | Laying hens | Broiler | Goat |
| Agro Integracja                          | Intensive, specialised, non-organic   | ✓                 | ✓     | ✓    |       |             |         |      |
| Farm Zero C                              | Intensive grazing                     |                   | ✓     |      |       |             |         |      |
| Ballymaloe                               | Intensive & extensive, mixed, organic | ✓                 | ✓     | ✓    | ✓     | ✓           |         |      |
| Remedios Picasso - A circular rum system | Intensive & extensive, indoor         | ✓                 | ✓     | ✓    | ✓     |             |         | ✓    |
| GPI Morteau-Comté                        | Intensive & extensive grazing, mixed  | ✓                 | ✓     |      |       |             |         |      |
| Newford Suckler Beef                     | Semi-intensive permanent grazing      |                   |       | ✓    |       |             |         |      |
| Rebracommerce                            | Intensive                             |                   |       |      |       | ✓           |         |      |
| Tenen doo                                | Intensive, mixed crop-poultry         |                   |       |      |       | ✓           | ✓       |      |
| OasYs                                    | Mixed crop-dairy cattle               |                   | ✓     |      |       |             |         |      |
| Papille                                  | Mixed crop-livestock                  | ✓                 | ✓     | ✓    | ✓     |             |         |      |
| Porganic (GenESI)                        | Organic farming                       | ✓                 |       |      |       |             |         |      |
| Waters of LIFE                           | Permanent grazing                     |                   | ✓     | ✓    | ✓     |             |         |      |
| Svensk Kolinlagring                      | Extensive                             |                   |       | ✓    |       |             | ✓       |      |
| Bleu Blanc Coeur                         | Mixed, extensive, intensive           | ✓                 | ✓     | ✓    |       | ✓           |         |      |

<sup>2</sup> The report in D2.2 contains the description of 15 ILPS. However, following the submission of the deliverable by M18 according to the DoA, we received additional information from three ILPS. At the time of writing this report, two of the ILPS had information on the indicators and are reported in this deliverable.

|                                |                                                                  |   |   |   |   |  |   |   |
|--------------------------------|------------------------------------------------------------------|---|---|---|---|--|---|---|
| <b>Sown Biodiverse Pasture</b> | <b>Extensive, semi-extensive, mixed, organic and non-organic</b> | ✓ | ✓ | ✓ | ✓ |  |   | ✓ |
| <b>AgriSearch</b>              | <b>Mixed</b>                                                     |   | ✓ | ✓ | ✓ |  |   |   |
| <b>Nature d'éleveurs</b>       | <b>Intensive indoor</b>                                          |   |   |   |   |  | ✓ |   |

Table 4: Classification of ILPS according to the 9 main livestock categories established in D1.1 - Typology of Current European Livestock Systems

|                                                                                          | Production system                    | Dairy cattle | Suckler cows | Beef / finishing cattle | Meat sheep | Dairy sheep | Goats | Pigs | Laying hens | Broilers |
|------------------------------------------------------------------------------------------|--------------------------------------|--------------|--------------|-------------------------|------------|-------------|-------|------|-------------|----------|
| <b>Agrointegracja Sp. z o.o.</b>                                                         | Intensive, specialised non-organic   | ✓            |              | ✓                       |            |             |       | ✓    |             |          |
| <b>Bleu Blanc Cœur</b>                                                                   | Mixed farming                        | ✓            |              | ✓                       |            |             |       | ✓    | ✓           |          |
| <b>Farm Zero C</b>                                                                       | Intensive grazing                    | ✓            |              |                         |            |             |       |      |             |          |
| <b>Ballymaloe Organic Climate Farm</b>                                                   | Intensive & extensive, indoor        | ✓            | ✓            | ✓                       | ✓          |             |       | ✓    | ✓           |          |
| <b>Svensk Kolinlagring (Swedish Carbon Storage)</b>                                      | Extensive                            | ✓            |              | ✓                       |            |             |       |      |             | ✓        |
| <b>A circular ruminant system coupled with crop production in Southern Mediterranean</b> | Intensive & extensive, indoor        | ✓            | ✓            | ✓                       | ✓          | ✓           | ✓     | ✓    |             |          |
| <b>Oasys</b>                                                                             | Mixed crop-dairy cattle              | ✓            |              |                         |            |             |       |      |             |          |
| <b>Newford Farm</b>                                                                      | Semi-intensive permanent grazing     |              | ✓            |                         |            |             |       |      |             |          |
| <b>GPI Morteau-DPO Comté</b>                                                             | Intensive & extensive grazing, mixed | ✓            |              |                         |            |             |       | ✓    |             |          |
| <b>NIV1 - Rebracommerce</b>                                                              | Intensive                            |              |              |                         |            |             |       |      | ✓           |          |
| <b>NIV2 - Tenen doo</b>                                                                  | Intensive, mixed crop-poultry        |              |              |                         |            |             |       |      | ✓           | ✓        |



