Cross-sectoral planning decision-making platform to foster climate action

Rethink Action

D 4.6 | LAMS catalogue: design, development and deployment II

WP4 – Land use-based Adaptation and Mitigation Solutions (LAMS) catalogue

Version 1.1 | February 2025

H2020-LC-GD-2020-2: LC-GD-9-2-2020. Developing end-user products and services for all stakeholders and citizens supporting climate adaptation and mitigation

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Document History

Project Acronym	RethinkAction
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Date	Ver.	Contributers	Comment
12/12/21	0.1	Iván Ramos Diez (CARTIF)	Template
08/03/24	0.1	Claudia Dămătîrcă (CMCC)	First draft for internal review
12/03/24	0.1	Carlos De La Cruz León (CARTIF)	Input to Section 3
12/03/24	0.1	Chiara De Notaris (CMCC)	Internal review
15/03/24	0.2	Claudia Dămătîrcă (CMCC)	Final draft for quality review
26/03/24	0.2	Tommaso Brazzini (UVa)	Internal review
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19/02/25	1.1	Iván Ramos (CARTIF)	Final review before the submission

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List of Organizations

	Participant Name	Short Name	Country	Logo
1	Fundación CARTIF	CARTIF	Spain	
2	University of Valladolid	UVa	Spain	
3	IVL Swedish Environmental Research Institute	IVL	Sweden	
4	RINA Consulting	RINA-C	Italy	
5	Euro-Mediterranean Center of Climate Change	CMCC	Italy	
6	Climate Media Factory	CMF	Germany	
7	National Observatory of Athens	NOA	Greece	
8	GMV Aerospace and Defence SAU	GMV	Spain	
9	FCiências.ID - Associação para a Investigação e Desenvolvimento de Ciências	FC.ID	Portugal	
10	ICLEI - Local Governments for Sustainability e.V. (World Secretariat) 10 A | ICLEI European Secretariat GmbH	ICLEI	Germany	
11	United Nations University - Institute for Environment and Human Security	UNU-EHS	Japan	
12	Geonardo Environmental Technologies Ltd.	GEO	Hungary	
13	Institut National de la Recherche pour l'Agriculture, l'Alimentation et l'Environnement	INRAE	France	

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Abbreviation and Acronyms

Acronym	Description
API	Application Programming Interface
EU	European Union
IPCC	Intergovernmental Panel on Climate Change
KPI	Key Performance Indicator
LAMS	Land use-based Adaptation and Mitigation Solutions
LUCAS	Land Use and Coverage Area frame Survey
SD	System Dynamic
SDGs	Sustainable Development Goals
SRCCL	Special Report on Climate Change and Land
WP	Work Package

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Executive summary

Deliverable D4.6 “LAMS catalogue: design, development and deployment II” presents the outcomes of Task 4.4 “LAMS catalogue development, deployment and validation”.

The deliverable D4.6 consists of the definitive version of the Land use-based Adaptation and Mitigation Solutions (LAMS) catalogue that includes the parameters and variables identified and analyzed under T4.2 “LAMS catalogue requirements definition and specifications” and T4.3 “Analysis of synergies and trade-offs and definition of the KPI-driven evaluation framework of LAMS”, that are deemed to be relevant for the RethinkAction modelling activities and incorporated in the RethinkAction platform. The LAMS catalogue is submitted as an Excel-based file (deliverable type: OTHER), while the present Explanatory Note is elaborated to describe the final structure of the catalogue, the updates applied form the former version submitted with D4.5 (“LAMS catalogue: design, development and deployment I) and the LAMS factsheets.

The definitive version of the catalogue includes 62 LAMS, consistent across scales (from EU/Global to national/local), that were analyzed in depth, including the identification of synergies, trade-offs, drivers, and barriers. The LAMS catalogue will be incorporated in the LAMS visualization RethinkAction platform, while a selection of the LAMS will be simulated and evaluated at different scales (both EU/global and local). Based on the results of the simulations and evaluation in the models under development in other tasks of the project, policy recommendations will be formulated and presented to the end-user community.

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1 Introduction

1.1 Purpose of the document

The deliverable D4.6 **"LAMS catalogue: design, development and deployment II"** is composed of the updated and definitive version of the Land use-based Adaptation and Mitigation Solutions (LAMS) catalogue (Excel file), an explanatory note (this document) and the LAMS factsheets. The aim of the present document is to detail the structure of the LAMS catalogue, the changes implemented from the first version submitted with D4.5 (LAMS catalogue: design, development and deployment I) at month 24, the process followed for the translation of the catalogue into a machine-readable format and present the LAMS factsheets prepared for each LAMS.

