DESCRIPTION OF THE ACTION – DELEGATED COOPERATION

Action: Land, Soil and Crop Information Services to support Climate Smart Agriculture (LSC-IS)

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Part 1 – Summary of the action

This action is submitted to the EU DeSIRA program, with the aim to contribute to climate-relevant, productive and **sustainable transformation of agriculture** and food systems in low and middle-incomes countries, **by putting more science into development,** considering that the solutions to achieve the Sustainable Development Goals (SDG) are **context specific**. It follows an initial expression of interest and Concept Note agreed in DCI committee in 2019. DeSIRA aims at supporting research and innovation projects in Africa, Asia, Latin America and **strengthening research capacities and research governance** involving key actors at national, regional, continental and global levels. The proposed action is in the heart of DeSIRAs strategy, as it will put more science in development projects focussing on Climate Smart Agriculture (CSA) by making relevant scientific information available to end users and building capacity at the level of the national agricultural research institutes and stakeholders.

CSA is an important policy objective in East African countries, focussing on sustainable agriculture intensification, while increasing resilience of the production systems under a changing climate and contributing to climate change mitigation through reduced carbon emissions from land use and/or sequestration of carbon in soils. A recent FAO study[1] on the potential of CSA concluded that 'CSA practices need to be tailored to the specific characteristics of the local natural conditions and farming systems, local socio-economic conditions and farmers expressed requirements. For this reason, the selection of climate-smart practices needs to be based on an analysis of the agro-ecology'. It implicates that providing context specific quantitative and spatial information on land, soils and crop, is important to (i) assist stakeholders to determine where in the landscape CSA measures will have the largest impact, (ii) reduce the risks of failure, and (iii) help upscaling successful pilots and improve the return on investments in CSA.

There is scientific consensus on the importance of soil and land characteristics for crop growth, crop resilience to stress and the potentials for carbon sequestration (see also section 2). Therefore, this action starts with the *safe assumption that soil, land and crop information can help to improve the efficacy of CSA measures and projects.* However, the potential use of up-to-date and high-resolution information on land, soils and crops, produced using the latest technical and scientific developments, is not always known, or used. This action aims to investigate and demonstrate with stakeholders and end-users how scientific information on land, soils and crops can help CSA projects to become more effective. To this end, the project follows an iterative process of stakeholder consultations and hub development to bring together supply and demand in a useful manner. *It is important to note that this action is focused on technical and institutional innovation in climate relevant agricultural advisory services in line with the DeSIRA objectives.*

The overall objective of the action is to develop sustainable land-, soil-, crop information hubs in national agricultural research organisations that facilitate the exchange of knowledge and information between farmers, knowledge organisations, private sector and policy makers, enhance the effectiveness of national Agricultural Knowledge and Innovation Systems (AKIS 2.0) and contribute to rural transformation and Climate Smart Agriculture in East Africa. This is a pilot project that will focus on Kenya, Ethiopia and Rwanda because of their large investments in CSA and agricultural transformation. The action will provide insights and methodologies that will help in out scaling such approaches and services to other countries of Eastern Africa.

The action aims to achieve this through the development of national Land-, Soil- and Crop (LSC-) hubs where the latest advances in soil science and earth observation (EO) are translated into data and tools that are exchanged with users and providers through partnerships. The action will start with an assessment of user requirements, capacity assessment, assessment of policies, the institutional landscape and capacity in agricultural research, extension and support systems, including national agricultural data infrastructure and climate information services. This activity is followed by the preparation of a long-term sustainability strategy based on these assessments. The strategy will explore linking or integrating LSC information services into national LSC-hubs, linking these with existing information services, and define the mechanisms for sustained provision, use and financial and political support. The LSC-hubs will be set-up jointly with the national agricultural research centres in Kenya, Rwanda and Ethiopia firstly as prototype and will include capacity building and embedding, implementing the sustainability strategy. They will be tested and developed further in an iterative process with both primary users (policy bodies, knowledge organizations and development partners) and secondary users (local landscape and watershed planning and management bodies, local public rural extension, NGOs, farmer organizations and private sector). This iteration will allow developing the LSC hubs in a manner that accessibility and applications of the LSC-hubs for planning and implementation CSA and agricultural transformation is ensured. Finally, the use of the LSC-hubs at farm- and landscape scale will be tested through a participatory process with the different secondary users, e.g. those stakeholders with a direct interaction with small-scale farmers, and mechanisms for incorporating LSC-hub services in regular extension services, landscape planning and management bodies and digital service providers all operating at the local level.

The 4-year project will be coordinated by the Dutch Ministry of Foreign Affairs (NL-MFA) and implemented by Wageningen University & Research (WR and WU), ISRIC – World Soil Information (ISRIC) and the International Livestock Research Institute (ILRI), through the CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS). The National Agricultural Research Centres in the countries (Ethiopian Institute for Agricultural Research (EIAR), Kenya Agricultural and Livestock Research Organisation (KALRO) and Rwanda Agricultural Board (RAB)

[1] Planning, implementing and evaluating three Climate-Smart Agriculture in Smallholder Farming Systems. Food and Agriculture Organization of the United Nations (FAO), Rome, 2016

are principle national implementing partners; they will be co-developers of the LSC-hubs as well as beneficiaries as their capacity is being built and strengthened through this action. In addition, a number of (knowledge) institutions will be involved to provide specific input in the process.

Part 2 –Context of the action and needs analysis

In East Africa climate change leads to a drastic reduction of the quality and resilience of the land, increased greenhouse gas emissions and food and nutrition insecurity for the growing urban and rural population. CSA can mitigate these impacts and focuses on three aspects of agricultural production: (i) sustainable intensification, by improving water and nutrient availability; (ii) increasing resilience against climate variability; and (iii) contributing to climate change mitigation through reduced carbon emissions from land use and/or sequestration of carbon in soils.

Currently national governments and donors (including the EU and MFA-NL) invest in CSA in Eastern Africa. To support these investments, it is of great importance to understand the nature of the land, the soil and the crop-soil relationships. This is confirmed by increased political attention translated into policies that recognise the crucial role soils have in providing food, feed and timbre, as well as sustaining ecosystem services for clean water, nutrients, biodiversity, and regulating climate [1-3]. For example, soil organic carbon (SOC) sequestration related research now figures prominently on the international agenda [4]. To achieve the goals of the 2015 Paris Agreement (COP21), the potential role of agriculture and land use in emission reduction and mitigation is well recognised in the IPCC scenario's, [5]. Similarly, land-related targets and indicators are considered under UN Sustainable Development Goal (SDG) #1 (No poverty), #2 (Zero hunger), #5 (Gender equality), #11 (Sustainable cities and communities), and #15 (Life on land). Land-based emissions may be considered in Nationally Determined Contributions. Changes in SOC content are a key indicator in the Land Degradation Neutrality (LDN) work of the UNCCD, corresponding with SDG target 15.3.

Land, soil and crop information in many East African countries cannot be used effectively in decision-making, because the data are not available in an organised and accessible form that is suitable for decision-making and innovation [12, 13] and is not seen as 'owned' by national organisations. However, over the last 15 years, Digital Soil Mapping using Earth Observation data, made high-resolution spatial land, soil and crop information available to a variety of users. The LSC-hubs developed in this project will be managed by national organisations to ensure local ownership of the developed nation-wide land, soil and crop information systems that respond to the needs of information users and informs stakeholders in their decision-making in CSA.

As this is a pilot project, the action will focus on Kenya, Ethiopia and Rwanda. These countries were selected because they have made large investments in land, soil and crop information services, and have a clear focus on CSA in their **national policies**. The National Agricultural Research Institutes of these three countries have ongoing activities to improve their soil and land information systems. KALRO has a large project together with the University of Nairobi, funded by the Government of Kenya; in Ethiopia large efforts were made in the context of Ethiopian Soil Information System, funded from national funds and the Bill and Melinda Gates Foundation (BMGF); in Rwanda an activity started recently to increase capacity for soil information development, also funded by national funds and the BMGF. These investments show that in these countries soil and land information is seen as an important ingredient for boosting CSA and sustainable agriculture intensification. Also, each country has developed institutionally distinct different agricultural extension and support systems, that will require the action to adapt its strategy and approach. The consortium partners have a strong well-developed presence in these countries: WR and ISRIC through past and ongoing projects and active communication and collaboration with KALRO, EIAR and RAB; ILRI (CCAFS) through its ongoing physical presence and activities in the countries. The national parties are eager to further improve their systems, test and evaluate them with end users and to work with internationally renowned institutions. This project will also help to realise the National Determined Contributions (NDCs) to achieving the **Paris Climate Agreement**, as sustainable intensification and climate smart / climate resilient agriculture are prominent topics in the NDCs of the three countries. The impact of the project will help in achieving goals related to the CAADP Malabo Declaration on Accelerated Agricultural Growth and Transformation for Shared Prosperity and Improved Livelihoods, especially to the sub-goals 'doubling productivity' and 'enhancing resilience of agricultural production.

This action matches well with **EU strategy** for cooperation with Africa ('Towards a Comprehensive Strategy with Africa'), as the action contributes to the EU's ambition to support the implementation of NDCs, help devise strategies for reducing emissions and contribute to the development of national adaptation plans. Moreover, it will contribute to the theme Digital Transformation. The action is also fully in-line with the Roadmap towards a jointly funded EU-Africa Research & Innovation Partnership on Food and Nutrition Security and Sustainable Agriculture (FNSSA) Roadmap, especially to research and innovation theme 1: Sustainable Intensification. The action also matches bilateral cooperation agendas with the three selected countries. The project supports the Africa – Europe Agenda for Rural Transformation (key area of action 4.3), as it stresses the need for reliable datasets, the use of Copernicus Earth Observation (EO) data and digital soil mapping to maximise the potential for climate smart farming. Through the Horizon 2020 and Intra-ACP climate services program the EU invests considerably in research and capacity building in the field of sustainable intensification and data management in Africa. Apart from many ongoing EU funded projects in this field, 6 new and mutually related projects were started in June 2020, all focussing on the *role of soil* in sustainable intensification (Sustainable Intensification in Africa ID: SFS-35-2019-2020[2]). The central project in this set of projects is the Soils4Africa project aiming at the development of a Soil Information System for Africa (managed by ISRIC – World Soil Information). **The**

[2] https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/opportunities/topic-details/sfs-35-2019-2020

proposed action can and will build on the methodologies developed in the Soils4Africa program and apply them in the context of development cooperation, in-line with the DeSIRA objectives.

At national level sustainable intensification, food security and climate smart / climate resilient agriculture are prominent topics in the National Indicative Programmes (NIPs) of the three selected countries. NIPs describe the focus of EU aid-cooperation with the countries and thus this project is in line with EU investment policies for these countries.

The action is in-line with **Dutch Development Cooperation** policies. Kenya and Ethiopia are focus countries for the Dutch Development Cooperation and in both countries sustainable intensification of the agricultural sector is a focus theme for this cooperation. The project is aligned with **Dutch investments that support EU policies**. Strategically, LSC-hubs will complement the food systems research component in the Netherlands development portfolio, which consists of the Netherlands contribution to international research centres including the CGIAR as well as bilateral research investments. Efforts will be made to achieve synergies with the broader research portfolio under the Strategic Knowledge and Innovation Agenda, as well as the broader development, trade and investment agenda of the Netherlands Food Partnership (NFP), including Climate Resilient Agribusiness for Tomorrow (CRAFT) project funded by the NL-MFA.

International cooperation projects may directly benefit from the proposed action. A more in-depth consultation process is needed and therefore, these projects will be part the stakeholder consultation process in WP 2 and 4. The action will consider (among others) the projects listed below:

Name of the project	Funder(s)	Countries	Link
Kenya Cereal Enhancement Programme Climate Resilient Agricultural Livelihoods Window (KCEP-KRAL)	EU, IFAD, GoK	Kenya	Improved planning of CSA interventions
Regreening Africa	EU	Kenya, Ethiopia and Rwanda	Aims at upscaling proven technologies. LSC – information is useful to identify the potentials for upscaling
Landscape Restoration and Integrated Water Resources Management in Sebeya and other Catchments	NL-MFA	Rwanda	Better planning of improved natural resources management practices
Climate Resilient Agribusiness for Tomorrow (CRAFT)	NL-MFA	Kenya	Better planning of improved CSA measures to increase availability of climate resilient food

This action will build upon methods developed and tested during the Africa Soil Information Services (AfSIS) project, funded by the Bill and Melinda Gates Foundation, now a partner of the DeSIRA program.

Part 3 – General and specific objectives, methodology

3.1. GENERAL OBJECTIVE OF THE ACTION

The **general objective of this Action** is to develop sustainable land-, soil-, crop information hubs in national agricultural research organisations that facilitate the exchange of knowledge and information between farmers, knowledge organisations, private sector and policy makers, enhance the effectiveness of national Agricultural Knowledge and Innovation Systems (AKIS 2.0) and contribute to rural transformation and Climate Smart Agriculture in East Africa.

As such, the **impact of the Action** will be a critical contribution to increased agricultural productivity especially for small-scale farmers, based on climate resilient and sustainable food production in Ethiopia, Kenya and Rwanda, characterised by reduced greenhouse gas emissions from primary production systems.

The impact is particularly sustained by enhanced land, soil and crop-informed decision making by various user groups in CSA, through which LSC information services will be mainstreamed into policy development and decision making at (sub) national and regional levels.