|                                   |                                |   |   |   |   |   |   |   |  |   |
|-----------------------------------|--------------------------------|---|---|---|---|---|---|---|--|---|
| PAPILLE                           | Mixed crop-livestock           | ✓ |   |   | ✓ |   |   | ✓ |  |   |
| INRAE PORGANIC                    | Organic farming                |   |   |   |   |   |   | ✓ |  |   |
| Sown Biodiverse Pasture           | Mixed forage-livestock farming | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |   |  |   |
| Waters of LIFE Integrated Project | Extensive                      | ✓ |   | ✓ | ✓ |   |   |   |  |   |
| AgriSearch                        | Mixed, semi-extensive          | ✓ |   | ✓ |   | ✓ |   |   |  |   |
| Nature d'éleveurs                 | Indoor                         |   |   |   |   |   |   |   |  | ✓ |

### 3. Synergising ELPS and ILPS Case Studies

Following the classification of ELPS (Table 2), and ILPS (Table 4), this deliverable (D2.3) synergises data/indicators from selected ELPS with information from the ILPS case studies. Potential data gaps are identified, and the foundation for assessing the feasibility of applying new and improved indicators is outlined.

Generally, the definitions, structure and applications of current indicators that profile ELPS are utilised and available traditionally in the Farm Accountancy Data Network (FADN) (under revision in the form of the Farm Sustainability Data Network (FSDN)) ‘aims to improve the effectiveness of CAP support schemes by enabling better-tailored policies and providing farmers with data-driven insights to enhance their operational efficiency and profitability’ (Europa, 2025<sup>3</sup>). As the STEP UP proposal and wider literature clearly suggest, there is a need to diversify indicators to a greater extent to capture a wider range of sustainability characteristics. Using the ILPS as real-life operational (rather than hypothetical) settings, STEP UP through WP2 (in collaboration with other WPs especially WP3, WP4 and WP6) is attempting to test the application of new and improved indicators and metrics to capture wider-ranging and more diverse sustainability attributes. Testing processes involve multiple aspects – such as end-user data collection feasibility issues; time and resource considerations; and efficacy of the indicators in capturing data that make significant contributions to knowledge of sustainability at farm-level (and wider agri-food systems). These processes are a wider objective of STEP UP. However, a starting point for the process addressed in D2.3 is to cross check characteristics of paradigmatic case-study ELPs with characteristics of the ILPS. This process of cross-checking is undertaken in tandem with contextualising the new and improved indicators emerging from WP3 in ELPS and ILPS cases.

A crucial foundational consideration for the wider work of STEP UP is the assessment of how additional new or improved indicators arising from STEP UP research in WP3 are aligned with, relevant to and applicable to both ELPS and ILPS (as a basis for testing preliminary transferability). To achieve this, we cross-checked how both ELPS paradigmatic case-studies and ILPS case studies relate to the criteria listed below:

- ✓ connection with STEP UP’s impact subcategories, which reflect the overall sustainability focus of STEP UP
- ✓ farm /livestock systems alignment (to practically aid and enhance the matching of sustainability transition mechanisms / indicators from ILPS to ELPS), and

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<sup>3</sup> Europa (2025) overviewing FLINT [https://ec.europa.eu/enrd/evaluation/knowledge-bank/sustainability-indicators-farm-level-monitoring-and-evaluating-cap\\_en.html](https://ec.europa.eu/enrd/evaluation/knowledge-bank/sustainability-indicators-farm-level-monitoring-and-evaluating-cap_en.html)

- ✓ data accessibility/ potential for data accessibility, so that new and improved indicators can be practically tested

### 3.1. Data on ELPS and ILPS case studies

Primary data collection undertaken in ILPS (presented in D2.2); together with the desk-based review of datasets and literature to profile ELPS (D1.1) have shown that, while there are similarities and alignment of ELPS and ILPS in terms of common production systems, there are marked differences in the operational structures and features of ILPS and ELPS. Both similarities and differences have implications for transferability of indicators across ILPS and ELPS. In Section 4, a description is presented of areas where data are available for both ELPS case studies and ILPS case studies and corresponding identification of gaps.