The development of the LAMS started from the solutions identified in Tasks 4.1 (Review of Land use-based Adaptation and Mitigation Solutions) and followed the structure and requirements defined under Task 4.2 (LAMS catalogue structure and requirements). The list of solutions was refined, simplified, and holistically analyzed and characterized in the subsequent Task 4.3 (Analysis of synergies and trade-offs and definition of the KPI-driven evaluation framework of LAMS) and Task 4.4 (LAMS catalogue development, deployment and validation). The final version of the catalogue includes 62 LAMS relevant at different scales (from local, *i.e.,* RethinkAction case studies, to EU/Global) and across different policy sectors (*e.g.*, agriculture, biodiversity, forestry, buildings, energy, and tourism among others) and address both climate change adaptation and mitigation, as defined by the Intergovernmental Panel on Climate Change (IPCC). Adaptation is "the process of adjustment to actual or expected climate and its effects, in order to moderate harm or exploit beneficial opportunities", while mitigation is "a human intervention to reduce emissions or enhance the sinks of greenhouse gases".

The aim of the LAMS catalogue is to facilitate the consultation and use of the solutions by end-users, consortium members, modelers in WP5 (Modelling framework and policy recommendations) and WP6 (Case studies-local evaluation), and to be integrated in RethinkAction platform in WP7 (RethinkAction Platform: design, development and deployment).

The definitive version of the LAMS catalogue consists of an Excel file with 12 sheets, which are detailed in Section 2 (Structure of the catalogue).

1.2 Structure of the document

The present document is structured as follows:

- Section 1: introduces the document and explains its main purposes.

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- Section 2: describes the different sections of the LAMS catalogue and the updates from the last submitted version.
- Section 3: describes the process followed for the translation of the LAMS catalogue into a machine-readable format.
- Section 4: presents the LAMS factsheets.
- Section 5: presents the next steps and links to other WPs.
- Section 6: includes concluding remarks.

Additionally, one annex is provided to complement the information in the main sections, namely:

Annex I: Example of LAMS factsheet.

2 Structure of the LAMS catalogue

The LAMS catalogue will, on the one side, form the basis for the modelling activities (WP5 and WP6), while on the other side will be implemented in the RethinkAction platform (under development in WP7). The implementation of the LAMS catalogue in the RethinkAction platform will allow its consultation by end-users. The usability of the LAMS catalogue will be tested with the end-user community along with the demonstration and validation activities that will be performed for the platform release, within WP7.

The catalogue contains a brief and clear description of each LAMS, general specifications, as well as requirements that are strictly connected to the setup and functioning of the models, currently under development.

As above mentioned, the Excel-based LAMS catalogue consists of twelve sheets:

- Introduction: include information about the project and the partners involved.
- LAMS list: include the **list of the 62 LAMS**, accompanied by the **LAMS source** (*i.e.,* the policy document where the LAMS was identified at EU/global and national/local scale), **LAMS definition** and **LAMS benefits** with their references. Further, to emphasize the importance of Nature-based Solutions (NbS), for each LAMS it is indicated whether it can be considered as one. Nature-based Solutions are defined by the European Commission as "solutions that are inspired and supported by nature, which are cost-effective, simultaneously provide environmental, social and economic benefits and help build resilience. Such solutions bring more, and more diverse, nature and natural features and processes into cities, landscapes and seascapes, through locally adapted, resource-efficient and systemic interventions". More

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details about the LAMS identification and simplification process can be found in D4.1 (Review of solutions for LAMS catalogue), D4.2 (Requirements and specifications for designing the LAMS catalogue), and D4.5 (LAMS catalogue: design, development and deployment II).

- General specifications: reports the LAMS characterization and systematization by: **Type of solution** (i.e., spatial planning, land management, lifestyle/behavioural change), **Primary policy sector** (*i.e.,* policy sector where the solution is directly applied/implemented), **Secondary policy sector** (*i.e.,* other policy sectors affected), , **Land cover**, **Application** (*i.e.,* supply and/or demand), **Scope** *(i.e.,* adaptation and/or mitigation), **Scale** (implementation in the model), **Actors involved** (actors that have a direct contribution for a successful LAMS implementation), **Institutional support** (necessary (in)direct support for the success of LAMS implementation), **Associated KPI**. The attribution of each LAMS to a specific type of solution was performed according to the 2019 Intergovernmental Panel on Climate Change (IPCC) Special Report on Climate Change and Land (SRCCL) [1]. The policy sectors were determined based on the reviewed policy documents, in alignment with ClimateADAPT [2]. The Land cover was derived from the Land Use and Coverage Area frame Survey (LUCAS) [3] and aligned with the categories used by the "Within Limits Integrated Assessment Model" (WILIAM). Application and scope were determined based on the IPCC's definitions [1]. The scale was determined with partners involved in the modelling activities, and it is referred to the scale of implementation in the system dynamic (SD) models (EU/global or local). Generally, all LAMS can be implemented at every scale. Actors involved and institutional support were developed starting from the factors identified in D2.2 (Review of lifestyle and structural behaviour change affecting land use), and expert judgement. Lastly, the Associated KPIs for each LAMS were based on the association of Key Performance Indicators (KPIs) from the "KPIs and SDGs" list to relevant LAMS. KPIs will be used to evaluate LAMS in the SD model. More details are available in D4.2 (Requirements and specifications for designing the LAMS catalogue), D4.4 (List of KPIs to measure, analyze and compare solutions) and D4.5 (LAMS catalogue: design, development and deployment II).
- Suitability factors: covers the geographical (*e.g.,* land use, altitude/elevation, slope, soil texture, and climate conditions), regulatory (*e.g.,* protected land status such as natural protected areas, areas of special protection for birds), sustainability (*e.g.*, distance from protected areas, distance from settlements and urban areas, distance from industrial and transport infrastructures) and techno-economic (*e.g.*, proximity to ignition sources) suitability factors or applicability conditions of the LAMS, identified based on available literature. More details can