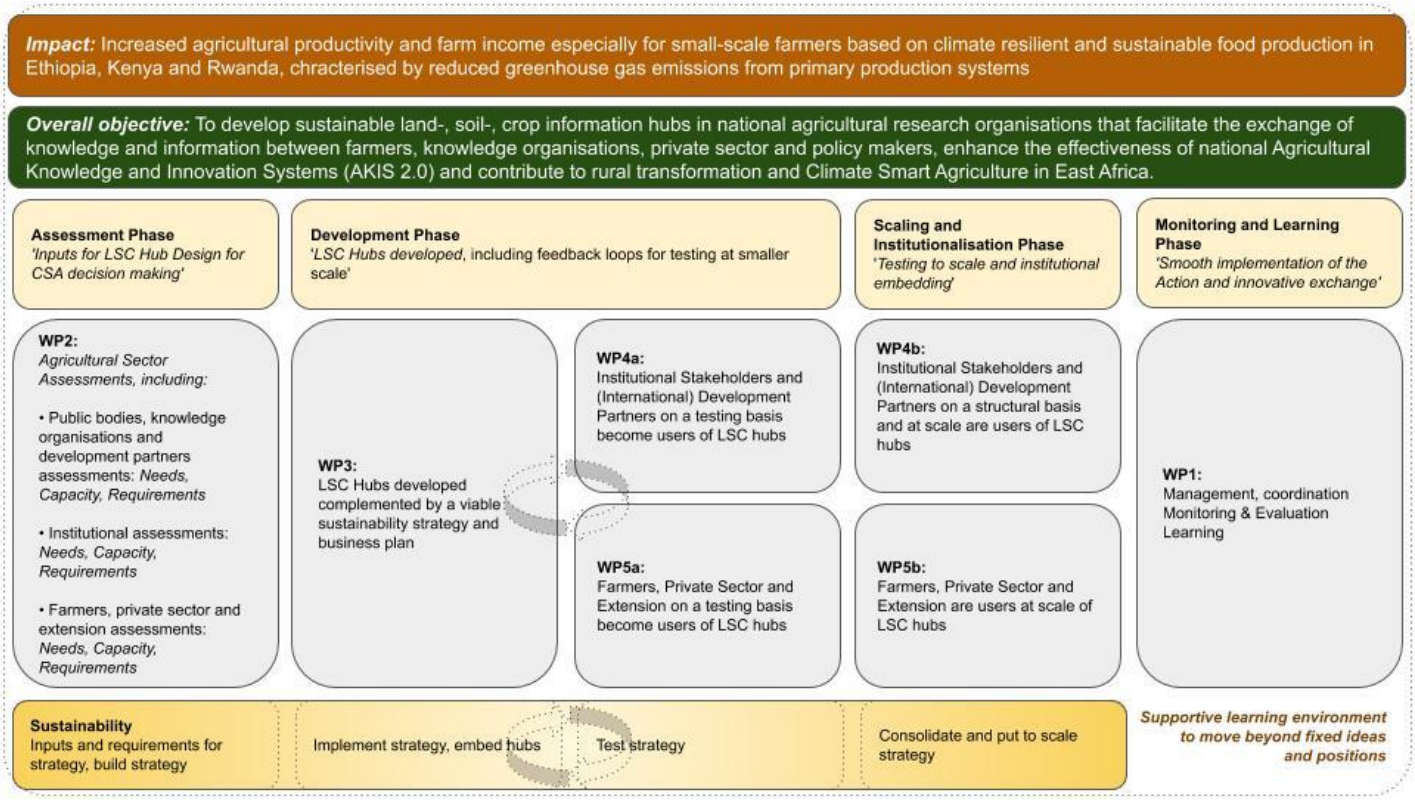

Figure 3.1: The four phases of the Theory of Change and their linkage with work packages in LSC-IS Action

3.2. SPECIFIC OBJECTIVES OF THE ACTION

The theory of action includes four pathways visualized in figure 3.1 as well as in Annex 3 (the Results Framework); these are the (i) assessment pathway; (ii) development pathway; (iii) scaling and institutionalisation pathway; (iv) monitoring and learning pathway. The results framework presented in Annex 3, elaborates for each pathway:

- Ultimate outcomes (10 years after the end of the Action) with key performance indicators (indicating quantitative or qualitative change)
- Intermediate outcomes with key performance indicators (indicating quantitative or qualitative change)
- Immediate outcomes (after finalisation of work package activities)

Please note, that the Assessment Phase, the Development Phase, the Scaling & Institutionalisation Phase include a ***combination*** of outcomes, outputs and activities of the different Work Packages! Administratively, the work packages are structured 'around' stakeholders performing in three different roles: (i) key players with whom the action will have a contractual relationship and that will be hosting the LSC hubs (WP3); (ii) those stakeholders in the CSA and agricultural transformation that as 'primary' (WP4) and 'secondary' users (WP5) contributing to the design, development of the LSC hubs; and (iii) other stakeholders (mainly WP4), who have an indirect interest in the services, CSA and agricultural transformation related decision making, and those targeted for scaling. The Results Framework, however focussed the Action around Impact Pathways, which is visualized in Figure 3.1.

WP1: Management & coordination

WP1 has four *specific objectives:*

1.1 To monitor progress and performance of the Action and ensure that the project deliverables are reached within the indicated time frames and budget
1.2 Integrate within all WPs rapidly evolving approaches to knowledge exchange, learning and innovation
1.3 Share regularly and make visible to the general public updates on progress and performance of the Action
1.4 To establish a conducive learning environment for the teams involved in the implementation of the Action

WP1 specific objectives contribute to the following *intermediary outcomes (medium term effect) of the Action*:

- A clear overview of the results, outcomes and lessons learnt of the Action recommended steps to further optimise sector performance and resilience exists; these have been widely disseminated and enjoy a great visibility

WP1 specific objectives result in *three immediate outcomes:*

- A project management structure that supports project implementation and reporting
- A digital monitoring dashboard monitoring the progress and facilitating learning in work packages
- A communication strategy implemented

The outcomes of WP1 contribute to the general objective of the Action through:

- Setting up and implementing a lean and agile project management structure;
- Setting up and implementing a communication structure increasing visibility among general public, supporting implementation and scaling;
- Using a robust monitoring framework that monitors progress, supports project management and facilitates learning

WP2: Needs assessment and LSC-hub design

WP2 has two *specific objectives:*

2.1 Assess the demand among stakeholders for LSC knowledge and information
2.2 Assess strategic, technical, operational and institutional requirements for LSC hubs

WP2 specific objectives contribute to the following *intermediary outcome (medium term effect) of the Action*:

- A (proven) effective methodology and strategy for a LSC hub design trajectory based on lessons learned of clearly specifying demands, roles, responsibilities and capacity of actors exists and ownership has been made explicit

WP2 specific objectives result in two *immediate outcomes:*

- A set of clearly defined user requirements that guide the design of the LSC-hubs
- Assessment of the capacity and institutional requirements for the design of the LSC hubs

WP2 immediate outcomes contribute to the *general objective of the Action* through:

- Conducting capacity assessment of the organizations hosting the hubs in operational, technical, human resources and financial aspects, thereby generating inputs for the development of strong sustainability strategy and business model for the embedding of the LSC-services at national level
- Conducting an extensive assessment of the information demands and capacity to work with LSC information of different stakeholders
- Approaching stakeholders as distinct users of LSC-information, the Action considers two large categories of stakeholder groups:
    - upstream users: public bodies, knowledge organizations and development partners (those stakeholders with -in general- no direct interaction with small-scale farmers)
    - downstream users: local landscape and watershed planning and management bodies, local public rural extension, NGOs, farmer organizations and private sector (those stakeholders with a direct interaction with small-scale farmers)

- Approaching these potential users as distinct groups and assess their demands and capacities, the LSC hubs are foreseen to be sustainable and increase effectiveness of AKIS 2.0 in promoting CSA measures and stimulate rural transformation

WP3: Development of LSC-hubs

WP3 has two *specific objectives:*

3.1 To design and establish innovative LSC-hubs in Ethiopia, Kenya and Rwanda

3.2 To develop the capacity of staff of the LSC-hub hosts in the routine operations, maintenance and facilitation of use

WP3 specific objectives contribute to the following *intermediary outcomes (medium term effect) of the Action*:

- LSC partners (i.e. producers and users of data) are familiar with LSC services, are able to reflect on these services and are able to update LSC functions and operations

WP3 specific objectives result in three *immediate outcomes:*

- LSC-hubs have been designed based on Assessment Phase outputs *and* are operational in Ethiopia, Kenya and Rwanda
- Designs include LSC-hub business plans, country specific variations and the feedback of the testing of the LSC hubs at selected woredas, counties or districts
- Development processes have taken into account country specific variations and included a testing phase at smaller scale
- LSC-hub hosts' staff has been trained and has capacity in LSC operations and maintenance and in the facilitation of knowledge exchange between users and producers of information

WP3 immediate outcomes contribute to the *general objective of the Action* through:

- Using a research driven approach (science- and evidence based) in the entire process of design, development, testing, scaling and institutionalization of the LSC-hubs
- Being supported by research in the development of sustainability strategies, demand and capacity assessments; soil information management, using the latest EO data and tools, and information use for decision making
- Integrating LSC information in services for land use planning at farm- and watershed level, regular extension services, upcoming digital private and NGO agricultural information dissemination services
- Meeting demands of its distinct user groups and thereby developing LSC hubs that are institutionally sustainable
- Incorporating the newest technology and data sources and management techniques in the design and development of the LSC-hubs
- Enhancing the capacity of staff of organizations hosting the hubs
- Embedding hubs in the local institutional setting to ensure local ownership and sustained provision of the new services according to international standards

WP4: LSC-hubs use at national level

WP4 has four *specific objectives:*

4.1 To introduce, familiarize and train LSC information users working with and benefiting from land, soil and crop information

4.2 To collect feedback from LSC information users for improving the functionality and user-friendliness of the LSC-hubs

4.3 To implement and adapt a sustainability strategy for the LSC hubs within hosting organizations

4.4 To develop and implement a financial strategy to ensure sustainability

WP4 specific objectives contribute to the following *intermediary outcomes (medium term effect) of the Action*:

- Operational LSC hubs, complemented by a long-term viable business plan
- Operational LSC hubs are able to collect and provide up to date LSC data to users
- Producers of LSC information are actively engaged in knowledge exchange
- LSC hubs started to play an active role in policy development and in CSA decision making

WP4 specific objectives result in nine *immediate outcomes:*

- Stakeholders aware of the usefulness and potential impact of the hubs
- LSC information users able to access, work with and benefit from LSC information in their contributions to CSA and agricultural transformation
- Feedback from LSC information users improves the design and content of the hubs
- The LSC hubs are developed and operationalized within the hosting organizations
- Inputs for embedding within the hosting organizations
- Inputs for embedding and linkage with other agro-information platforms enhances sustainability
- Financial strategy to sustain the LSC hubs within the hosting organizations
- Inputs for regional scaling

WP4 immediate outcomes contribute to the *general objective of the Action* through:

- Developing a strong sustainability strategy and business model for the embedding of the LSC-services at national level;
- Considering policy bodies, knowledge organizations and development partners stakeholder groups as distinct users with specific demands:
- Being explicit on the policy development, planning and decision-making processes that need to be supported to make the LSC hubs to meet those demands and be institutionally sustainable;
- Enhancing the capacity of staff of various types of users of the LSC-hubs using blended learning processes; and

- Embedding hubs in the local institutional setting to ensure local ownership and sustained provision of the new services according to international standards.

WP5: LSC-hubs use at local level

WP5 has four *specific objectives:*

5.1 To contribute to the availability of science-based land, soil and crop information to stakeholders operating at the level of small-scale farmers in their efforts to promote integrated CSA practices and contribute to agricultural transformation

5.2 To introduce, familiarize and train LSC information users operating at the level of small-scale farmers benefiting from science-based land, soil and crop information

5.3 To collect feedback from LSC information users working at the level of small-scale farmers for improving the functionality and user-friendliness of the LSC-hubs

5.4 Include local level use of LSC hub services in LSC-hub sustainability plans.

WP5 specific objectives contribute to the following *intermediary outcomes (medium term effect) of the Action:*

- Operational LSC hubs, complemented by a long-term viable business plan
- Operational LSC hubs are able to collect and provide up-to-date LSC data to users and users
- Producers of LSC information are actively engaged in knowledge exchange
- LSC hubs started to play an active role in policy development and in CSA decision making
- LSC hubs are contributing to enhancing the performance of extension services and public and private sector advisors
- The strategy developed during the Action to reducing the gap between research and practice in the farm planning of small-scale farmers has been embarked upon by public and private sector stakeholders

WP5 specific objectives result in four *immediate outcomes:*

- Local stakeholders / users operating in a direct linkage with small-scale farmers aware of the usefulness and potential impact of the hubs
- LSC information users able to access, work with and benefit from LSC information in their small-scale farmer level contributions to CSA and agricultural transformation
- Feedback from LSC information users working at the small-scale farmer level improves the design and content of the hubs
- Inputs for embedding and linkage with other agro-information platforms and farm-level information service provides reaching small-scale farmers enhances sustainability

WP5 immediate outcomes contribute to the general objective of the Action through:

- Considering those stakeholders with a direct interaction with small-scale farmers (e.g. local landscape and watershed planning and management bodies, local public rural extension, NGOs, farmer organizations and private sector) as a distinct category of distinct users with specific demands
- Integrating LSC information in relevant to services at farm- and watershed level planning, regular extension services, upcoming digital private and NGO agricultural information dissemination services
- Enhancing through blended learning processes the capacity of staff various types of users
- Embedding hubs in the local institutional setting to ensure local ownership and sustained provision of the new services

3.3 METHODOLOGY

The LSC-IS Action will last for 4 years and will be implemented by WR, ISRIC and ILRI in collaboration with national implementing organisations EIAR, KALRO and RAB, through overall coordination by NL-MFA.

The project includes applied ***research to support development-oriented innovations*** that will focus on soil information management including research into: (i) what data to provide, e.g. translating the newest soil property data into innovative soil functional information and maps that bridge global, national and local scales and are relevant for CSA and agricultural transformation; and (ii) innovations into how data can best be provided; through the design, development and evaluation of land, soil and crop information hubs in the three countries as satellites of the central hub at ISRIC, facilitating strong information management with local ownership. To this end, we propose to include support for a PhD student, originating from one of the three countries, to work and study in above field and who will be supervised by project- and academic staff so that quality and scientific relevance are guaranteed.