## 4. Impact sub-categories for sustainability assessment

One of the vital attributes of the STEP UP project is collaborative, intersectional approach across the different work packages and tasks, culminating in enhanced multi-disciplinary knowledge-sharing and a coherent focus on impact categories (and subcategories). Task 1.3 (WP1) provided a review of evidence and mapping of the positive and negative impacts & externalities of livestock farming systems in connection with the ELPS types classified in Table 1 above. The following eight impact sub-categories were identified, within which 1,517 indicators from several scientific literature databases, which measure the positive/negative social, economic, and environmental impact of ELPS, were identified.:

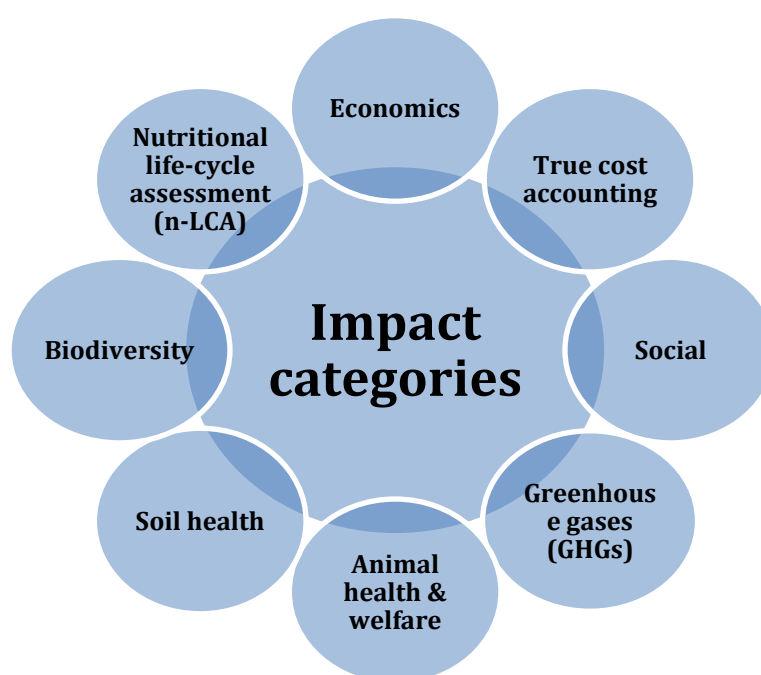


Figure 1: Impact sub-categories for sustainability assessment

## 4.1. Sustainability indicators for ILPS and ELPS analyses

Based on the work presented in D1.3 – *Mapping and analysis of impacts/externalities of livestock farming*, indicators measuring the eight impact sub-categories were identified from a literature review. Whilst the research results showed that for some impact sub-categories, indicators, and by extension, the underlying data can be easily accessed in data routinely collected; for other impact sub-categories, a lack of available data and a lack of complexity in the underlying indicators are persisting problems. For example, while data and the literature are replete with indicators measuring economic impacts, this was not the case for indicators for social and animal health and welfare. Table 5 presents a synthesis of the key sustainability assessment indicators, based on the reviewed literature. Potential data gaps and areas requiring further work are highlighted.

Table 5: Impact categories and sustainability indicators – across ILPS and ELPS case-studies