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be found in D3.3 (Land use maps and suitability factors for the allocation of land uses) and D5.2 (Methods for impacts assessment and land allocation considering LAMS deployment).

- Processes and parameters: covers the description of parameters and processes involved for each LAMS, the variables needed for model simulation, as well as the feasibility of modeling in the global and local scale models of each LAMS. More details can be found in D4.2 (Requirements and specifications for designing the LAMS catalogue).
- Adaptation and mitigation: reports the LAMS mitigation potential (*i.e.,* small, moderate, large) and the respective intervals of confidence (*i.e.,* low, medium, high), potential global mitigation range expressed in Gt CO2eq year^{-1}; adaptation potential (*i.e.*, small, moderate, large) and the respective intervals of confidence (*i.e.,* low, medium, high), and the IPCC source from which the data was collected [1][4]. Since it was not always possible to find the exact land-based solution in the IPCC estimates, the most relevant IPCC correspondent solution was selected and reported in the Corresponding IPCC option column. The main risks addressed and the possible opportunities associated to each LAMS were also identified based on available literature, highlighting how also LAMS with a primary mitigation scope can provide adaptation co-benefits. The cost of implementation followed the same approach as the mitigation potential. It was extracted from the IPCC reports [1][4], and was expressed as USD/t CO_2 eq. As the mitigation potential, it was divided in three ranges: < 10 USD/t CO_2 eq, 10 to 100 USD/t CO_2 eq and > 100 USD/t CO_2 eq. When no data was available, "No Global Estimates" was reported.
- LAMS Drivers: reports the institutional and legal, financial and investment, economic and market, socio-cultural, organizational and governance and technical drivers to LAMS implementation, determined based on literature review. More details are available in D4.3 (Report on the synergies and trade-offs between the solutions catalogued).
- LAMS Barriers: reports the institutional and legal, financial and investment, economic and market, socio-cultural, organizational and governance and technical barriers to LAMS implementation, based on literature review. More details are available in D4.3 (Report on the synergies and trade-offs between the solutions catalogued).
- Synergies and trade-offs: reports the identified synergies and trade-offs between the different LAMS, determined based on the qualitative assessment of the environmental, social, economic and financial impacts and natural, social, economic and financial resources required for LAMS implementation. LAMS assessment followed an iterative approach, based on expert judgement. For the Impacts criteria: "++" refers to a significant positive impact of the LAMS, "+" to slightly

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positive impact of the LAMS, "-" to slightly negative impact of the LAMS, "--" to a significant negative impact of the LAMS. For the Resources criteria: "+" refers to a small amount of resources for the LAMS implementation, "++" to a moderate need of resource for the LAMS implementation and "+++" to a high need of resource the LAMS implementation (highlighting a high competition for resources between different LAMS). Empty cells refer to a neutral LAMS impact or negligible need of resources. More details are available in D4.3 (Report on the synergies and trade-offs between the solutions catalogued).

- KPIs and SDGs: reports the list of identified Key Performance indicators (KPIs), including their pillar, category, definition, unit, associated LAMS and associated Sustainable Development Goals (SDGs). The identification of KPIs was based on available literature and covers the three pillars of sustainable development (*i.e.,* environment, social and economy). More details are available in D4.4 (List of KPIs to measure, analyze and compare solutions), including quantitative targets.
- List of policy documents: includes the acronyms, the complete name of the policy documents consulted for the LAMS identification, scale of the document, type of document, year of publication and achievement, and the link. The policy documents at national scale include documents identified in the six RethinkAction case studies.
- List of references: includes the list of all the references cited for the LAMS analysis.

2.1 Updates from D4.5

The LAMS catalogue will serve multiple purposes. Therefore, a strong alignment with the other activities conducted in the project was needed, leading to updates and improvement of the LAMS catalogue respect to the last version submitted with D4.5. The updates and improvements performed mainly referred to:

- In the LAMS list sheet: the "Other info" column was converted into "Benefits". The information included in the former "Other info" column was enriched based on the available literature, related to the benefits of the implementation of each LAMS.
- In General specifications sheet: a new "Associated KPI column" was included, in order to associate the KPIs identified in Task 4.3 and included in the "KPI and SDGs" sheet, to each LAMS. The association was made based on the feasibility of the KPIs the evaluate the LAMS in the SD model, and was validated by other partners involved in this activity.