The primary users of the LSC hubs are stakeholders that operate at the national level within the East African region. These stakeholders include policy bodies, knowledge organizations and development partners. To facilitate interaction with small-scale farmers, the hubs are designed to provide information at sub-national levels to a group of secondary users, e.g. those stakeholders that do have a direct link in promoting CSA practices and supporting rural transformation. This group of stakeholders include local landscape and watershed planning and management bodies, public rural extension, NGOs, farmer organizations and private sector. Currently, these stakeholders have no access to LSC information, or they only have access to scattered information. The information they use is with unknown quality. Moreover, many stakeholders never used LSC information; they are yet to experience how LSC information can help them in decision making, planning and implementing CSA.

The Action will actively ***engage with both groups of stakeholders to co-design and co-develop the LSC-hubs*** and assist them in the actual access and use of information made available by the hubs. Stakeholders will provide feedback in a structured manner, which will be used during the period for further development and refinement of the structure and operations of the hubs. The Action will use an approach to disaggregate stakeholders in distinct groups, and thereby ensure that their specific demands and capacities in information use feeds into the process of co-design and co-development. The hubs will contain data on land, soil and crops including visualisations and tools for optimal understanding and use, which all will be tested and refined during the development phase.

These innovative hubs will be developed in a process of collaboration and capacity building with three knowledge organizations (EIAR, KALRO and RAB) that are the foreseen hub hosts in the three countries. To ensure success of this innovation, capacity building of the foreseen hub hosts is an important aspect of the development phase of the project as it contributes to long term maintenance and accessibility of the hubs. An agile process will be followed to allow for continued adaptation of the hubs over the course of the Action, based on feedback received from the staff of those organizations as well as from various user groups. The Action will develop a sustainability strategy that will guarantee hosting, maintenance, improvement and a financial section with agreements on cost recovery for the first 5 years after the Action.

The anticipated resolution of the LSC information is 250*250 meter, as this is the maximum resolution supported by the currently available data. Therefore, the logical primary hub information users are stakeholders that make decisions at the national and sub-national scale, such as policy bodies (including Ministries of Planning, Agriculture, Natural Resources and Climate Change, and specific agencies relevant to natural resource management, agricultural transformation agencies and climate change), knowledge organizations (including NARS, natural resource and climate change research agencies, and universities) but also development partners, investors and development programmes. Because small-scale farmers are the ultimate decision-makers in the implementation of CSA, the Action will also work with stakeholders who interact directly with small-scale farmers, as mentioned above.

The action will be implemented recognizing that **women and young small-scale farmers** are most impacted by land degradation because agriculture is central to their livelihoods. Therefore, for CSA to be effective, women and youth as agricultural stewards and entrepreneurs are considered particularly during the selection of stakeholders as secondary users of the LSC hubs. In the four pathways of the Action, we use an approach including specific stakeholders among local landscape and watershed planning and management bodies, local public rural extension, NGOs, farmer organizations and private sector that target women and youth. Through the selection of those intermediate stakeholders who have a women and youth focus, the Action will set up LSC hub that are cognizant with the specific roles and requirements of women and youth in promoting CSA and agricultural transformation.

The Action will be implemented with **stakeholders in three different roles**: (i) key players with whom the action will have a contractual relationship and that will be hosting the LSC hubs; (ii) those stakeholders that as 'primary' (WP4) and 'secondary' users (WP5) and who will contribute to the design, development of the LSC hubs; and (iii) other stakeholders, who have an indirect interest in the services, CSA and agricultural transformation related decision making, and those targeted scaling.

The Action takes into account that the practice of knowledge exchange in agriculture has evolved in Ethiopia, Kenya and Rwanda: shifting from a linear model of knowledge transfer (scientists to farmers) to a perspective that integrates knowledge from multiple actors through facilitation and participation and **emphasises learning in a social context**.

The Action considers the ongoing **COVID-19** pandemic a given. As a principle, physical interaction between international and local staff, action

partners and stakeholders, needs to be minimized, at least for the first or one and a half year of the action. When meetings will take place, physical distancing will be observed in combination with other measures put in place by national governments. We have planned to undertake online meetings instead of physical meetings for part of the management under WP1. The implementation of online workshops will be tested, though internet access remains a challenge in the action countries. Also, ISRIC and WR have experience with and will be implementing methods of blended learning combining online with classroom teaching for most of the short courses that are planned in the action.

Part 4 – Description of work packages and activities

4.1. DESCRIPTION OF WORK PACKAGES

<table>
<tr><td colspan="4">Work package 1: Management & coordination</td></tr>
<tr><td>Duration in months</td><td>48 months</td><td>Name of the implementing partner leading this work package</td><td>ISRIC</td></tr>
<tr><td colspan="4">I. Objective(s) of this work package and expected outcomes:</td></tr>
<tr><td colspan="2">Objective:</td><td colspan="2">Outcomes:</td></tr>
<tr><td colspan="2">• To monitor progress and performance of the Action and ensure that the project deliverables are reached within the indicated time frames and budget
• Integrate within all WPs rapidly evolving approaches to knowledge exchange, learning and innovation
• Share regularly and make visible to the general public updates on progress and performance of the Action
• To establish a conducive learning environment for the teams involved in the implementation of the Action</td><td colspan="2">• A project management structure that supports project implementation and reporting
• A digital monitoring dashboard monitoring the progress and facilitating learning in work packages
• A communication strategy implemented</td></tr>
<tr><td colspan="4">I. Description of the work (activities)</td></tr>
<tr><td colspan="4">The Netherlands Ministry of Foreign Affairs (NL-MFA) as the contracting partner for the European Commission (EC) will report on the action to the EC. The NL-MFA in the Hague will be responsible for the: (a) provision of a channel for formal communication with the EC; and (b) overseeing the financial and project management, including ensuring timely reporting to EC. The Action will be implemented by a Consortium of three partners: Wageningen Research, ISRIC-World Soil Information and International Livestock Research Institute. See Section 5.1 for further details on the project management.

This work package will ensure that the project deliverables will be reached within the indicated time frames and budget. In this WP the following activities will be performed:
1.1 Scientific Activity Management
The scientific project management will be carried out by the Scientific Coordinator (SC) (ISRIC – World Soil Information) and comprises all activities during the project related to support of the scientific and technical work in the project and related to project strategy, reporting on progress of these activities and ensure that scheduled deliverables of project are produced. A senior project manager employed by ISRIC - World Soil Information, will be responsible for the scientific management of the project whereas the daily activities in the project will be managed by a medior scientific project manager. Both are joined by WP coordinators in the Action Scientific Management Team (ASMT). ISRIC organizes and coordinates monthly online meetings of the ASMT to ensure alignment and coordination of activities among the WPs. Deliverables including annual narrative and financial reports will be provided by the WP coordinators and harmonized by the Scientific Coordinator and Project Manager.
1.2 Day-to-day project management
Being the lead implementer, WR is responsible for the day-to-day project management of the entire Action and all its Work packages. WR will prepare a Consortium Agreement (CA) with the aim of regulating the managerial bodies and the decision-making process. This includes an Intellectual Property Rights (IPR) agreement for new IP and prior-existing IP, Access Right, Confidentiality, Liability and Indemnification. The provisions will be in accordance with EU regulations. This activity also includes setting up the administrative procedures for the project that meet EC requirements and for reporting to the Commission, follow up of EC payments, provide assistance to individual project partners on administrative issues and sub-contracting, collecting Financial Statements from partners, preparing annual consolidated reports and financial and auditing statements, facilitating project implementation in general; monitor progress and prepare contingency plans if necessary.
1.3 Action Meetings
ISRIC and WR will co-organise annual Project Meetings with all implementing partners including NL-FMA to discuss and monitor strategy and progress in implementation, define and if required adapt work plans, receive updates and decide on the management of finances, address issues related to intellectual property rights.
1.4 Action Advisory Committee (AAC) Meetings
The Action Advisory Committee (AAC) provides strategic advice to the Action Management Team (AMT) and the Overall Action Coordinator. The AAC consists of representatives from important users of the hubs as well as representatives from the Netherlands</td></tr>
</table>

embassies and EU Delegations in Rwanda, Ethiopia and Kenya. NL-MFA participates as an observer. ISRIC chairs the AAC and WR will take the role of the secretariat.

1.5 *Communication, dissemination and visibility*

ISRIC will develop and maintain a website supported by social media channels. ISRIC's communication officer will support this activity through the development of a communication strategy and annual communication plans. The website will share all the documents, guidelines, and manuals produced and link to the data portal.

1.6 Monitoring, evaluation and learning

ISRIC will coordinate the compilation among WP coordinators of annual narrative reports. The narrative reports are an input into a digital dashboard which documents progress and achievements in terms of indicators and targets. The dashboard is aimed to be updated digitally on a monthly basis. The compilation of reports and the digital dashboards will be shared bi-monthly with the MT and annually with the ASMT, ensuring progress and if required support decision making, and will support reporting to NL-MFA and DG DevCo. A senior Learning and Monitoring specialist from WR will develop and manage the dashboard and support the communication and visibility activities required. The dashboard and reports will be provided to NL-MFA to report on Action performance and progress. A mid-term and a final external project review will be performed. Members of the review committed will be selected by the MT in cooperation with the Action Advisory Board.

1.7 Audits

Annual financial audits will be performed and reported to NL-MFA

II. Expected outputs (incl. deliverables)

II.a. Expected output(s) (excl. deliverables) of this work package

Output No.	Output (a)	Explanation (b)
1.1	Managed and coordinated activities among the various WPs	Preparation of annual workplans, monthly ASMT and MT meetings and annual action team meetings, including a kick-off meeting ASMT and annual action team meetings
1.2	Annual workplans	AAC annual meetings
1.3	Strategic advice of relevant stakeholders and potential users	Supported by a Consortium Agreement with a separate chapter on IPR
1.4	Managed contracts, finances and IPs	Supported by a communication strategy and annual communication plan
1.5	External communication about the project and its deliverables	Annual narrative and financial reports and a final report at the end of the action provide both the conceptual foundations and practical tools that underpin successful partnerships. Documents progress and achievements and is basis for learning
1.6	Annual progress reporting informs project management and the donor. Periodically updated digital dashboard	

II.b. Expected deliverable(s) of this work package

Deliverable No.	Deliverable name/type (a)	Format (b)	Language (c)	Months of implementation (d)
1.1	Annual workplans.	electronic	English	M1, M13, M25, M37
1.2	Consortium Agreement with IP section.	electronic	English	M3
1.3	Report of each AAC meeting.	electronic	English	M1, M13, M25, M37
1.4	Website operational supported by social media channels.	electronic	English	M3
1.5	Digital dashboard, annual progress reports and final report.	electronic	English	M12, M24, M36, M48
1.6	Midterm review report and final review report.	electronic	English	M24, M48
1.7	Annual financial audit reports.	electronic	English	M12, M24, M36, M48

III. Distribution of activities to each implementing partner in this work package

Activity No.	Name of the activity	Implementing partner
1.1	Scientific Activity Management	ISRIC

1.2 1.3 1.4 1.5 1.6 1.7	Day-to-day project management Action Meetings Action Advisory Committee Meetings Communication, dissemination and visibility Monitoring, evaluation and learning Annual financial audits	WR ISRIC ISRIC and WR ISRIC and WR - WR

IV. Sub-contracting

- A website designer will be subcontracted to support the communication, dissemination and visibility activity 1.5.2 for an amount of EUR 9,000.
- For the external project evaluations and for the annual financial audits consultants will be hired

V. Financial support to third parties

Not foreseen

VI. Equipment

Not foreseen.

Work package 2: Needs assessment and LSC-hub design			
Duration in months	7 months	Name of the implementing partner leading this work package	ILRI

I. Objective(s) of this work package and expected outcome:

Objectives:	Outcomes:
• Assess the demand among stakeholders for LSC knowledge and information • Assess strategic, technical, operational and institutional requirements for LSC hubs	• A set of clearly defined user requirements that guide the design of the LSC-hubs is available due to the multi-stakeholder consultative process; • A thorough overview of current capacity assets and gaps of different stakeholder groups is available which serves as an input for the development of tailor-made training modules (as part of WP3 and4); • The results of the assessment of the institutional capacity and requirements contributes to unfolding the necessary enabling institutional setting and further guides and determines the design of the LSC hubs

II. Description of the work (activities):

This work package will ensure that the LSC hubs will meet the demands of distinct groups of users in terms of knowledge and information. It will inform the design in terms of strategic, technical, operational aspects and conditions ensuring sustainability.

The activities will be coordinated by ILRI. The day to day management of the WP activities will be coordinated by an ILRI Scientific Officer, who oversees the implementation of the activities by the Participatory Action researcher and two junior research associates. A team composed of a WR senior advisor and two advisors will support the ILRI team. The joint team will design the assessment and the ILRI junior research associates and WR advisors will implement the assessments. An ILRI junior scientist will support the organization of focus group discussions and workshops.

2.1	*Design demand and capacity assessment*
	• Define types of LSC information available
	• Define aspects of capacity requirements for LSC information use
	• Define stakeholder groups per country
	  ○ Public bodies (e.g. ministries of agriculture; ministries of environment; ministries of planning; agricultural transformation agencies; regional/provincial/country governments)
	  ○ knowledge organizations (including national agricultural research organizations (NARS) and universities
	  ○ public rural extension and advisory services
	  ○ non-government organization (NGOs)

	○ farmer organizations including farmers unions, cooperatives and informal farmer groups ○ private sector actors including input providers, agro-dealer networks, ICT-based information and advisory service providers ○ development partners ○ Design assessment methodology including stakeholder surveys, focus group discussions and workshops ***Note:*** The assessment will ensure that it includes those extension, farmer organization and private sector stakeholders that work directly with small-scale producers. These activities are, however, administratively registered under and budgeted by Work Package 5a. Specific attention is given to those stakeholders that target women and young small-scale farmers (see also section 3.3). This is part of the assessment phase of the Action.
2.2	*Design institutional assessments* • Define strategic, technical, operational and institutional aspects for organizations hosting and running a LSC hub • Develop institutional assessment methodology
2.3	*Conduct demand and institutional assessments* • Conduct the demand and capacity assessment including online surveys, focus group discussions and workshops in Ethiopia, Kenya and Rwanda • Conduct the institutional assessment among the potential hosting organization within its larger institutional framework
2.4	*Consolidate inputs to the LSC-hub design* • Synthesize the variation between the three countries • Identify generic, country and stakeholder specific demands and capacities • Identify generic and country specific institutional requirements • Present the demand, capacity and institutional assessment within AEC, refine and finalize
2.5	*Prepare and submit assessment report*

III. Expected outputs (incl. deliverables)

III.a. Expected output(s) (excl. deliverables) of this work package

Output No.	Output (a)	Explanation (b)
2.1	A multi-stakeholder consultative process design for the demand and capacity assessment.	A design and methodology for the multi-stakeholder consultative process per country to collect and define the specific demands and the current capacity *assets and gaps* of each stakeholder group with regard to the LSC hub;
2.2	A multi-stakeholder consultative process to define the institutional requirements and assessment.	A design and methodology for the multi-stakeholder consultative process in each country to work towards a supportive institutional setting for the LSC hubs;
2.3	Multi-stakeholder country-based demand, capacity and institutional assessments.	The actual assessments per country to make demands and current capacity per stakeholder group explicit to use, produce and/or support the exchange of LSC information, as well as the institutional assessments;
2.4	Overview of generic and country specific demands, capacities and institutional requirements for the LSC hub design	A general overview and a country specific overview of demands and requirements for the LSC design;
2.5	Consolidated report of the demand, capacity and institutional assessment, including sustainability strategy	The report describes the assessment results per country and provides the sustainability strategy for institutional embedding of the hubs.