| Impact sub-category                                       | Production systems                                                                                                                | Potential indicator (unit)                                                                                                                                                | Data needs/gap                                                             | Impact type (+ve or -ve)            | Comment                                                                                               |
|-----------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|-------------------------------------|-------------------------------------------------------------------------------------------------------|
| Economic                                                  | ELPS & ILPS <ul style="list-style-type: none"> <li>Intensive indoor</li> <li>Intensive grazing</li> <li>Semi-extensive</li> </ul> | 1. Profitability (e.g., income, costs, productivity, efficiency etc.)<br>2. Durability (e.g., resilience, liquidity, viability etc.)<br>3. Autonomy<br>4. Diversification | Indicators for fairness, resilience, diversification, risk management etc. | +ve economic impacts                | Need to standardise economic indicator terminologies to improve replicability and comparability       |
| True cost accounting (TCA)                                | ELPS & ILPS <ul style="list-style-type: none"> <li>Intensive indoor</li> <li>Intensive grazing</li> <li>Semi-extensive</li> </ul> | 1. "Own" Abatement cost curve<br>2. "Available" monetisation factor                                                                                                       | Indicators/methods for social externalities                                | Environment (climate change)        | Need to expand or develop new social externalities indicators for TCA                                 |
| Social                                                    | ELPS & ILPS <ul style="list-style-type: none"> <li>Intensive indoor</li> <li>Intensive grazing</li> <li>Semi-extensive</li> </ul> | 1. Local employment<br>2. Fair salary<br>3. Occupational health & safety                                                                                                  | Indicators for social impact/externalities                                 | -ve social impact                   | Need to develop a standardised social impact indicators, methods and weighting + improve data quality |
| Greenhouse Gas (GHG): Enteric methane & Manure mgt.       | ELPS & ILPS <ul style="list-style-type: none"> <li>Intensive indoor</li> <li>Intensive grazing</li> <li>Semi-extensive</li> </ul> | 1. Emission factors (EFs)<br>2. Milk production & composition variables<br>3. Milk composition & animal variables                                                         |                                                                            |                                     |                                                                                                       |
| Nutritional life cycle assessment (n-LCA) – Environmental | ELPS & ILPS <ul style="list-style-type: none"> <li>Intensive indoor</li> <li>Intensive grazing</li> <li>Semi-extensive</li> </ul> | 1. Digestible Indispensable Amino Acids Score (DIAAS)<br>2. Nutrient Rich Food (NRF)<br>3. Nutrient Rich Diet (NRD)                                                       |                                                                            | +ve environmental (climatic) impact |                                                                                                       |
| Animal Health & Welfare (AHW)                             | ELPS & ILPS <ul style="list-style-type: none"> <li>Intensive indoor</li> <li>Intensive grazing</li> <li>Semi-extensive</li> </ul> | 1. Lameness<br>2. Body condition score                                                                                                                                    | Quantitative indicator data                                                | Broad applicability                 | Need to provide standardised indicators and scoring methods where indices are normalised              |
| Soil health – chemical,                                   | ELPS & ILPS <ul style="list-style-type: none"> <li>Intensive indoor</li> </ul>                                                    | 1. pH, SOC, Nitrogen, Phosphorus, stocking                                                                                                                                | Biological, physical and                                                   | +ve impact                          |                                                                                                       |

|                                           |                                                                                                                                   |                                                           |  |            |  |
|-------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------|--|------------|--|
| biological, & physical quality, fertility | <ul style="list-style-type: none"> <li>Intensive grazing</li> <li>Semi-extensive</li> </ul>                                       | density, soil compaction<br>2. Livestock slurries/manures |  |            |  |
| Biodiversity                              | ELPS & ILPS <ul style="list-style-type: none"> <li>Intensive indoor</li> <li>Intensive grazing</li> <li>Semi-extensive</li> </ul> | 1. Grazing (over-grazing) score/threshold                 |  | +ve impact |  |

As shown in Table 5, gaps in the available data have been identified, alongside limitations, such as the increasing need for standardisation of research data indicators across the main impact sub-categories. The EU's Farm Accountancy Data Network (FADN), from which most livestock production data and indicators are retrieved, provides some methodological benchmarks and frameworks for livestock production data and indicators. For most of these indicators, at least for the publicly available ones, measurements are standardised and quantified at EU level.

However, for indicators that are not entirely quantitative in nature, the complexity of collecting and standardising them creates challenges for developing EU-level datasets that facilitate standardised measurement across different regions. This is one of the reasons why many of these indicators are not collected across contexts using harmonised measurements etc. and made publicly available. When available, quantification approaches can be inevitably inconsistent across regions and perceived as vague and ambiguous by disciplines using traditional quantitative approaches (which have dominated mainstream data collection approaches historically). Thus, one of STEP UP's research objectives is to identify, improve and harmonise current sustainability indicators (including qualitative indicators) and, where feasible, develop new, improved indicators aligned with the key livestock production impact sub-categories (Figure 1). A significant challenge in this context is inter-disciplinary harmonisation and the incorporation of different methodological (quantitative/positivist and qualitative/interpretivist) approaches and data types. An overall objective of STEP-UP, through WP2, is to address these challenges through the eventual testing of different indicators (drawn from diverse methods such as Life Cycle Analysis, Safe and Just Operating Space) in diverse ILPS and integrating these data with conventional ELPS data to generate more holistic and comprehensive insights to sustainability transitions.