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- In the Suitability factors sheet: the "x" that emphasized the applicability of the suitability factors for the LAMS implementation, was substituted with the suitability intervals and criteria, identified from the literature. The suitability factors and criteria were identified and reported in D5.2 (Methods for impacts assessment and land allocation considering LAMS deployment).
- The Drivers and barriers sheet was separated into two different sheets (LAMS drivers and LAMS barriers), to facilitate the transition of the LAMS catalogue into a machine-readable format.
- In the KPI and SDGs sheet: a new column "Associated LAMS" was included, with the LAMS that were found relevant to be evaluated by each KPI in the SD model.
- A new List of references sheet was included, reporting all references used for the LAMS analysis and characterization. To each reference was assigned an ID, in order to facilitate the transition of the LAMS catalogue into a machine-readable format. The references in all LAMS catalogue sheets were updated to include the same reference ID as in the List of references sheet.
- In the synergies and trade-offs sheet, based on input emerged during quality review it was decided to change the water resources needed for LAMS 18. Renewable energy (biogas) from agricultural residues from 0 to 1, and the impact on air quality criteria of LAMS 19. Renewable energy produced from forest biomass from 1 to 0.

3 LAMS catalogue ontologies

Based on the structure defined in the *General specifications* sheet of the catalogue, its ontology can be constructed as follows:

1. Sectors (primary and secondary sectors of application) that will be the main classes.
2. Measures (LAMS) that will be associated with sectors.

Figure 1 includes the representation of the catalogue ontology, which illustrates the relationships between sectors, and adaptation and mitigation measures against climate change (LAMS). To better understand the relationships, it is necessary to divide them into hierarchical and implementation relationships.

- Hierarchical relationships:
    - The catalogue is structure in sectors.
    - Each sector contains measures.
    - A measure can be at least related to one or multiple sectors.

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- Implementation relationships:
    - Some measures can be shared by more than one sector.
    - Complementary relationships (synergies and trade-offs) between measures exists that enhance their impact on adaptation and mitigation.