III.b. Expected deliverable(s) of this work package

Deliverable No.	Deliverable name/type (a)	Format (b)	Language (c)	Beneficiaries (d)	Months of implementation (e)
2.1	Methodology for country demand and capacity assessment	Electronic	English	All potential LSC users	M4
2.2	Methodology for country institutional assessment	Electronic	English	Potential LSC host (EIAR, KALRO, RAB)	M4
2.3	Country level demand, capacity and institutional assessment	Electronic	English	Potential LSC host (EIAR, KALRO, RAB) & all potential LSC users (covering all stakeholders groups)	M6

2.4	Overview of generic and country specific demands, capacities and institutional requirements	Electronic	English	Potential LSC host (EIAR, KALRO, RAB) & all potential LSC users (covering all stakeholders groups)	M6-7
2.5	Strategy report, including sustainability strategy	Electronic	English	Potential LSC host (EIAR, KALRO, RAB) & all potential LSC users (covering all stakeholders groups)	M10

IV. Distribution of activities to each implementing partner in this work package

Activity No.	Name of the activity	Implementing partner
2.1	Design demand and capacity assessment.	WR, ILRI.
2.2	Design institutional assessments.	WR, ISRIC, ILRI.
2.3	Conduct demand and institutional assessments in Ethiopia, Kenya and Rwanda.	ILRI, WR.
2.4	Consolidate generic and country specific inputs to the LSC design.	ILRI, WR
2.5	Prepare and submit the demand, capacity and institutional assessment report, including sustainability strategy	ILRI, WR

V. Sub-contracting

- The organisation of the focus group discussions and workshops will be implemented in collaboration with EIAR, KALRO and RAB. In each country 10 FGDs are organized covering at least five stakeholder groups; they are complemented with 2 workshops.
- ICRAF will assist in the selection of (and contacts with) stakeholders it has a good network in the region related to LSC information management.
- Three NARS, ILRI and WR have a good understanding of the stakeholder groups in the countries.
- IUCN will provide additional information of the most relevant development programmes.

VII. Financial support to third parties

Not foreseen.

VIII. Equipment

Not foreseen.

Work package 3: Development of LSC-hubs

Duration in months:	48	Name of the implementing partner leading this work package	ISRIC

I. Objective(s) of this work package (expected outcome)

Objectives	Outcomes
• To design and establish innovative LSC-hubs in Ethiopia, Kenya and Rwanda. • To develop the capacity of staff of the LSC-hub hosts in the routine operations, maintenance and facilitation of use.	• LSC-hubs have been designed based on Assessment Phase outputs *and* are operational in Ethiopia, Kenya and Rwanda; • Designs include LSC-hub business plans, country specific variations and (*see WP4a and 5b*) the feedback of the testing of the LSC hubs at selected woredas, counties or districts; • Development processes have considered country specific variations and included a testing phase at smaller scale (see WP4a and 5b); • LSC-hub hosts' staff has been trained and has capacity in LSC operations and maintenance and in the facilitation of knowledge exchange between users and producers of information

II. Description of the work (activities)

In this work package, innovative LSC-hubs will be developed in a process of co-creation involving national and international research institutions as well its potential users. This requires novel methods for data compilation, data presentation and the development of specific soil information products for specific needs, for instance in the field of soil fertility management, water management and carbon sequestration. *Information hubs with these kind information layers and that are highly tuned towards the needs of the user are innovative. Currently this type information is hardly available to users. If available, the content is oftentimes not actionable, presented in a format that is not user friendly and neither tuned towards user needs.*

This work package includes activities focused on capacity on routine operations, maintenance and facilitation of use among staff of the LSC-hub hosts, being national research institutions.

A senior information specialist employed by ISRIC will coordinate the work package. A soil data specialist will carry out data compilation activities (3.1); a soil mapping specialist will carry out the soil mapping activities (3.2 and 3.3). A senior specialist Information Systems in cooperation with an IT specialist will oversee and implement design and development of the hubs (3.4 and 3.5).

This Work package includes a PhD student, to enable in-depth research in the field of digital soil mapping and soil functional mapping. These research areas are of high importance for the project, as the functional soil maps are the products that provide the basis for communication with stakeholders and are key for applicability of the hubs in planning and implementation of CSA interventions. The PhD student will be recruited from one of the action countries and will be supervised by staff from ISRIC and will graduate at Wageningen University.

3.1	*Data compilation* • Compile the available land, soil and crop information • Use point data, achieved through wet chemistry or soil spectroscopy • Compile information per country • Bring point data into a common, standardized format that will facilitate upload of the data into the LSC-hubs once these are developed (see activity 3.5) • Use standards developed under the Global Soil Partnership (eg through GLOSOLAN) managed by the FAO
3.2	*Soil-, land-, crop mapping* • Combine the basic soil point data (3.1) with data from the Copernicus Earth Observation Programme (CEAP) • Generate national soil maps of basic chemical and physical soil properties at 250 m resolution • Use innovative digital soil mapping techniques based on advanced geo-statistics methodologies and machine learning (i.e. as GIS layers)
3.3	*Soil functional mapping* • Create tailor-made GIS layers to support decision-making for CSA and agricultural transformation • Use based on identified LSC hub use requirements, such as maps showing nutrient deficiencies, potential for improved water management, water harvesting and potentials for carbon sequestration • The type of maps to be created will be defined based on the user demands (WP2) • An innovative approach is used in order to produce maps with the right content in the right format. • The approach will integrate scientific knowledge on soil chemistry, soil physics, hydrology and plant nutrients, combined with advanced geoinformatics
3.4	*Architectural design* • Design the architecture of the system in a manner that it can be maintained or expanded • Identify the main structural components of the system, the relationships between these and the supporting technologies • Design the LSC-hubs based on the latest open-source software solutions, which will support the sustainability of the project and allow LSC hub host continued access to the required software without the need to purchase licences
3.5	*System building* • Develop the supporting infrastructure of the LSC-hubs • Use an innovative microservices approach and user-friendly web-services to make the information (freely) available to all stakeholders • Develop an application programming interface (API) that will allow direct access by (mobile) applications by third parties such as extension services, agro-chemical providers, credit providers, development programs and projects • Use an agile development approach for the development of the LSC-hubs, which means that the LSC-hubs will evolve gradually through iterations • During each iteration develop a working product that can be demonstrated to users (‘rolling releases’) • An agile - or ‘evolving’ - implementation approach allows for adjustment of the design and implementation when required based on user demands that might change through the life cycle of this action • Permits the LSC-hubs to adapt to changes quickly, ensuring that with the final release the functionality of the LSC-hub meets user demands • The development of the LSC-hubs will continue for the entire duration of the action
3.6	*Capacity building for data management* • Develop a technical capacity building programme for three NARS becoming the LSC hub hosts • Develop training materials • Train and coach local staff in operations, maintenance and facilitation of use • Includes training of local staff in data handling and mapping, as well as in required IT aspects relevant to operations and maintenance • Include training of local staff in supporting user making use of the LSC hubs, including relevant IT aspects
3.7	*Integration of LSC-hubs*

	• Functionally connect with or entirely embed the developed LSC-hubs in existing national agricultural data *infrastructures (e.g. hosting NARs) and/or* in existing *multi-stakeholder platforms of agricultural knowledge exchange* so that continued financial support from national governments or international donors is secured (based on outcomes of WP4a and WP5b) • Connect where possible with existing advisory service provision for efficiency, cost reduction • Combine LSC information with other types of information (e.g. administrative data, socio-economic data, other agricultural data), which drastically increases the potential of the applications and safeguards the focus on bridging the digital divide and strengthen the linkage between research and practice. • Formulate maintenance and operational backstopping requirements for the LSC-hubs and integrate feedback loops to continuously optimise LSC functionality and performance.

III. Expected outputs (incl. deliverables)

III.a. Expected output(s) (excl. deliverables) of this work package

Output No.	Output (a)	Explanation (b)
3.1	Existing basic land, soil and crop information available in the right format for deployment in the LSC hubs.	Provides basic information needed for the development of the spatial layers in activity 3.2 and 3.3.
3.2	GIS layers with basic land, soil and crop information at 250*250m resolution in the LSC-hub.	This entails standard information layers such as pH, soil organic matter, texture, slope etc.
3.3	Tailor-made GIS layers to support CSA and agricultural transformation decision-making (e.g. nutrient deficiency, potential for improved water management and water harvesting, and potential for carbon sequestration).	Provides critical layers to underpin CSA and agricultural transformation decision making. Type and number of layers to be created depends on user demands (WP 2).
3.4	Agreed on architecture of the hubs, based on the demand and institutional assessment (WP 2).	This is the basis of the development of the hub infrastructure (activity 3.5).
3.5	LSC hubs developed in three countries according to user demands and populated with the data developed in activity 3.1 – 3.3.	Building of the system through beta release, testing by users and incorporating feedback into the final system development.
3.6	Human, organisational and institutional capacity for operating and maintaining LSC hubs, for providing support services to stakeholders, and for promoting and facilitating use; training materials.	For EIAR, KALRO and RAB capable to operate, maintain and facilitate use, and further develop the LSC hub.
3.7	LSC-hubs embedded in existing national agricultural data infrastructures, platforms of agricultural sector collaboration and connected to agricultural advisory services of e.g. NARS.	Prerequisite for sustained operation of the hubs after the project ends.

III.b. Expected deliverable(s) of this work package

Deliverable No.	Deliverable name/type (a)	Format (b)	Language (c)	Beneficiaries (d)	Months of implementation (e)
3.1	Harmonised datasets with existing basic land, soil and crop information available	electronic	English	EIAR, KALRO, RAB	M12
3.2	Nation-wide GIS layers with basic land, soil and crop information at 250*250m resolution	electronic	English	EIAR, KALRO, RAB	M16
3.3	Tailor-made GIS layers to support CSA decision-making	electronic	English	User groups (defined per country in WP2)	M19
3.4	Document describing the agreed upon architecture of the hubs	electronic	English	Action team: required for hub development	M19
3.5	Hubs in three countries developed and populated with the data developed in activity 3.1 – 3.3.	electronic	English	User groups (defined per country in WP2); EIAR, KALRO, RAB	Beta version: M36 Final version: M48
3.6	The training material used at the three national hubs to train staff in data management, data integration and use).	electronic	English	EIAR, KALRO, RAB	M48
3.7	LSC-hubs embedded in existing national agricultural data infrastructures *and* in existing	electronic	English	User groups (defined per country in WP2);	M48

	multi-stakeholder platforms of agricultural sector collaboration			EU/NL funded programmes on CSA and agricultural transformation, ASARECA	

IV. Distribution of activities to each implementing partner in this work package

Activity No.	Name of the activity	Implementing partner
3.1	Data compilation	ISRIC
3.2	Soil-, land-, crop mapping	ISRIC
3.3	Soil functional mapping	ISRIC
3.4	Architectural design	ISRIC
3.5	System building	ISRIC
3.6	Capacity building for data management and data integration	ISRIC
3.7	Integration of LSC-hubs in national agricultural information systems and institutions and/or platforms already supporting agricultural knowledge exchange	ISRIC, WR

V. Sub-contracting

- EIAR, KALRO and RAB will gather and compile LSC data available in their countries. After having received training by ISRIC they will also carry out mapping activities in activity 3.2 and 3.3. The mentioned institutes are well positioned for this task, being the nationally mandated institutes for soil information provisioning.
- ICRAF will (i) assist with data compilation, (ii) provide access to a large amount of soil data available at ICRAF, (iii) assist with the development of concepts for functional soil mapping.
- IUCN will provide a significant amount of soil information gathered by the institute in a series of development programs carried out in the region.
- IFDC will compile, standardise and make available a large amount of data dealing with soils, crops and crop responses to fertilisers that have been collected by IFDC in the past. IFDC will also help with developing concepts for functional soil mapping especially related to soil fertility management.
- AgroCares has innovative spectroscopy methods for quick assessment of soil properties related to soil fertility. They will help developing hub-functionality that allows for easy ingestion of new data generated through soil spectroscopy.
- DLR will assist with innovative soil mapping methodologies recently developed by them and ensure adequate use of remote sensing data and tools from Copernicus in the mapping activities.

VII. Financial support to third parties

A web-designer well be hired to design the front-end of the LSC-hubs (the web portal that gives users access to the hubs) as part of activity 3.5. Professional web-design is an expertise that the project partners do not have in house and that is required for the project.

VIII. Equipment

Computer equipment under activity 3.7 for hosting the LSC hubs and for supporting data management in each country.