Providing groundwork for this, the criteria for identifying comprehensive indicators vis-à-vis the objectives of STEP UP have been defined, including data availability, data scalability, and ethical concerns (D2.1). An essential contribution of STEP UP is to support the transition of ELPS to more sustainable attributes of ILPS. Achieving this objective is hinged on identifying and leveraging clearly defined sustainability transition indicators linking current ELPS to ILPS across the EU. This will require thorough data-based analysis, possibility of which will emerge as STEP UP multidisciplinary research progresses. However, a preliminary assessment linking ELPS with ILPS is provided here as a foundation for this work, with specific reference to WP3 indicators.



## 5. Description of potential WP3 indicators for testing

### 5.1. WP3 indicators

The final refined and developed indicators of STEP UP's WP3 will integrate comprehensively to the eight key impact subcategories: economic, social, True Cost Accounting (TCA), greenhouse gases (GHGs), soil health, biodiversity, nutritional life cycle analysis (n-LCA), and animal health and welfare (Figure 1). Indicators (or components) for these subcategories are already routinely collected, and others (or components) will be newly tested using a subset of the ILPS case studies (in collaboration with WP3). As an example, the below highlights the potential economic indicators (improved and new):

- *Agricultural Income Distribution*: Explores indicators such as changes in family farm income across livestock production systems. The data and measurement framework for this indicator type are publicly available, e.g. in the FADN.
- *Income Volatility*: Potential indicators will include changes in farm income across time. The data and measurement framework for this indicator type are publicly available, e.g. in the FADN.
- *Risk management*: Potential indicators to be explored include management strategies and liquidity capacity (e.g., cash flow capacity) as risk reduction strategies. Indicators will be designed to capture this data in relation to publicly available information.
- *Diversification*: Potential indicators capture data related to the share of output, income or subsidies per livestock production system/enterprise. Indicators will be designed to capture this data in relation to publicly available information.
- *Public support*: The proposed indicators will be related to the level of support from the CAP pillars. New indicators will be designed.
- *Competitiveness*: Proposed indicators include compliance costs (whether at the CAP level or general EU regulations), premium price, financing requirements, among others. Indicators will be designed and calculated based on publicly available information.

An assessment of case-study ILPS (conducted by T2.2) was conducted for this deliverable (D2.3) to identify the alignment between ILPS features (and, in cases data) and WP3 preliminary indicators. When this assessment was conducted, the following indicator categories from WP3 were used:

1. Biodiversity
2. Land use
3. Water use
4. Nutrient Flows
5. Chemical Pollution
6. Aerosol loading

## D2.3 Dataset collected on ELPS and ILPS for WP3 Indicators

7. Climate
8. Livestock System Description
9. Nutrition Security
10. Health and Safety
11. Economy
12. Livestock System Resilience
13. Social

The alignment between these categories of indicators and the characteristics of ILPS overviewed in the Table 6 below:

Table 6: List of indicators and alignment with the ILPS

| Indicators                            | Sub-indicators                                                                                              | AgriSearch | Agro Integracja | Ballymaloe | Farm Zero C | Porganic (GenESI) | GPI Morteau-Comté | Nature d'éleveurs | Newford Suckler Beef | OasYs | Papille | Rebra-commerce | Remedios Picassat - A circular rum system | Sown Biodiverse Pastures | Tenen doo | Waters of LIFE | Svensk Kolinlagring |
|---------------------------------------|-------------------------------------------------------------------------------------------------------------|------------|-----------------|------------|-------------|-------------------|-------------------|-------------------|----------------------|-------|---------|----------------|-------------------------------------------|--------------------------|-----------|----------------|---------------------|
| Biodiversity                          | Total Permanent Pasture Area                                                                                | ✓          | ✓               | ✓          | ✓           | ✓                 | ✓                 | ✓                 | ✓                    | ✓     | ✓       | ✓              |                                           | ✓                        | ✓         | ✓              | ✓                   |
|                                       | Total Temporary Pasture Area                                                                                | ✓          | ✓               | ✓          | ✓           | ✓                 | ✓                 | ✓                 | ✓                    | ✓     | ✓       | ✓              | ✓                                         |                          | ✓         | ✓              | ✓                   |
|                                       | Livestock density on pastures                                                                               | ✓          | ✓               | ✓          | ✓           | ✓                 | ✓                 | ✓                 | ✓                    | ✓     | ✓       | ✓              | ✓                                         | ✓                        | ✓         | ✓              | ✓                   |
|                                       | Domestic diversity                                                                                          |            | ✓               | ✓          | ✓           | ✓                 |                   | ✓                 | ✓                    | ✓     | ✓       | ✓              |                                           | ✓                        | ✓         | ✓              |                     |
|                                       | CAP payments rights                                                                                         |            | ✓               | ✓          |             | ✓                 | ✓                 | ✓                 | ✓                    | ✓     | ✓       | ✓              | ✓                                         |                          | ✓         |                |                     |
|                                       | General biodiversity                                                                                        |            |                 |            | ✓           | ✓                 |                   | ✓                 | ✓                    | ✓     | ✓       | ✓              |                                           | ✓                        | ✓         | ✓              |                     |
| Land Use                              | Required agricultural area for feed demand, discriminated, if possible, by pastures and feed (fodder crops) |            | ✓               | ✓          | ✓           |                   | ✓                 | ✓                 | ✓                    | ✓     | ✓       | ✓              | ✓                                         |                          | ✓         |                |                     |
|                                       | Soil organic carbon concentration in pasture and feed soils                                                 | ✓          | ✓               |            | ✓           |                   | ✓                 | ✓                 | ✓                    | ✓     | ✓       | ✓              | ✓                                         | ✓                        | ✓         | ✓              | ✓                   |
|                                       | Manure produced (discriminated by excretion in pastures AND manure kept in storage)                         | ✓          | ✓               | ✓          | ✓           | ✓                 | ✓                 | ✓                 | ✓                    | ✓     | ✓       | ✓              | ✓                                         |                          | ✓         | ✓              |                     |
| Water use                             | Consumptive Blue Water uses for animal and feed production                                                  | ✓          | ✓               | ✓          | ✓           | ✓                 | ✓                 | ✓                 | ✓                    | ✓     | ✓       | ✓              | ✓                                         | ✓                        | ✓         | ✓              | ✓                   |
| Nutrient flows                        | Release of organic and inorganic fertilizer (Nitrogen) from animal production                               | ✓          | ✓               | ✓          | ✓           | ✓                 | ✓                 | ✓                 | ✓                    | ✓     | ✓       | ✓              | ✓                                         |                          | ✓         | ✓              | ✓                   |
|                                       | Input of organic and inorganic fertiliser (Nitrogen)                                                        |            | ✓               | ✓          | ✓           |                   | ✓                 |                   | ✓                    | ✓     | ✓       | ✓              | ✓                                         |                          | ✓         | ✓              | ✓                   |
|                                       | Release of organic and inorganic fertilizer (phosphorus) from animal production                             |            | ✓               |            | ✓           | ✓                 | ✓                 | ✓                 | ✓                    | ✓     | ✓       | ✓              | ✓                                         |                          | ✓         | ✓              | ✓                   |
|                                       | Input of inorganic fertilizer (phosphorus)                                                                  |            | ✓               | ✓          | ✓           |                   | ✓                 | ✓                 | ✓                    | ✓     | ✓       | ✓              | ✓                                         | ✓                        | ✓         | ✓              |                     |
| Chemical pollution<br>*Novel entities | Use of pesticides for animal feed production                                                                | ✓          | ✓               | ✓          | ✓           | ✓                 | ✓                 | ✓                 | ✓                    | ✓     | ✓       | ✓              | ✓                                         | ✓                        | ✓         | ✓              | ✓                   |
|                                       | Use of antimicrobials for animal production                                                                 | ✓          | ✓               | ✓          | ✓           | ✓                 | ✓                 | ✓                 | ✓                    | ✓     | ✓       |                | ✓                                         | ✓                        | ✓         | ✓              | ✓                   |