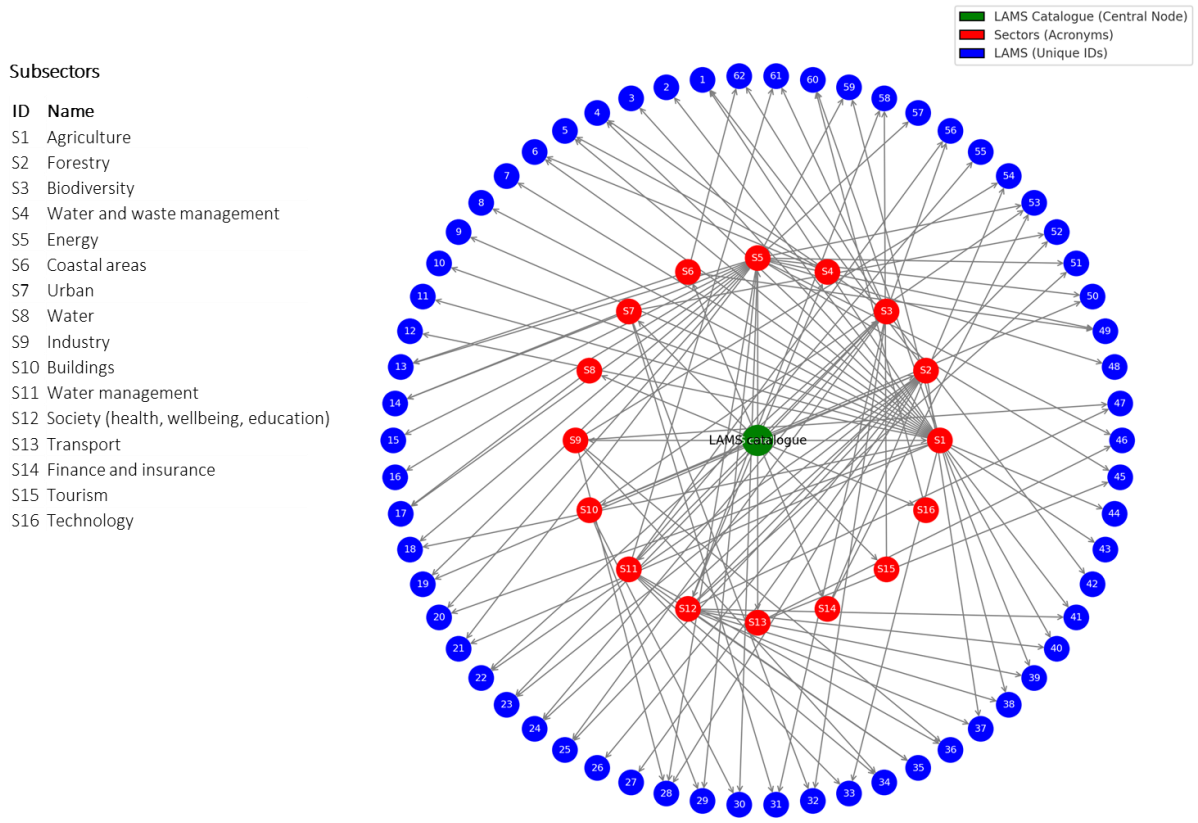

Figure 1. Representation of the LAMS catalogue ontologies.

4 LAMS catalogue into machine-readable format

For the migration of the LAMS Catalogue from an Excel-based (.xlsx) document to a machine-readable format, the information in the catalogue was strategically organized into a well-structured relational model, which is why a PostgreSQL database has been selected for storing the information. The central node of the database is the LAMS table, featuring attributes such as LAMS ID, name, and primary characteristics. This central node serves as a focal point from which various related tables emanate, categorized into three main groups.

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The first category encompasses tables for secondary characteristics, covering aspects like adaptation, mitigation, processed data, drivers, and barriers.

The second category consists of reference tables, housing essential information such as policy documents, references and key performance indicators (KPIs). These reference tables establish a link to LAMS through a mapping table, employing REFERENCE ID-LAMS ID relationships.

The third category, the impacts section, involves two distinct tables. The first captures the synergies and trade-off matrix, while the second stores suitability factors. These tables follow a consistent structure, featuring listing tables and mapping tables containing entity ID, LAMS ID, and the corresponding values.

Furthermore, we have guaranteed data accessibility through an Application Programming Interface (API), offering a specific endpoint for retrieving only the necessary data for the Catalogue Tool in the project platform and endpoints for public use. Each of these public use endpoints corresponds to a tab in the original .xlsx file, ensuring integration and user-friendly data retrieval capabilities for the LAMS Catalogue tool.

The API is already developed but it cannot be publicly accessed yet. It will be accessible for any user with a device with internet connection in the following months. More information on this database will be included in Deliverable 7.2 (Synthesis of the integration of databases for the RethinkAction data layer).

5 LAMS factsheets

The LAMS factsheet will be available for download by the end-users in the RethinkAction platform, for getting key information about each LAMS. A first template of the LAMS factsheet was submitted with D4.5. However, the design was updated and improved to ensure alignment with the project visual identity. The new and improved design of the factsheets was created using online the Figma software (https://www.figma.com). After the approval and validation of the template by the consortium, a factsheet was created for each LAMS.

With respect to the former template, submitted with D4.5, the catalogue visualization path and relevant KPIs were removed from the factsheets since they were considered redundant or not relevant for end-users.

The contribution towards SDGs of each LAMS was determined based on IPCC reports [1][4]. The measures directly mentioned in the IPCC report (e.g. Agroforestry) the contribution to SDGs was retrieved. Contrarily, when the LAMS measures were not explicitly mentioned in the reports, they were assigned to broader similar categories that might include them [1][4].

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The final version of the LAMS factsheet is organized in the following sections:

- LAMS name.
- General description and characterization of the solution: type of solution; land use; policy sector(s); definition; processes, effects and relevant factors; scope and potential; application; LAMS benefits.
- Co-benefits and possible negative effects: that includes the environmental, social, economic and financial impacts and natural, social, economic and financial resources required for LAMS implementation, following the same structure of the synergies and trade-offs matrix.
- Contribution to SDG: the contribution to specific SDGs of each LAMS, based on IPCC reports [1][4].
- Drivers and barriers: table including the institutional and legal, financial and investment, economic and market, socio-cultural, technical, organizational and governance drivers and barriers to LAMS implementation.
- Policy document and relevance: includes the policy documents (LAMS source) in which the LAMS was identified, and the relevant scale. The relevant scale is always Local/National and EU/Global since the LAMS included in the catalogue can generally be implemented at all scale.
- References: includes all the references cited in the factsheet, with their corresponding ID.

After the development of all factsheets in Figma, a first round of review was performed with the RethinkAction partners, based on their expertise, to check the accuracy of the information included. Then, the definitive consolidated version was downloaded from Figma as a PDF file, that will be submitted separately to ease usability for the platform. An example of LAMS factsheet is included in Annex I.

6 Next steps

The LAMS catalogue represents the basis of modelling activities, both at EU/global and local scale (WP5 and WP6). Following the simulation and evaluations of the LAMS in the system dynamic models, policy recommendation will be provided at EU/global scale (WP5) and at local scale (WP6). The catalogue will also form the basis of the user-friendly visualization tool, developed in the context of the RethinkAction Project. The RethinkAction platform will allow end-users to investigate the solutions included in the catalogue, and to access the data collected during the LAMS characterization and analysis, and therefore to have a complete overview of the solutions. These could help empowering on one hand decision-

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makers (policymakers, landowners, farmers, investors, consultancies, renewable energy companies, etc.) and on the other hand citizens (civil society, NGOs or other associations representing citizens), by improving their knowledge on climate services and adaptation and mitigation solutions and impacts.