Work package 4: LSC-hubs use at national level

Duration in months:	4 (4a) 4 (4b)	Name of the implementing partner leading this work package	ILRI

I. Objective(s) of this work package (expected outcome)

Objectives	Outcomes
• To introduce, familiarize and train LSC information users working with and benefiting from land, soil and crop information • To collect feedback from LSC information users for improving the functionality and user-friendliness of the LSC-hubs • To implement and adapt a sustainability strategy for the LSC hubs within hosting organizations	• Stakeholders aware of the usefulness and potential impact of the hubs (WP 4a & 4b) • LSC information users able to access, work with and benefit from LSC information in their contributions to CSA and agricultural transformation (WP 4a & 4b) • Feedback from LSC information users improves the design and content of the hubs (WP 4a) • The LSC hubs are developed and operationalized within the hosting organizations (WP 4a & 4b) • Inputs for embedding within the hosting organizations (WP4b) • Inputs for embedding and linkage with other agro-information platforms enhances sustainability (WP 4b)

• To develop and implement a financial strategy to ensure sustainability	• Financial strategy to sustain the LSC hubs within the hosting organizations (WP 4a & 4b) • Inputs for regional scaling

II. Description of the work (activities)

WP 4 consists of a part a and a. WP4a operates parallel to WP3 and WP5c during the *Development Phase* of the Action (see Theory of Change; figure 3.1) WP4b operates in parallel to WP5c during the *Institutionalization and Scaling phase* of the Action. During development (WP4a) and institutionalization (WP4b) a business model including a financial strategy will be developed that ensures funds to host and maintain the hubs for at least 5 years, based on the sustainability strategy developed in WP2.

The activities will be coordinated by the ILRI Work Package Coordinator. The day to day management of the WP activities will be coordinated by an ILRI Scientific Officer, who oversees the implementation of the activities by two junior research associates. A team composed of a WR senior advisor and three advisors will support the ILRI team in the activities with LSC hub hosts and the three user groups. An ILRI junio scientist will support the organization of focus group discussions and workshops.

4.1	*Awareness raising and training* • Organise workshops with a selected group of stakeholders to introduce and create awareness for the use of information from the LSC hubs; specific workshops are organized targeting public bodies, knowledge organizations and development partners. • Train staff of interested stakeholders in the use of the LSC-hubs.
4.2	*Feedback for LSC-hub development* • Contributing to agile development and facilitating feedback loops, conduct surveys and organize focus group discussions to collect feedback per stakeholder group to improve the functionality, visualization and user friendliness of the LSC-hubs.
4.3	*Inputs to scaling and institutionalization* • Conduct surveys and organize focus group discussions per stakeholder group (public bodies, knowledge organizations and development partners) providing inputs to scaling and institutionalization. • Develop a strategy to increase accessibility, promote use within each stakeholder group and contribute to enhancing sustainability. • Organize a workshop including policy makers from the three countries and those from other East African countries to explore possibilities for wider application of the LSC-hub in other countries.
4.4	*Inputs for business plan and financial strategy* • Consult hosting organizations and relevant stakeholders on the embedding of the developed LSC hubs. • Assess embedding and linkage with other agro-information systems. • Provide inputs to business plans including human resources, institutional and financial strategies (link to WP3).

III. Expected outputs (incl. deliverables)

III.a. Expected output(s) (excl. deliverables) of this work package

Output No.	Output (a)
4.1	Public bodies, knowledge organizations and development partners are aware and use information from LSC hubs
4.2	Public bodies, knowledge organizations and development partners through feedback contribute to the functionality, visualization and user friendliness of LSC hubs
4.3	Public bodies, knowledge organizations and development partners provide inputs to scaling and embedding of LSC hubs
4.4	Inputs for the business plan including a financial strategy contributes to the sustainability of the LSC hubs

III.b. Expected deliverable(s) of this work package

Deliver-able No.	Deliverable name/type (a)	Format (b)	Language (c)	Beneficiaries (d)	Months of implementation (e)
4.1	3 x 20 staff of public body trained	electronic	English	Ministries of Agriculture, other public bodies	M31
4.2	3 x 20 staff of knowledge organizations trained	electronic	English	Knowledge organizations including EIAR, KALRO and RAB and other NARS	M32
4.3	3 x 20 staff of development partners trained	electronic	English	Development organizations	M34
4.4	3 country reports including feedback consultations with policy bodies, knowledge organizations and development partners	electronic	English	LSC hub hosts (EIAR, KALRO and RAB)	M35

4.5	3 country reports including inputs for scaling and institutionalization from policy bodies, knowledge organizations and development partners	electronic	English	LSC hub hosts (EIAR, KALRO and RAB)	M36
4.6	Workshop report on the regional policy consultation	electronic	English	Other Eastern African agricultural ministries and research institutes ASARECA	M37
4.7	3 reports with inputs for business plans for LSC hubs	electronic	English	LSC hub hosts (EIAR, KALRO and RAB)	M38

IV. Distribution of activities to each implementing partner in this work package

Activity No.	Name of the activity	Implementing partner
4.1	Awareness raising and training	ILRI, WR
4.2	Feedback for LSC development	ILRI, WR
4.3	Inputs to scaling and institutionalization	ILRI, WR, ISRIC
4.4	Inputs for business plan development including a financial strategy	ISRIC, ILRI, WR

V. Sub-contracting

- The organisation of the training workshops, FGDs and other workshops will be implemented in collaboration with the national implementing partners: EIAR, KALRO and RAB.
- In each country 3 FGDs per stakeholder group are organized contributing to activity 4.2, 4.3 and 4.4; they are complemented with workshops, organised by EIAR, KALRO and RAB.
- ICRAF will to assist CCAFS in the selection and contacting stakeholders as ICRAF has a good understanding of the stakeholder landscape in the three countries and is well connected to these stakeholders
- ASARECA will organise the Regional Demonstration meeting (act 4.6). ASARECA is the umbrella organisation of NARS in East Africa and well positioned to organise this workshop.

VII. Financial support to third parties

Not foreseen.

VIII. Equipment

Not foreseen.

Work package 5: LSC-hubs use at local level			
Duration in months:	14	Name of the implementing partner leading this work package	WR

I. Objective(s) of this work package (expected outcome)

Objectives	Outcomes
• To contribute to the availability of science-based land, soil and crop information to stakeholders operating at the level of small-scale food producers at farm and landscape level in their efforts to promote integrated CSA practices and contribute to agricultural transformation	• Local stakeholders / users operating in a direct linkage with small-scale food producers aware of the usefulness and potential impact of the hubs (WP 5a & 5b)
• To introduce, familiarize and train LSC information users operating at the level of small-scale food producers benefiting from science-based land, soil and crop information	• LSC information users able to access, work with and benefit from LSC information in their small-scale farmer level contributions to CSA and agricultural transformation (WP 5a & 5b)
• To collect feedback from LSC information users working at the level of small-scale food producers for improving the functionality and user-friendliness of the LSC-hubs	• Feedback from LSC information users working at the small-scale farmer level improves the design and content of the hubs (WP 5a)
• Include local level use of LSC hub services in LSC-hub sustainability plans.	• Inputs for embedding and linkage with other agro-information platforms and farm-level information service provides reaching small-scale food producers enhances sustainability (WP 5b)

II. Description of the work (activities)

WP5 is divided into three blocks, WP5a operates parallel to WP2 during the *assessment phase* (see Theory of Change) of the action. WP5b supports the local input in the *development phase*, in parallel with WP3 and WP4a. WP5c focuses on the scaling and institutionalization phase of the Action, in parallel with WP4b. During development (WP5b) and institutionalization (WP5c) contributions to the business models addressing this feature of the LSC hubs will be developed. WP5 targets four types of stakeholders that operate at the level of small-scale food producers: public rural extension, NGOs, farmer organizations (including unions and cooperatives) and private sector. With private sector, we include stakeholders such as input providers (e.g. fertilizers, seed, farm equipment), agro-dealer networks and digital (mobile) agro-information providers.

This WP is designed based on the principle that small-scale food producers will become users of information available in LSC-hubs *with support of local intermediaries that operate directly with them*. Therefore, the local intermediaries are the prime stakeholders in this WP. A variety of stakeholders that have distinct processes and business models for interacting with farmers will be selected. Special attention will be given to those stakeholders that specifically target women and young producers. The variation in demands, interests and capacity covered by this approach is used in the development, scaling and institutionalization of the LSC- hubs.

Experiences with the Integrated Farm Planning (Plan Intégré du Paysan (in French) or PIP) approach, developed by WUR for East-Africa, will be incorporated in the selected pilot villages, especially for participatory learning and action (PLA) at farm level, as well as for promoting exchange of knowledge between farmers and researchers.

This WP will work with stakeholders having different goals, approaches, and business models while working with producers. Therefore, a team with diverse expertise in agricultural development, food systems, natural resource management (including soil fertility, water management), and agro-economy is needed. The activities will be coordinated by a WR Senior soil fertility specialist. The day to day management of the WP activities will be coordinated by a WR Senior soil and water specialist, who oversees the implementation of the activities by three junior research associates (each operating in one country). To develop the methodologies for dealing with the variety of stakeholders, the team will be completed with specialists that provide expertise in agricultural transformation, extension and rural development in each country, targeting women and youth in agricultural development, digital applications in rural advisory services and developing business models at local level.

5.1 *Identify target geographies and stakeholders*

- Select in each country two different distinct local administrative units (woredas, counties, districts) that represent typical examples of production systems, and have a distinct variety in the degree of food and nutrition security, progress of agricultural transformation, impact of climate change, and with a diverse set of stakeholders.
- Conduct a stakeholder analysis within the target geographies.
- Identify and include stakeholders specifically targeting women and young small-scale food producers.
- Select two focal villages within each identified geography based on the stakeholder analysis
- Identify potential users within each stakeholder group at village level, who will test the LSC hubs and provide feedback during the development phase of the action.

5.2 *Awareness raising and training*

- Organise workshops in each selected geography with a selected group of stakeholders to introduce and create awareness of the use of information from the LSC hubs; specific workshops are organized targeting agricultural extension, farmer organizations, NGOs and private sector using local languages (Ethiopia: Amharic, Oromo or Tigrigna; depending on the selected region; Kenya: Swahili; Rwanda Kinyarwanda; even though the LSC hub uses English)
- Develop a blended learning module for training stakeholders (including classroom and on-line components); the training is organized using local languages (Ethiopia: Amharic, Oromo or Tigrigna; depending on the selected region; Kenya: Luhya, Kikuyu, Kiswahili; Rwanda Kinyarwanda; even though the LSC-hub uses English.
- Train staff of interested stakeholders in the use of the LSC-hubs.
- Provide coaching to stakeholders while using the LSC-hubs.

5.3 *Feedback for LSC-hub development*

- Organize FGDs to collect feedback per stakeholder group to improve the functionality, visualization and user friendliness of the LSC-hubs.
- Compile national synthesis reports highlighting inputs from the various geographies and stakeholder groups.

5.4 *Inputs to scaling and institutionalization*

- Conduct surveys and organize focus group discussions per stakeholder group (both at the level of the selected geographies and at nationally level), providing inputs to scaling and institutionalization (embedding LSC-hub information in development and business models of users).

	• Develop a strategy to increase accessibility, promote use within each stakeholder group and contribute to enhancing sustainability.
5.5	*Inputs for business plan and financial strategy* • Consult relevant stakeholders on the embedding of the LSC hub information within their development and business models • Organize a multi-stakeholder workshop within each selected geography to discuss and elaborate mechanism for continued use of LSC information, thereby contribute to the sustainability of the LSC hubs. Assess embedding and linkage with other agro-information systems. • Provide inputs to business plans (link to WP3)

III. Expected outputs (incl. deliverables)

III.a. Expected output(s) (excl. deliverables) of this work package

Output No.	Output (a)	Explanation (b)
5.1	20 representatives of staff of local public rural extension, planning and policy development, NGOs, farmer organizations and private sector in each selected area are ***aware of LSC hubs*** (total 120)	Awareness raising workshops for local landscape planning and management bodies, public rural extension, NGOs, farmer organizations and private sector
5.2	20 representatives of staff of local public rural extension, planning and policy development, NGOs, farmer organizations and private sector in each selected area ***trained in the use information from LSC hubs*** (including those organizations targeting specifically women and young small-scale food producers) (total 120)	Includes development of blended learning course and curriculum for short course in LSC-hub usage in local language (Amharic, Tigrigna; Luhya, Kikuyu, Kiswahili; Kinyarwanda) and English, and implementation. Special attention to consider gender and youth. For 4 stakeholder groups in 2 location per country.
5.3	20 representatives of staff of local public rural extension, planning and policy development, NGOs, farmer organizations and private sector in each selected area provided ***feedback towards the functionality***, visualization and user friendliness of LSC hubs (total 120)	Includes testing of beta-version and structured provision of feedback on LSC-hub data offer, functionality and (helpdesk-) support. Will be undertaken as part of in training 5.2
5.4	20 representatives of staff of local public rural extension, planning and policy development, NGOs, farmer organizations and private sector in each selected area provide inputs in use cases for incorporating LSC information into ***scaling and embedding*** of LSC-hubs services. (total 120)	Includes scaling strategy for each organisation, assessment of number of stakeholders in next level and strategies to embed service delivery by local providers / intermediaries.
5.5	20 representatives of staff of local public rural extension, planning and policy, NGOs, farmer organizations and private sector in each selected area provided inputs for ***incorporating LSC information in their development- and business plans***. (total 120).	Provides contribution to the business plan and thus sustainability of the LSC hubs.