|                                     |                                                                                                                                  |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|-------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <b>Aerosol loading</b>              | Share of the Ammonia emissions allowed for livestock production                                                                  | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |   | ✓ | ✓ | ✓ | ✓ | ✓ |   | ✓ | ✓ | ✓ |
|                                     | Share of PM 2.5 emissions allowed for livestock production                                                                       |   |   | ✓ |   | ✓ | ✓ |   | ✓ | ✓ | ✓ | ✓ | ✓ |   | ✓ | ✓ | ✓ |
| <b>Climate</b>                      | Share of GHG emissions allowed for livestock production                                                                          |   | ✓ | ✓ | ✓ | ✓ | ✓ |   | ✓ | ✓ | ✓ | ✓ | ✓ |   | ✓ | ✓ | ✓ |
|                                     | Share of Radiative forcing allowed for livestock production                                                                      |   |   | ✓ |   | ✓ |   |   |   |   | ✓ | ✓ | ✓ |   | ✓ | ✓ | ✓ |
| <b>Livestock system description</b> | Livestock number: animal numbers by animal category (e.g. species and age)                                                       | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
|                                     | Product sales                                                                                                                    | ✓ | ✓ |   | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
|                                     | Productivity                                                                                                                     | ✓ | ✓ |   | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |   | ✓ |
|                                     | Feed use                                                                                                                         | ✓ | ✓ |   | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |   | ✓ |
|                                     | Efficiency                                                                                                                       |   | ✓ |   | ✓ | ✓ | ✓ |   | ✓ | ✓ | ✓ | ✓ | ✓ |   | ✓ |   |   |
| <b>Nutrition security</b>           | Share of population that cannot afford animal-source foods                                                                       |   |   | ✓ |   |   | ✓ |   |   |   |   | ✓ | ✓ |   | ✓ | ✓ |   |
|                                     | Percentage of price increase of animal-source foods                                                                              |   |   | ✓ | ✓ | ✓ | ✓ |   |   | ✓ |   | ✓ | ✓ |   | ✓ | ✓ |   |
|                                     | Import dependency ratio for animal-source foods                                                                                  |   |   | ✓ | ✓ | ✓ | ✓ |   |   |   | ✓ | ✓ | ✓ |   | ✓ | ✓ |   |
|                                     | Self-sufficiency ratio for feed                                                                                                  | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
|                                     | Share of animal-source foods waste from food processing, transport and food waste from commodities and food services consumption |   |   | ✓ |   |   | ✓ |   |   |   |   | ✓ | ✓ |   | ✓ | ✓ |   |
| <b>Health &amp; Safety</b>          | Zoonoses                                                                                                                         | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |   | ✓ | ✓ | ✓ | ✓ | ✓ |   | ✓ | ✓ |   |
|                                     | Animal source food consumption safety                                                                                            |   |   | ✓ | ✓ |   | ✓ |   | ✓ | ✓ | ✓ | ✓ | ✓ |   | ✓ |   |   |
|                                     | Share of population that over-consume animal-source foods (split products ?)                                                     |   |   | ✓ | ✓ |   | ✓ |   | ✓ | ✓ | ✓ | ✓ |   |   | ✓ |   |   |
| <b>Economy</b>                      | Average value added in animal food value chain                                                                                   |   |   |   | ✓ | ✓ |   |   |   |   | ✓ | ✓ |   |   | ✓ |   |   |
|                                     | Total factor productivity in animal food value chain                                                                             |   |   |   | ✓ | ✓ |   |   |   |   | ✓ | ✓ | ✓ |   | ✓ |   |   |
|                                     | Number of employment (EQUIVALENCE TO full-time workers) in animal production (full sector)                                       |   |   | ✓ | ✓ | ✓ |   |   | ✓ |   | ✓ | ✓ | ✓ |   | ✓ | ✓ |   |

|            |                                                                                             |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|------------|---------------------------------------------------------------------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
|            | Evolution of employment rate in rural areas                                                 |   |   |   | ✓ |   |   |   | ✓ |   |   | ✓ | ✓ |   | ✓ | ✓ |   |
|            | Direct production costs                                                                     | ✓ | ✓ |   | ✓ | ✓ | ✓ |   | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
|            | Animal purchases and sales                                                                  | ✓ |   | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
|            | Share of value added for primary producers in the food chain                                |   |   |   | ✓ | ✓ |   |   | ✓ |   |   | ✓ | ✓ |   | ✓ |   |   |
|            | Cashflow                                                                                    | ✓ | ✓ |   | ✓ | ✓ | ✓ |   | ✓ |   | ✓ |   | ✓ | ✓ |   |   | ✓ |
|            | Capital investment                                                                          | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |   | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |   | ✓ |
|            | Difference between sectoral and MS wages                                                    |   |   | ✓ | ✓ |   |   |   |   |   | ✓ | ✓ | ✓ |   |   |   |   |
|            | Workload (work intensity, physical load etc.)                                               | ✓ | ✓ |   | ✓ | ✓ | ✓ |   | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
|            | Contribution to ecosystem services                                                          | ✓ | ✓ |   | ✓ | ✓ |   |   |   | ✓ |   | ✓ | ✓ | ✓ |   |   | ✓ |
|            | Diversification (food and non-food products)                                                | ✓ |   | ✓ | ✓ |   |   |   |   | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |   | ✓ |
| Resilience | (Difference or ratio) of young farmers and farmers going into retirement                    | ✓ |   |   | ✓ |   |   | ✓ |   |   |   | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
|            | Net farm income / FTE (Full-Time Equivalent) farmer                                         | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |   | ✓ |
|            | Farm net income - Total subsidies / Total Output                                            | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |   | ✓ | ✓ | ✓ | ✓ | ✓ |   | ✓ |
|            | Fixed assets (excluding land) + stocks / FTE farmer                                         | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |   | ✓ | ✓ | ✓ | ✓ | ✓ |   | ✓ |
|            | Gross product of the farm's main production, before aid / farm Gross Product before aid (%) | ✓ | ✓ |   | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |   | ✓ |
|            | Yearly bank loans repayment / Gross Product (%)                                             | ✓ | ✓ | ✓ | ✓ |   | ✓ | ✓ | ✓ | ✓ |   | ✓ | ✓ | ✓ | ✓ |   | ✓ |
|            | Total subsidies / Farm net Income (%)                                                       | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |   | ✓ |
| Social     | Palma Ratio                                                                                 | ✓ |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|            | Animal friendly practices index?                                                            |   |   |   |   | ✓ |   |   |   | ✓ |   |   |   |   |   |   |   |
|            | Farmers welfare index?                                                                      |   |   |   | ✓ | ✓ |   |   |   | ✓ |   |   |   |   |   |   |   |
|            | Nb of people with a professional diploma who work in agro-industry                          | ✓ |   | ✓ | ✓ |   |   | ✓ |   |   | ✓ |   | ✓ |   | ✓ | ✓ |   |
|            | Nb of people with a professional diploma who work in livestock farms                        | ✓ |   | ✓ | ✓ |   |   |   |   | ✓ |   | ✓ | ✓ |   | ✓ | ✓ | ✓ |