7 Conclusions

This report is an Explanatory Note accompanying D4.6 "LAMS catalogue: design, development and deployment II". It describes the structure and the improvements applied to the LAMS catalogue, an Excel-based tool that contains 62 LAMS that were comprehensively analyzed and characterized. The holistic analysis of LAMS started from general specifications (*e.g.,* definition, policy sector, application, scope, etc.) and continued with the identification of suitability factors, adaptation and mitigation potential, drivers, barriers, synergies and trade-offs, and more. The collected data was included in a first version of the LAMS catalogue, submitted with D4.5 (LAMS catalogue: design, development and deployment I), that was improved and consolidated in the definitive version of the catalogue, submitted together with the present document. The LAMS catalogue was also translated into a machine-readable online format, that will be available in the following months for usage by end-users.

The LAMS included in the catalogue will be simulated and evaluated at different scales (EU/global to local), integrated in the RethinkAction platform and used for the formulation of policy recommendations that will be presented to the RethinkAction End Users Community.

References

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In IPCC, 2022a: Climate Change 2022: Mitigation of Climate Change. Contribution of Working Group III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [P.R. Shukla, J. Skea, R. Slade, A. Al Khourdajie, R. van Diemen, D. McCollum, M. Pathak, S. Some, P. Vyas, R. Fradera, M. Belkacemi, A. Hasija, G. Lisboa, S. Luz, J. Malley, (eds.)]. Cambridge University Press, Cambridge, UK and New York, NY, USA. doi: 10.1017/9781009157926.004

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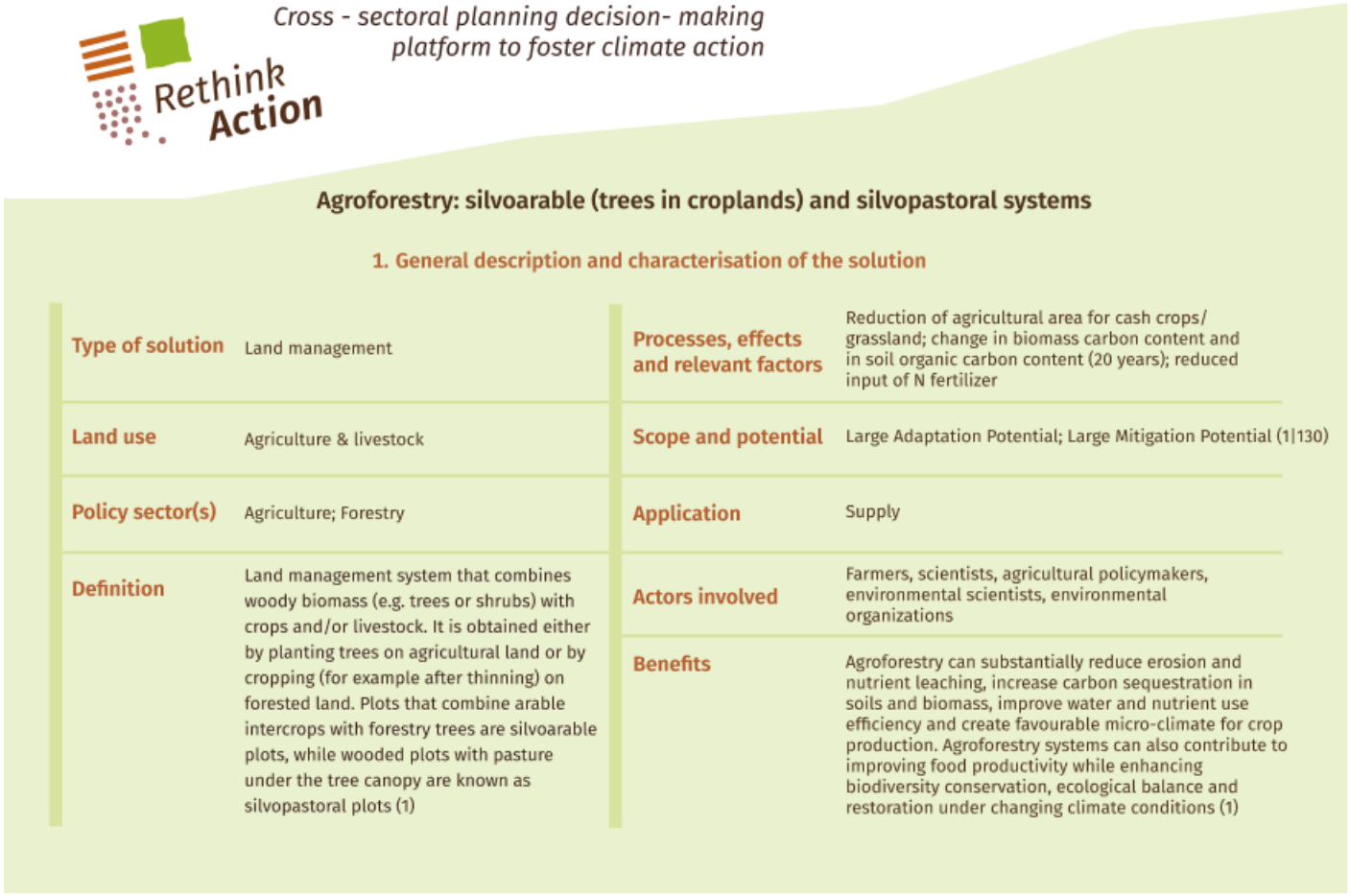
Annex I: Example of LAMS factsheet