III.b. Expected deliverable(s) of this work package

Deliverable No.	Deliverable name/type (a)	Format (b)	Language (c)	Beneficiaries (d)	Months of implementation (e)
5.1	3 country reports with selection of target districts/villages, stakeholder analysis and potential users lists.	electronic	English	LSC-hub users	M3-6, M33
5.2	3 country reports on the awareness raising activity, including nr of potential users and nr of represented organisations.	electronic	English	Project staff and partners	M35
5.3	3 country reports on the training activity including number of persons trained, locations, stakeholder group	electronic	English	LSC hub users & LSC hub hosts (EIAR, KALRO and RAB)	M35
5.4	3 country reports on FGD providing feedback on LSC-hub use, incl nr of	Electronic/ video	English	LSC hub users, WP3 developers	M37

	participants, location, gender. Includes testimonies of farmers on lessons learned.				
5.5	3 country reports on FGD providing feedback on scaling and institutionalisation, from local level policy bodies, knowledge organizations and development partners including nr of participants, location, gender, organisation.	electronic	English	LSC hub users & LSC hub hosts (EIAR, KALRO and RAB)	M39
5.6	3 country reports with user's business plans for applications of LSC-hub services	electronic	English	LSC hub users & LSC hub hosts (EIAR, KALRO and RAB)	M41

IV. Distribution of activities to each implementing partner in this work package

Activity No.	Name of the activity	Implementing partner
5.1	Identify target geographies and stakeholders	WR
5.2	Awareness raising and training	WR
5.3	Feedback for LSC-hub development	WR
5.4	Inputs to scaling and institutionalization	WR
5.5	Inputs for business plan and financial strategy	WR, ISRIC

V. Sub-contracting

- The organisation of the training workshops, focus group discussions and other workshops will be implemented in collaboration with EIAR, KALRO and RAB; and within focus districts and selected geographies a locally based lead partner
- In each country and in cases within selected geographies, training workshop (5.8), FGDs (5.9 and 5.10) and multi-stakeholder workshops (5.12 and 5.13) are organized; EIAR, KALRO and RAB and locally operating stakeholders will be organized if required to support their organization

VII. Financial support to third parties

Not foreseen.

VIII. Equipment

Under activity 5.2.10 purchase of training materials is foreseen for the three countries. This includes instruction materials, leaflets and related materials against a cost of EUR 10,000 per country, EUR 30,000 total. Some computer equipment will be purchased to support the presentations during the implementation of decentralised workshops and training (activity 5.5.19).

4.2 IMPLEMENTATION TIMETABLE

	Number and name of the activity	Year *)	2021												2022												2023												2024											
		Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48
WP1	**Management and Coordination**																																																
1.1	Scientific activity management		D1.1												D1.1												D1.1												D1.1											
1.2	Day-to-day project management		D1.2																																														
1.3	Action meetings																																																
1.4	Action Advisory Committee (AAC) Meetings			D1.3												D1.3												D1.3												D1.3											
1.5	Communication, dissemination and visibility				D1.4																																											
1.6	Monitoring, evaluation & learning												D1.5												D1.6											D1.5												D1.6	
1.7	Audits												D1.7												D1.7											D1.7												D1.7	
WP2	**Assessment of stakeholder needs**																																															
2.1	Design demand and capacity assessments					D2.1																																										
2.2	Design institutional assessments					D2.2																																										
2.3	Conduct demand and institutional assessments						D2.3																																									
2.4	Consolidate inputs to the LSC-hub design							D2.4																																								
2.5	Prepare and submit assessment report										D2.5																																					
WP3	**Development of LSC hubs and Capacity building**																																															
3.1	Data compilation												D3.1																																			
3.2	Soil and land mapping																	D3.2																																
3.3	Soil functional mapping																			D3.3																														
3.4	Architectural design																			D3.4																														
3.5a	System building - (Beta release)																											D3.5																					
3.5b	System building - (improvements based on feedback)																																															
3.6	Capacity building for data management																																														D3.6	
3.7	Integration of LSC-hubs																																														D3.7	
WP4	**LSC-hubs use at national level**																																															
4.1	Awareness raising and training																													D4.1																			
4.2	Feedback for LSC development																																D4.2														
4.3	Inputs to scaling and institutionalization																																				D4.4											
4.4	Inputs for business plan development and financial strategy																																						D4.5									
WP5	**LSC-hubs use at local level**																																															
5.1	Identify target geographies and stakeholders																																D5.1														
5.2	Awareness raising and training																																				D5.2										
5.3	Feedback for LSC-hub development																																						D5.3									
5.4	Inputs to scaling and institutionalization																																														
5.5	Inputs for business plan and financial strategy																																														

Part 5 – Partnership and Action management

5.1 PARTNERSHIP

The Netherlands Ministry of Foreign Affairs (NL MFA) is the contracting partner for the European Commission (EC) will report on the action to the EC. The NL MFA in the Hague will be responsible for the: (a) provision of a channel for formal communication with the EC; and (b) overseeing the financial and project management, including ensuring timely reporting to EC.

Implementing partners

- *Wageningen Research (WR) is the day-to-day project manager of the action*. WR is a globally leading research organisation in the fields of agriculture, healthy food and the living environment. WR Corporate (WR-CS) has the responsibility for project management. The nine Research Institutes that together form Wageningen Research (https://www.wur.nl/en/Research-Results/Research-Institutes.htm) carry out application-oriented and field-based research. Two Wageningen Research Institutes contribute to this activity. Wageningen Environmental Research (WEnR) is responsible for the testing the hubs at farm level and will coordinate WP 5. WEnR has an extensive track record on participatory research approaches with smallholder farmers in Africa. Wageningen Centre for Development Innovation (WCDI) is a WR expert centre with a track record on successfully implementing projects that link knowledge management in the agricultural sector with sustainable development. It will guide the multi stakeholder consultation and the development of the sustainability strategy for the hubs.

- *ISRIC – World Soil Information (ISRIC) is the scientific coordinator of the action,* takes care of the daily activity management (WP1) and is responsible for the development of the LSC-hubs and capacity building (WP3). ISRIC is globally leading the innovations in the field of Digital Soil Mapping, soil data management and harmonisation. ISRIC leads various working groups of the International Union of Soil Science in the field of Digital Soil Mapping and leads the scientific innovations within the Global Soil Partnership, coordinated by the FAO.

- *International Livestock Research Institute (ILRI) on behalf of CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS)* is responsible for all stakeholder consultation activities in East Africa, at national/regional level (WP2) and WP4 (which it will coordinate), and at local level (WP5). CCAFS has a strong regional and in-country presence and ample experience with stakeholder processes in East Africa. It maintains an extensive network with CSA policy makers and projects as well as private sector.

National Implementing partners

- The *Kenya Agriculture and Livestock Research Organization (KALRO)* will build a national LSC-hub for Kenya, building on current activities in cooperation with the University of Nairobi.

- The *Ethiopian Institute for Agricultural Research (EIAR)* will build a national LSC-hub for Ethiopia, based on current activities in the CASCAPE project and EthioSIS.

- The *Rwanda Agricultural Board (RAB)* will build a national LSC-hub for Rwanda in cooperation with relevant national stakeholders.

Subcontractors

- The *World Agroforestry (ICRAF)* will provide use-cases on agro-forestry, water harvesting for dry land resilience.

- the *German Aerospace Centre (DLR)* will make available all relevant Copernicus EO products.

- the *International Fertiliser Development Centre (IFDC)*, will assist in developing databases in the field of soil fertility management.

- *AgroCares* will develop options for uploading additional soil and crop information by stakeholders to improve performance of the hubs for specific geographies.

- The *Association for Strengthening Agricultural Research in Eastern and Central Africa (ASARECA)* will leverage on its convening power to organize workshops and consultative meetings in the 3 action countries, and will also assist with demonstration of the hubs to research organisation in other East African countries to show the possibilities and potential impact of the hubs.

- The *International Union for Conservation of Nature (IUCN)* has a strong presence in Rwanda with activities in soils and agro-forestry and will contribute to the activities in Rwanda.

Identified Stakeholders

- Ministry of Agricultural, Livestock and Fisheries (MoALF), Kenya; Ministry of Agriculture (MoA), Ethiopia; Ministry of Agriculture and Animal Resources (MoAAR), Rwanda.
- *SNV* will provide uses cases from CSA-EA and HortInvest Rwanda.
- Various institutes involved in the development and use of agro/climate-related information in the three countries, such as RCMRD Nairobi, EIONET in Ethiopia. More stakeholders will be identified during the action phase, budget will be reserved for their participation.

5.2 ACTION MANAGEMENT

The action consists of following management and advisory bodies:
1. Overall Action Coordinator (OAC)
2. Action Management Team (AMT)
3. Action Scientific Management Team (ASMT)
4. Action Advisory Committee (AAC)

The Delegate Cooperation Agreement requires clear reporting and communication lines and frequencies. To ensure this, there is a central role of the Action Management Team and the Action Scientific Management Team. The management structure will be established in the Grant Agreement with the EC as well as in the Consortium Agreement (CA) and is presented in Figure 5.1.

Overall Action Coordinator (OAC)
NL-MFA is the contracting agency for DG DevCo and has the final responsibility for the implementation of the action and duly submission of annual narrative and financial reports and deliverables. The OAC will chair the Executive Team and will be supported by the Project Manager (WR) and the Scientific Coordinator (ISRIC).

Project Manager (PM)
WR will be the Manager (PM) and has the responsibility for the day-to-day management of the action, including the legal, contractual, financial and administrative management, monitor progress and prepare contingency plans if necessary. WR will also be the secretariat of the Action Advisory Committee.

Scientific Coordinator (SC)
ISRIC will be the scientific coordinator of the action and has the responsibility for the development of the LSC hubs, embedding of the hubs in existing information services, capacity building in use and maintenance of the hubs.

Action Management Team (AMT)
The PM, together with the SC form the Action Management Team, jointly overseeing and coordinating all managerial and scientific aspects of the action.

Action Scientific Management Team (ASMT)
The ASMT is the scientific management team of the action. It is led by Scientific Coordinator (SC) and includes the five WP coordinators. The SC carries responsibility for the scientific coordination and management of the action on behalf of the partners. Tasks include: (i) activity management and coordination, ii) risk management (iii) monitoring, learning, evaluation and narrative reporting, (iv) communication and visibility, and (v) chair the Action Advisory Committee. The ASMT will convene monthly through teleconferencing.

Action Advisory Committee (AAC)
An Action Advisory Committee will be established to advise the OAC and ASMT. The AAC consists of representatives from important users of the hubs as well as representatives from the Netherlands embassies and EU Delegations in Rwanda, Ethiopia and Kenya. NL-MFA participates as an observer. ISRIC chairs the AAC and WR will take the role of the secretariat. Other potential members may be identified during the inception of the action.

Work Package Coordinators
This action consists of five WPs. Each WP is led by a WP coordinator who is also a member of the ASMT. The WP Coordinators will be responsible for daily management, the progress, reporting and deliverables of their respective WPs. Any major diversion from the initial action plan will be reported to ASMT and its decisions will be translated into WP day-to day management. Each WP will put its own management procedures in place as appropriate.

Action Partners include the national implementing partners and subcontractors. They may participate in the annual action meetings, in order to provide their advice on scientific and/or managerial aspects of the work. Action Partners who wish to address certain issues concerning the action

or action management may always approach the SC, who will try to resolve and/or put the issue on the agenda of the ASMT or AMT and meeting for discussion.

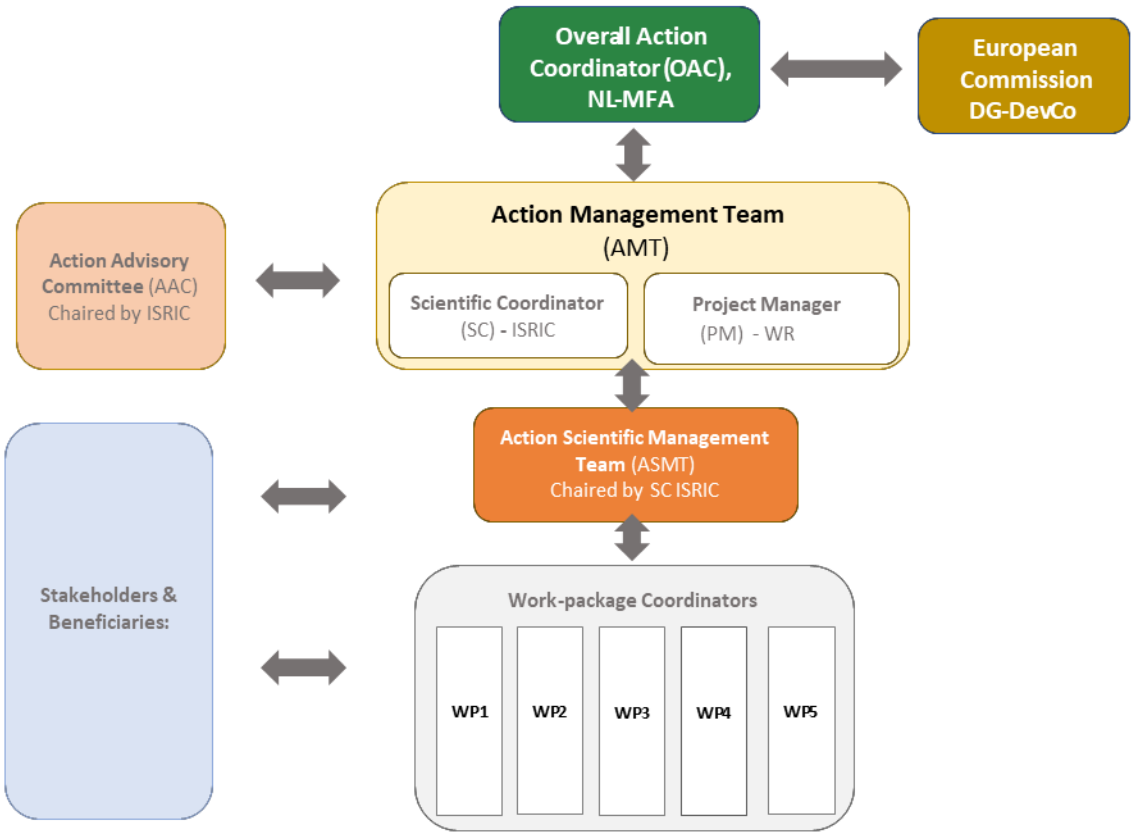

Fig 5.1: Management structure of the proposed action

5.3 MONITORING AND EVALUATION

Regular activity management

The SC will oversee the activities and ensure, together with the ASMT, that all deliverables will be available in time. In monthly MT meetings the progress of the ongoing activities will be closely monitored. The SC together with the AC will provide quarterly reports to the Overall Action Coordinator (OAC). In case of delay in the realisation of deliverables the SC will, in dialogue with the AC, decide on appropriate corrective measures. In case of serious delays and /or failure the EU will be notified by the OAC.