|  |                                                                             |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|--|-----------------------------------------------------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
|  | Number of female-owned agri-businesses of farm and on farm product/business | ✓ |   | ✓ | ✓ |   |   | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
|  | % women/men students in agriculture                                         | ✓ |   | ✓ | ✓ |   |   | ✓ | ✓ |   | ✓ | ✓ |   | ✓ | ✓ |   |   |
|  | Numbers of hours worked on the farm (hired and family)                      | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |

While the above table show how preliminary WP3 indicators are reflected within ILPS when the ILPS case-studies were newly completed, at the time of writing (D2.3), a revised list of indicators from WP3 became available. Whilst these potential indicators are still developing, preliminary analysis indicates that indicators correspond to the following categories (which are an iterative refinement of the categories used in the tables above):

1. Safe & healthy living conditions
2. Commitment to sustainability issues
3. Food Safety & Hygiene
4. Animal Health & Welfare
5. Waste
6. Supply Chain Transparency & Traceability
7. Environmental: GHG Emissions & Biodiversity
8. Just Transition: Fair Competition & Wealth Distribution
9. Farm income
10. Risk management measures
11. Liquidity
12. Compliance costs
13. Premium prices/ premiumisation.

For the next iteration of case-study field research in ILPS, data capturing the above revised categories of indicators will be undertaken. Opportunities and challenges will be identified using the ILPS as testbeds, continuing with the ongoing mission of refinement and assessment of the feasibility of new and improved indicators.

## 6. Conclusions

Deliverable D2.3 aimed to overview the collected datasets for the ELPS and ILPS case studies and to provide a preliminary view as to how they intersect, specifically for the application and testing of WP3 indicators (and WP4 methods). This deliverable provides a snapshot of the intersections between the information collected on the ELPS and the ILPS within the STEP UP consortium so far, and the reflection of indicators corresponding to key impact subcategories across ELPS and ILPS. The ILPS case-study selection criteria (D2.1) ensured ILPS' relevance to STEP UP's impact sub-categories (deployed across the project, Figure 1). This deliverable has revealed potential themes in the sustainability impact subcategories, where there may be possible limitations in the current ELPS data for applying the new and improved indicators developed by STEP UP to guide sustainability transition pathways. The initial assessment of cross-relevance between ELPS and ILPS

presented in this deliverable, provides important relevant background data/information for the next stages of experimental work, which are underway. The gaps identified in Table 4 provide important direction for exploring potential for the development for enhancing the comprehensiveness and rigour of revised datasets to capture the wider dynamics of sustainability transitions of ELPS. In impact subcategories such as social and biodiversity, as the work of STEP UP progresses, selected ILPS will serve as testbeds for assessing new and improved sustainability indicators and methods. Outputs in the form of tested indicators will then be furthermore refined for assessing feasibility for their application in routine data collection instruments used across ELPS.

### References

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