Cross - sectoral planning decision- making platform to foster climate action

Agroforestry: silvoarable (trees in croplands) and silvopastoral systems

1. General description and characterisation of the solution

Type of solution	Land management	**Processes, effects and relevant factors**	Reduction of agricultural area for cash crops/ grassland; change in biomass carbon content and in soil organic carbon content (20 years); reduced input of N fertilizer
Land use	Agriculture & livestock	**Scope and potential**	Large Adaptation Potential; Large Mitigation Potential (1|130)
Policy sector(s)	Agriculture; Forestry	**Application**	Supply
Definition	Land management system that combines woody biomass (e.g. trees or shrubs) with crops and/or livestock. It is obtained either by planting trees on agricultural land or by cropping (for example after thinning) on forested land. Plots that combine arable intercrops with forestry trees are silvoarable plots, while wooded plots with pasture under the tree canopy are known as silvopastoral plots (1)	**Actors involved**	Farmers, scientists, agricultural policymakers, environmental scientists, environmental organizations
		Benefits	Agroforestry can substantially reduce erosion and nutrient leaching, increase carbon sequestration in soils and biomass, improve water and nutrient use efficiency and create favourable micro-climate for crop production. Agroforestry systems can also contribute to improving food productivity while enhancing biodiversity conservation, ecological balance and restoration under changing climate conditions (1)

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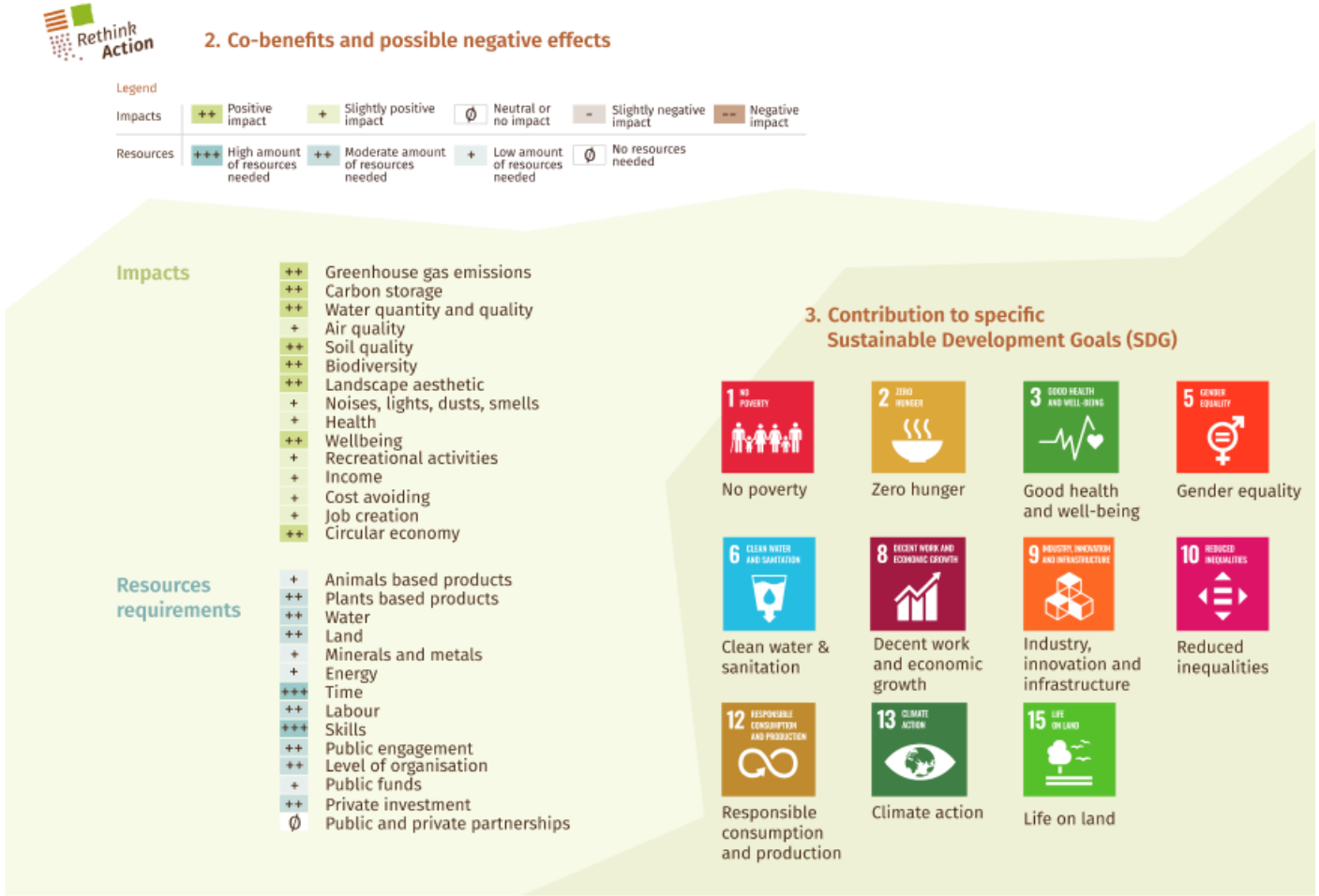