The action will make use of an online project management system to enable fast and convenient reporting for scientific work done at different (partner, WP) levels. The online system will include the WP coordinators' observations on progress, risks and deviations for the ASMT and MT to resolve.

Monitoring and Learning

The action *progress* will be monitored following in WP 1, activity 1.6. The action will include monitoring and learning activities as a basis for regular reporting to both action partners as well as annual reporting to NL-MFA and EU. (WP1.6). The activity will be based on the descriptions of the deliverables, indicators and targets listed for each output under each WP and the time table in 4.2. A dashboard of progress against targets will be developed during the inception of the action. Subsequently progress will be tracked and reported. Lessons learned will receive special attention and will be disseminated through the communication activities.

External reviews

A midterm and final external review will be carried out; review committee members will be selected by the action coordinator in cooperation with the Action Advisory Board.

Financial monitoring will be done through annual financial auditor's reports.

5.4 RISKS AND MEASURES TO MITIGATE THEM

There is one risk that we cannot consider a risk any longer but is simply a given considered in the approach and the methodology of the implementation of the Action. That 'given' is Covid-19. For that reason, we will assume that the inception phase of the action, and most of the trainings will largely take place online. Where possible our local partners will conduct the stakeholders meetings guided by a robust methodology developed in collaboration with the Netherlands' based partners. The norm will be online cooperation in the first year of action implementation.

Annex 3 of the of the Action, the Results Framework, includes assumptions formulated from the immediate work package outcomes towards the impact of the Action. In the table below we focussed particularly on the immediate outcome level assumptions, described them as risk and indicated mitigating measures.

Risk	Risk level (H/M/L)	Impact on the Action	Mitigating measures
All WPs - Despite growing experience in online project management, complemented by advantages and disadvantages, the inception phase of the action, team building and commitment to the division of tasks, may take longer than anticipated.	M	Delays at action start-up may have medium level impact on all outcomes in all three countries.	Team building online will be harder than in a face-to-face setting. Team meetings need to be to-the-point, short and extremely well-prepared. They still need to allow for healthy interaction. Professional facilitation is key. All partners have increasingly enhanced their online meeting skills. WR staff involved in the action have been trained in online facilitation and blended learning. Where possible, virtual approaches will be used to guide the development of the LSC-hubs and CSA Decision Support Tools.
WP 2 specifically – multi-stakeholder workshops and focus group discussions to assess stakeholder demands and capacity may have to be conducted by local partners only	L	Participation of international partners during meetings could motivate towards (faster) action	The multi-stakeholder consultative process design for the demand and capacity assessments already takes into account the current no and/or limited travel situation due to Covid-19
WP 3 specifically - Soil and land data collected from local data providers is of poor quality (e.g. no metadata, missing georeferencing, outdated)	M	If provided data is of insufficient quality, then these cannot be used to develop actionable maps (activities 3.2 and 3.3).	Use other, freely available data sources (e.g. ISRIC's SoilGrids a.o.) to include in the LSC-hubs and to generate soil maps for the three countries.
WP 3 specifically - The implementation of a data system (activity 3.5) is difficult to plan. It requires development of software and technologies which can be unpredictable processes.	H	Outcome (operational LSC-hubs in the three countries) cannot be achieved.	Follow an agile development approach that develops the LSC-hubs gradually through development iterations. Each iteration results in a working product (system) that gradually evolves over time.
WP 3 specifically – bringing stakeholders, with different demands and capacity, together, often leads to unpredictable processes	M	Development of hubs in the three countries may be delayed	WP2 and WP5a activities, (see also the Assessment Phase of the Results Framework in Annex 3) anticipate and mitigate possible challenges that may hinder effective knowledge exchange and thus effective software and technology development.
WP 4 and WP5 - low interest of stakeholders in the use of the LSC-	L	Limited feedback from stakeholders; end product	Involving all organisations and stakeholders needed to join the action at an early stage supports the creation of ownership.

hubs, threatening long term sustainability of the hubs.		not suitable to needs of the end-users	Advocating the added value of the hubs to stakeholders by creating a community of stakeholders in WP 2. This will especially be supported by WP 1 in the frame of facilitating multi-stakeholder learning. The foreseen LSC hub hosts KALRO, EIAR and RAB already have close links with producers and users of LSC knowledge and information. WR (see mspguide.org) has extensive experience in facilitating multi-stakeholder platforms.

5.5 DISSEMINATION STRATEGY AND VISIBILITY

Dissemination and consultation is part and parcel of the project approach. WP 2, WP4 and WP5 are entirely dedicated to stakeholder consultation, dissemination of the results, and gathering feedback. Besides this, the team will establish and maintain a project website and project social media channels. All the documents, guidelines, manuals and training material produced by the project will be published on the project website.

In addition, and as part of WP 1, the team will develop a communication strategy and concrete annual communication plans to ensure adequate and timely communication of results to a broader audience. Also, for visibility a strategy and plan will be developed. A digital monitoring dashboard -rather than a report or a flyer- will clearly indicate the performance of work packages and the progress made during the Action on a periodical basis. This will support and enhance the monitoring as well as the visibility of the Action in general. The digital dashboard will also be used to openly and periodically share feedback and lessons learnt and thus also serves as a tool for knowledge exchange and visibility.

ISRICs, being the World Data Centre for soils, has extensive experience with online community management and external communication. ISRICs professional communication officer will be responsible for this task. WR will develop and manage the dashboard and support the communication and visibility activities.

5.6 SUSTAINABILITY AND LONG-TERM IMPACT OF THE RESULTS OF THE ACTION

Sustainability of the action is ingrained in the overall action and work packages and follows the goal to enhance the effectiveness of regional Agricultural Knowledge Innovation System (AKIS 2.0). The log frame defines the ultimate outcomes and related indicators. WP1 defines the Monitoring and Learning pathway to define and track the achievements of these goals.
In WP2, a sustainability strategy will be developed, based on an institutional landscape and capacity needs assessments of value chain actors including user groups.
In WP3, the sustainability strategy will be translated into long term business plans and capacity building plans for the embedding of LSC-hubs in the national agricultural data infrastructures linked to existing climate and other information systems and extension services. In WP4b/5c the sustainability strategy will be will be translated into mechanisms for i) sustained engagement of users in development of LSC-hub services, ii) embedding LSC-hub services in their policy development, decision making, planning and extension services related to CSA and related users' business plans iii) by training users in the use of LSC-hub services. This will result in the development of partnerships and the formalisation of commitments into agreements for the sustained political, financial and logistical support to the LSC-hubs.

Number of farmers reached

In WP5 the action will ***directly work with 480 local users, intermediaries and farmers*** and assist them to integrate LSC-hub services in regular extension and information services that support farming and resource planning for CSA at the local level (see WP 5). However, the anticipated reach of the action is much larger, especially when the hubs developed in this action are integrated in existing information services. In Ethiopia the hubs will possibly be integrated in a digital climate agro-advisory platform called EDACaP (https://advisory.ethioagroclimate.net/ and http://agmetstn.ethioagroclimate.net/indexDesktop.php). This platform is piloted at a research level with 187.000 direct beneficiaries. Currently it is reaching at least 3.7 million farmers (excluding the general audience) through the communication of CSA advisories via radio broadcasting service every two weeks. In Kenya the hubs maybe integrated in a digital agricultural observatory platform called KAOP (https://www.kaop.co.ke/). The estimated number of beneficiaries is currently at a research level with 6000 direct beneficiaries. Currently 100.000 farmers are being connected to the platform through a project titled "E-voucher systems: Connecting Smallholders to Knowledge, Networks, and Institutions" (https://ruralsolutionsportal.org/en/-/e-finance-vouchers-support-growth-for-kenyan-smallholders). In Rwanda the hubs maybe embedded in the Rwanda Climate Services for Agriculture (RCSA). Reaching directly more than 111.000 farmers in four provinces across Rwanda through Participatory Integrated Climate Services for Agriculture (PICSA). RCSA Radio Listeners Clubs (LCs) is potentially accessible to about 70% of the population (12,712,431 million). Summarising: through embedding of the hubs in existing information services

the number of farmers reached is around 400.000, excluding the reach of the various radio services, mounting to many millions of farmers in the three countries.

Annex 1: References

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Annex 2: List of frequently used acronyms

AAC	Action Advisory Committee
AMT	Action Management Team
AfSIS	Africa Soil Information Services
AIRCA	Association of International Research and Development Centres for Agriculture (AIRCA).
AKIS	Agricultural Knowledge and Innovation Systems
ASARECA	Association for Strengthening Agricultural Research in Eastern and Central Africa
ASMT	Action Scientific Management Team
BMGF	Bill and Melinda Gates Foundation
CA	Consortium Agreement
CASCAPE	Capacity building for scaling up of evidence-based best practices in agricultural production in Ethiopia
CCAFS	CGIAR Research Program on Climate Change, Agriculture and Food Security
CGIAR	Consultative Group on International Agricultural Research
COP	Conference of Parties
CRAFT	Climate Resilient Agribusiness for Tomorrow
CSA	Climate Smart Agriculture
DeSIRA	Development of Smart Innovation through Research in Agriculture
DG-DevCo	Directorate-General for International Cooperation and Development
EA	East Africa
EC	European Commission
EDACaP	Ethiopia Digital AgroClimate Advisory Platform
EIAR	Ethiopian Institute for Agricultural Research
ENACTS	Enhancing National Climate Services (Rwanda)EO Earth observation
EO	Earth Observation
EU	European Union
FAIR	Findable, Accessible, Interoperable and Reusable
FAO	Food and Agriculture Organization
FGD	Focus group discussion
GHG	Greenhouse gas
IPCC	Intergovernmental Panel on Climate Change
ISRIC	International Soil Reference and Information Centre (ISRIC) – World Soil Information
DLR	German Aerospace Centre
GoK	Government of Kenya
IFAD	International Fund for Agricultural Development
IFDC	International Fertiliser Development Centre
IUCN	International Union for Conservation of Nature
KALRO	Kenya Agricultural and Livestock Research Organisation
KAOP	Kenya Agricultural Observatory Platform
KCSAIF	Kenya Climate Smart Agriculture Implementation Framework
LDN	Land Degradation Neutrality
LSC-hub	land, soil and crop information hub
LSC information	land, soil and crop information
LSC-IS	Land, Soil and Crop Information Services to support Climate Smart Agriculture
MoA	Ministries of Agriculture, Ethiopia
MoALF	Ministry of Agriculture, Livestock and Fisheries (Kenya)
MoAAR	Ministry of Agriculture and Animal Resources (Rwanda)
NARS	National Agricultural Research Systems,
NAS	National agricultural system
NDC	National Determined Contribution
NGO	Non-governmental organisation
NIP	National Indicative Programme
NL-MFA	Netherlands Ministry of Foreign Affairs
OAC	Overall Action Coordinator
PM	Project Coordinator
RAB	Rwanda Agricultural Board
RCSA	Rwanda Climate Services for Agriculture
RCMRD	Regional Centre of Resources for Development
SC	Scientific Coordinator
SNV	Netherlands Development Organization

SOC	Soil organic carbon
SDG	Sustainable Development Goal
UNCCD	United Nations Convention to Combat Desertification
WCDI	Wageningen Centre for Development Innovation
WP	Work package
WR	Wageningen Research

Annex 3: Results Framework for the Action

Title of the Action	**Land, Soil and Crop Information Services to support Climate Smart Agriculture (LSC-IS)**				
Impact of the Action	**Increased agricultural productivity and farm income especially for small-scale farmers based on climate resilient and sustainable food production in Ethiopia, Kenya and Rwanda, chracterised by reduced greenhouse gas emissions from primary production systems**				
Key performance indicators	- # hectares of farmland converted into sutainable use- # small scale farmers that have doubled productivity and/or income- # small scale farmers that have reduced their yield gap by at least x% in 10 y				
Overall Obective of the Action	**To develop sustainable land-, soil-, crop information hubs in national agricultural research organisations that facilitate the exchange of knowledge and information between farmers, knowledge organisations, private sector and policy makers, enhance the effectiveness of national Agricultural Knowledge and Innovation Systems (AKIS 2.0) and contribute to rural transformation and Climate Smart Agriculture in East Africa.**				
Target group	Small-scale farmers and other users and producers of knowledge and information				
Pathways	**Assessment Pathway**	**Development Pathway**		**Scaling & Institutionalisation Pathway**	**Monitoring & Learning Pathway**
	specified in WP2	***specified in WP3***	***specified in WP4(a) and WP5(a)***	***specified in WP4(b) and WP5(b)***	***specified in WP1***
Ultimate outcomes (10 years after the end of the Action)	Discussed and agreed roadmaps - based on the scaling and institutionalisation of LSC hubs- available for the design of an *enabling and vibrant* national AKIS 2.0 exist to contribute to rural transformation, climate change adaptation and mitigation in Ethiopia, Kenya and Rwanda and, eventually, in East Africa	Through the effective operation of *LSC knowledge and innovation hubs* the hubs evolved and expanded towards national *Agricultural Knowledge and Innovation Systems (AKIS 2.0)* contributing to continously challenging the status quo of food system performance, to rural transformation and a climate-smarter agriculutral sector in Ethiopia, Kenya and Rwanda, and, eventually, in East Africa	Enhanced *adaptive capacity* exists of *information users and producers* resulting in the continuous *updating and improving* of LSC hubs and their operation in particular and the national AKIS 2.0 in general in Ethiopia, Kenya and Rwanda, and, eventually, in East Africa	LSC hubs in particular -and the national AKIS 2.0 in general- contribute to the decrease of the digital divide in the agricultural sector and are used for policy formulation, for the development of policy frameworks, for (public and private) advice and service provision as well as for the development of (inter)national funding schemes contributing to rural transformation *and* climate change adaptation and mitigation in Ethiopia, Kenya and Rwanda and, eventually, in East Africa	The latest trends and approaches to stimulate knowledge exchange and (social) learning are applied to enhance *innovative capacity* of the LSC hubs in particular and the national AKIS 2.0 to contribute to rural transformation, climate change adaptation and mitigation in Ethiopia, Kenya and Rwanda, and, eventually, in East Africa