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4. Drivers and barriers

Category	Institutional and legal factors	Financial and investment factors	Economic and market factors	Socio-cultural factors	Technical factors	Organizational and governance factors
Drivers	• Supporting policies (167)	• CAP subventions (167)	• Livelihood diversification through the diversification of production (1|167|168|169) • Development of local rural economy including creating jobs and eco-tourism (167|168) • Decrease in charges of fertilisers or pesticides (167|168) • Increase in income through the increase in production, yield and number of production (if the system is well designed and conducted) (167|168) • Enhance the circular economy through the use of biomass coming from trees (169) • Low cost of implementation compared to other solutions (1)	• Increasing food security (1) • Support recreational activities (hunting, fishing, horseriding, mountain biking, wildlife watching, etc.) (167|168) • Pleasant looking landscape (167|168|169) • Conservation of landscape as cultural heritage (167) • Contribution to animal welfare (shelter from wind, cold and rain, shade from the sun, protection from predators and encourage natural behaviour such as foraging and scratching) (167) • Support ecosystem services (1|167|168|169) • Healthier food production (168) • Facilitation of well-being (168|169) • Safety benefits: reduction of risk fires (168|169)	• Development of technical advisory (agroforestry systems require careful design and a high level of initial planning and monitoring) (167|169) • Development of professionnal training (167|169) • Integrating agroforestry into agricultural training (167|169) • Development of research and innovation (e.g. shade adapted varieties) (167) • Increase resilience of livestock systems because it can improve fodder production and provide additional food sources (e.g. acorns, tree fodder) during periods of drought, hence leading to a reduced need for external inputs (169)	
Barriers	• Greater administrative burden, CAP measures are complex and extensive (167|168|169) • Constrained policies (169)	• Lack of reliable financial support (1) • Possible need of a high financial investment for farmers at the initial stage (167)	• Uncertainty in long-term returns from the tree plantations (market fluctuations, weather conditions, and unforeseen challenges) which can impact the profitability of the investment over time (167) • Benefits not fully perceived by markets (169)	• Request for additional work (167)	• Technical complexity of running an agroforestry system that requires skills in several areas of work (167|169) • Technical blockage through machinery dimensions that may not be adapted to the width of intercrops (167) • Lack of available technical information (167|169) • The five agroforestry practices are not well-known (169) • Lack of knowledge among farmers (169)	

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5. Policy documents and relevance

Reference policy documents

Local/National

ProRural agri farming program Azores (PT)
Regional Territorial Plan Azores (PT)
Climate Change Regional Plan Azores (PT)
Energy Climate National Plan 2030 (PT)
National Forest Strategy (PT)
CAP Strategic Plan Portugal(PT)
Italian National Forest strategy (IT)
Valle D'Aosta climate change strategy (IT)
Plan Andaluz de Accion Clima (ES)
Plan Forestal Espanol (ES)
Swedens strategy plan for agriculture policy 2023–2027 (SE)
Beach protection - a guide for planning and testing. (SE)
National Forest strategy - Hungary (HU)
HU Climate strategy BÉKÉS county (HU)
HU SECAP BACS-KISKUN county (HU)
CLIMAGRI study report - Occitanie (FR)
Strategic plan of the 4 by 1000 initiative (FR)
Occitanie regional paper on climate change (FR)

EU/Global

European Union Common agricultural policy (CAP)
IPCC Special report on climate change and land
EU Strategy on Adaptation to Climate Change
EU Biodiversity strategy for 2030

Relevant scale

Local, National
European Union/Global

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