Key performance indicators (indicating quantitative or qualitative change)	• 3 roadmaps to develop a national AKIS based on lessons learnt and effective practices at LSC hubs	• An operational and active multi-stakeholder partnership/platform of information users and producers actively exchanging, producing and using geo-referenced land, soil and crop data (for the continuous improvement of the resilience of the agricultural sector and contributing to rural transformation, climate change adaptation and mitigation in Ethiopia, Kenya and Rwanda) • # of partners incuded in the platform and # of meetings held of the multi-stakeholder partnership • Farmers, producer groups and/or producer organisations and/or producer unions, advisors (public and private), extension, research, education and training, NGOs, media are represented in the national AKIS 2.0 in Ethiopia, Kenya and Rwanda	• An operational multi-stakeholder partnership able and motivated to continuously improve the functioning, operation and effectiveness of the AKIS 2.0 (and as such the resilience of the agricultural sector in the face of climate change) • # meetings and # of feedback logs • overview of feedback provided and feedback integrated	• LSC data are freely available to everyone to use and republish as they wish, without restrictions from copyright, patents or other mechanisms of control • Public and private service providers confirm the use of LSC data • Better links between research and practice visible • Decrease of the digital divide visble in the agricultural sector: • At least # small-scale food producers, using LSC data • Agricultural extension is gradually changing from advising farmers to supporting farmers learn from other farmers trhrough the AKIS 2.0 • CSA, climate change adaptation, climate change mitigation or other relevant policies developed supported by the LSC hubs	• Rapidly evolving approaches to knowledge exchange, learning and innovation in agriculture form the foundation of AKIS 2.0 • Benefits and innovative collaborations or results are regularly shared and available to the general public
Assumptions	• Lessons learnt and effective practices of the LSC hubs have captured the interest of agricultural sector actors to establish knowledge platforms that catalyse innovation at national *and even at regional (East Africa) level*	• Science-based land, soil and crop data are a fundamental basis for AKIS 2.0, whether national or regional	• Knowledge exchange improves the quantity and quality of data and this is visible for all agricultural sector actors at national level and eventually at regional level	• Creative Commons Licences are applied in Ethiopia, Kenya and Rwanda	• Agricultural Knowledge and Innovation Systems are considered *key for innovation* as they support identifying, analysing and assessing the various actors in the agricultural sector as well as their communication, ways of interaction and collaboration
Intermediary outomes (at the end of the Action)	A (proven) effective methodology and strategy for a LSC hub design trajectory based on lessons learned of clearly specifying demands, roles, responsibilities and capacity of actors exists and ownership has been made explicit.	Operational LSC hubs, complemented by a long-term viable business plan, are able to collect and provide up-to-date LSC data to users and users and producers of LSC information are actively engaged in knowledge exchange.	LSC hub partners (i.e. producers and users of data) are *familiar* with LSC services, are *able to reflect* on these services and are *able to update* LSC functions and operations.	LSC hubs *started* to play an active role in policy development and in CSA decision making; they are contributing to enhancing the performance of extension services and public and private sector advisors; the strategy developed during the Action to increasingly facilitate reducing the gap between *research and practice* in the farm planning of small scale farmers has been embarked upon by *public and private* sector stakeholders.	A clear overview of the results, outcomes and lessons learnt of the Action and recommended steps to further optimise sector *performance and resilience* exists; These have been widely disseminated and enjoy a great visibility.

Key performance indicators (indicating quantitative or qualitative change)	• Description of sustainability strategies developed for Ethiopia, Kenya, Rwanda • Description of user needs assessments for LSC-hub information services for Ethiopia, Kenya, Rwanda	• 3 hubs operational (1 in Ethiopia, 1 in Kenya and 1 in Rwanda) complemented by a long-term business model	• Institutional Stakeholders and (International) Development Partners on a testing basis are users of LSC hubs • Farmers, Private Sector and Extension on a testing basis become users of LSC hubs	• Institutional Stakeholders and (International) Development Partners on a structural basis and at scale are users of LSC hubs • Farmers, Private Sector and Extension are users at scale of LSC hubs • LSC hubs are embedded in the extension and research services of the MoA • Private sector sees the entrpreneurial value of LSC hubs, resulting in at least # of business initiatives or start-ups	• An online monitoring dashboard (ncluding historical logs) with (periodically updated) results and final Action outcomes
Assumptions	• Land, soil and crop information exchange has proven to provide concrete benefits for agricultural sector actors (from farmers to policy makers)	• Business planning is based on *realistic* data	LSC hub partners (knowledge and information users and producers) are 'talking' each other's language	• Land, soil and crop information exchange has proven to provide concrete benefits for agricultural sector actors • LSC hubs are seen by policy makes as decision *support* tool in particular for CSA interventions	• Land, soil and crop data and the exchange, interaction and collaboration of users and producers of knowledge and information is considered key for innovation as it decreases the gap between research and practice and supports minimising the digital divide
Immediate outomes (after finalisation of work package activities)	• A set of clearly defined user requirements/demands that guide the design of the LSC-hubs is available; *during the Assessment Phase (by means of WP5a) specific attention has been paid to those LSC information users working at the level of small-scale food producers;* • An assessment of the current *capacity* and institutional requirements for the design of the LSC hubs has been described, discussed and finalised to form the foundation of the LSC Hub Development Phase ; during the Assessment Phase (by means of WP5a) specific attention been paid to the capacity and institutional requirements of LSC information users working at the level of small-scale food producers;	• LSC-hubs have been designed based on Assessment Phase outputs *and* are operational in Ethiopia, Kenya and Rwanda; • Designs include LSC-hub business plans, country specific variations and (*see WP4a and 5b*) the feedback of the testing of the LSC hubs at selected woredas, counties or districts; • Development processes have taken into account country specific variations and included a testing phase at smaller scale (see WP 4a and 5b); • LSC-hub hosts' staff has been trained and has capacity in LSC operations and maintenance and in the facilitation of knowledge exchange between users and producers of information	• LSC stakeholders are aware of the usefulness and potential impact of the hubs, *are motivated to test it* and are able to provide feedback for improvement; • LSC information users *(as indicated in WP4a and WP5b)* are able to access, work *with* and benefit *from* LSC information in their contributions to climate smart agriculture efforts/interventions and to rural transformation, and are engaged in discussing potential bottlenecks and finding solutions; • Feedback from LSC information users (as well as producers) improves the design, development process and information content of the hubs; • The LSC hubs are developed and operationalized, *tested and adapted* within the hosting organizations; • A financial strategy to sustain the LSC hubs within the hosting organizations has been *jointly* prepared with multiple stakeholders, extensively discussed, adjusted and improved, and finalised	• Agriculture sector stakeholders aware of the usefulness and potential impact of the hubs • LSC information users *(as indicated in WP4b and WP5c)* are able to access, work with and benefit from LSC information in their contributions to CSA and agricultural transformation • The LSC hubs are developed and operationalized within the hosting organizations • Inputs for embedding the LSC hubs within the hosting organizations are availeble • Sustainability has been enhanced through the linkages that have been established wih other agro-information platforms, as such forming the basis for an AKIS 2.0 • The financial strategy to sustain the LSC hubs within the hosting organizations has been rolled out • Inputs needed for further expanding geographic coverage of the hub and fostering the exchange with larger numbers of users and producers of LSC information have been made explicit, clearly described, discussed and a roadmap for follow up steps has been laid out	• A project management structure that supports project implementation • A digital monitoring *dashboard* clearly indicating the work package *performance* and the *progress* made *during* the Action on a periodical basis, and as such enhancing the monitoring *as well as the visibility* of the Action in general, has continuously been used during implementation • The dashboard has been used to openly and periodically share feedback and lessons learnt and thus serves as a tool for knowledge exchange and the facilitation of multi-stakeholder learning • A communication and visibility strategy implemented

Key performance indicators	• Methodology for country demand and capacity assessment • Methodology for country institutional assessment • Country level demand, capacity and institutional assessment • Overview of generic and country specific demands, capacities and institutional requirements • Assessment report and sustainability strategy • 10 FGDs organized covering at least five stakeholder groups; • 2 multi-stakeholder workshops per country	• Science-based land, soil and crop information is available to stakeholders operating at the level of small-scale food producers • Harmonised datasets with existing basic land, soil and crop information available • Nation-wide GIS layers with basic land, soil and crop information at 250*250m resolution • Tailor-made GIS layers to support CSA decision-making • Document describing the agreed upon architecture of the hubs • Hubs in three countries developed and populated with the data developed in activity 3.1 – 3.3 • Staff at the three national hubs trained in data management and use • LSC-hubs embedded in existing national agricultural data infrastructures and platforms	• 3 x 20 staff of public body trained • 3 x 20 staff of knowledge organizations trained • 3 x 20 staff of development partners trained • 20 representatives of staff of local public rural extension, planning and policy development, NGOs, farmer organizations and private sector in in 2 selected areas are aware of LSC hubs (total 120) • 20 representatives of staff of local public rural extension, planning and policy development, NGOs, farmer organizations and private sector in 2 selected areas trained in the use information from LSC hubs (including those organizations targeting specifically women and young small-scale food producers) (total 120) • 20 representatives of staff of local public rural extension, planning and policy development, NGOs, farmer organizations and private sector in 2 selected areas provided feedback towards the functionality, visualization and user friendliness of LSC hubs.(total 120) • 3 country reports including feedback consultations with public	• Around *400,000 farmers* directly connected to the LSC hubs in Ethiopia (187.000 farmers), Kenya (100,000 farmers), Rwanda (111.000 farmers) *of which at least 75% are small-scale farmers and of which at least 15% are small-scale female farmers and 15% are young farmers* • At least 3 million farmers per country are indirectly connected to the LSC hubs through communication of public and/or private advisory/extension services • 3 country reports including inputs for scaling and institutionalization from policy bodies, knowledge organizations and development partners • Workshop report on the regional policy consultation • 3 country reports on FGD providing feedback on scaling and institutionalisation, from local level policy bodies, knowledge organizations and development partners including nr of participants, location, gender, organisation. • 3 country reports with user's business plans for applications of LSC-hub services	* Meeting minutes/agreements * Annual workplans • Report of each AAC meeting • Consortium Agreement with section on Intellectual Property rights • Operational Website supported by social media channels • Annual progress reports • Digital (periodically updated) dashboard • Final report
Assumptions	• Agricultural actors are interested to take part in the LSC hub design	• Agricultural actors are interested to take part in the LSC hub development • Land, soil and crop data collected from local data providers are of good enough quality (e.g. no metadata, missing georeferencing, outdated) • Alternative open source data are available	• Agricultural actors are interested to take part in the testing of the LSC hub funtionality and in recording and sharing lessons learned • Agricultural actors actively think along in the LSC hubs' sustainability	• Land, soil and crop information exchange has proven to provide concrete benefits for agricultural sector actors (from farmers to policy makers) • Agricultural actors underline these benefits and share these with other actors that have not directly been involved • Agricultural actors take part in the scaling of the LSC hub funtionality and in its sector wide expansion	• The practice of knowledge exchange in agriculture has evolved in Ethiopia, Kenya and Rwanda: shifting from a linear model of knowledge transfer (scientists to farmers) to a perspective that integrates knowledge from multiple actors through facilitation and participation and emphasises learning in a social context

Outputs (numbered in accordance with the relevant WP)	2.1 Multi-stakeholder consultative process design for the demand and capacity assessment 2.2 Multi-stakeholder consultative process design for the institutional assessment 2.3 Multi-stakeholder implemented country based demand, capacity and institutional assessments 2.4 Overview of generic and country specific demands, capacities and institutional requirements for the LSC hub design 2.5 Consolidated report of the demand, capacity and institutional assessment and sustainability strategy	3.1 Existing basic land, soil and crop information available in the right format for deployment in the LSC hubs 3.2 GIS layers with basic land, soil and crop information at 250*250m resolution in the LSC-hub 3.3 Tailor-made GIS layers to support CSA and agricultural transformation decision-making (e.g. nutrient deficiency, potential for improved water management and water harvesting, and potential for carbon sequestration) 3.4 Agreed hub architecture, based on the demand and institutional assessment (WP 2) 3.5 LSC hubs developed in three countries according to user demands and populated with the data developed in activity 3.1 – 3.3 3.6 Human and institutional capacity for operating and maintain LSC hubs, and provide support services to stakeholders promoting and facilitating use; develop training materials 3.7 LSC-hubs embedded in existing national agricultural data infrastructures and agricultural advisory services of NARS (see WP4b)	4(a).1 Policy bodies, knowledge organizations and development partners are aware and use information from LSC hubs 4(a).2 Feedback of policy bodies, knowledge organizations and development partners which contributes to the functionality, visualization and user friendliness of LSC hubs	4(b).3 Inputs provided by policy bodies, knowledge organizations and development partners for scaling and institutionalisation of LSC hubs 4(b).4 Inputs for the business plan including a financial strategy contributing to the sustainability of the LSC hubs	1.1 Managed and coordinated activities among the various WPs 1.2 Annual workplans; Communication strategy and plan; Visibility strategy and plan 1.3 Demands of relevant stakeholders and potential users 1.4 Managed finances and IPs 1.5 External communication about the project and its deliverables 1.6 Annual progress reporting informs project management and the donor; periodically updated dashboard
Outputs (numbered in accordance with the relevant WP)			5(a).1 LSC users operating in a direct linkage with small-scale food producers aware of the usefulness and potential impact of the hubs 5(a).2 LSC information users able to access, work with and benefit from LSC information in their small-scale farmer level contributions to CSA and agricultural transformation 5(a).3 Feedback from LSC information users working at the small-scale farmer level improves the design and content of the hubs	5(b).4 Inputs (by representatives of staff of local public rural extension, planning and policy development, NGOs, farmer organizations and private sector in 2 selected areas) for incorporating LSC information into scaling and embedding of LSC-hubs services 5(b).5 Inputs (by representatives of staff of local public rural extension, planning and policy development, NGOs, farmer organizations and private sector in 2 selected areas) for incorporating LSC information in their development- and business plans	