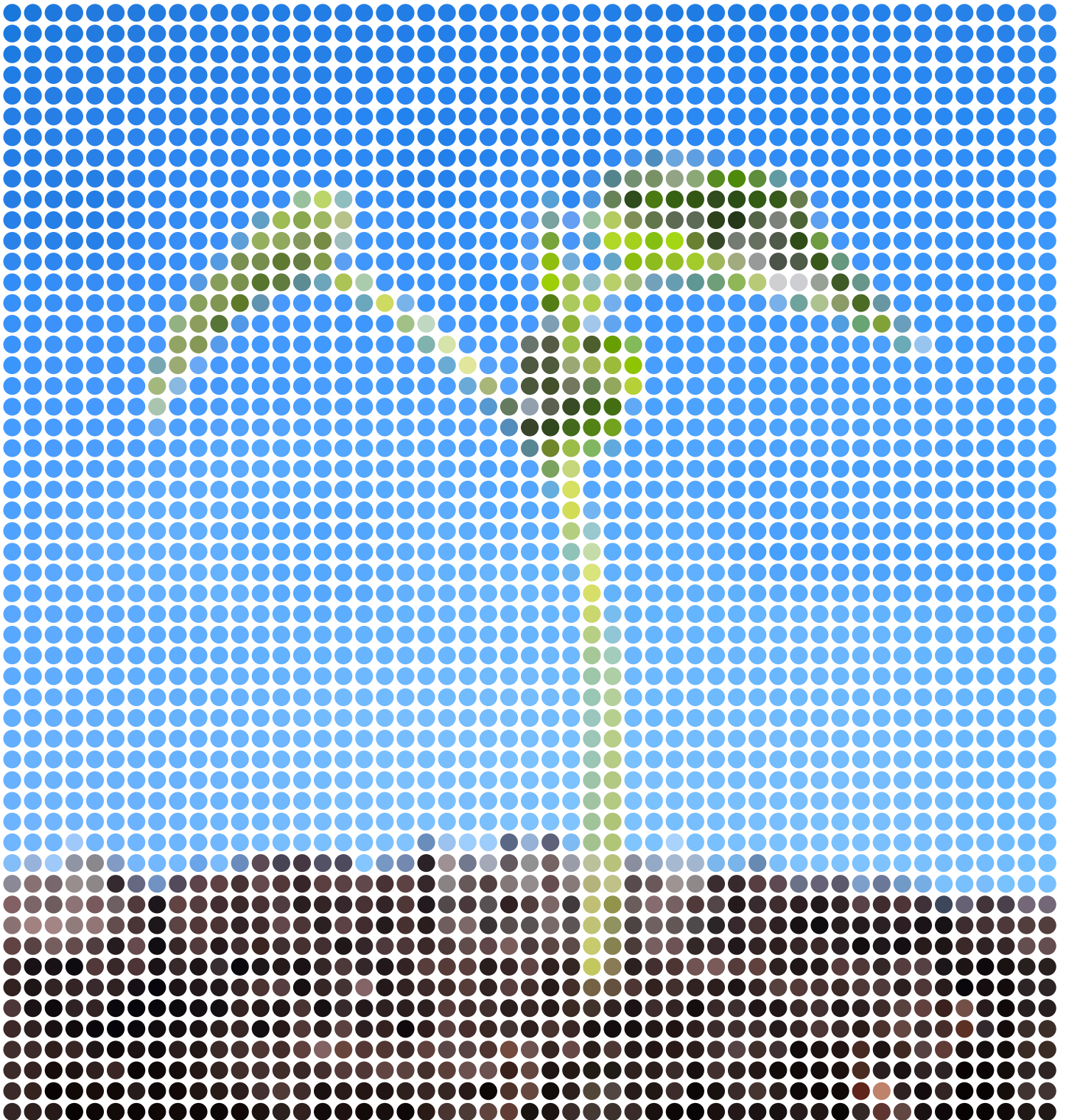


# EIRA: Environmental Impact Reporting in Agriculture

creating a link between agricultural investments and environmental impact



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- **Christine Negra**, Versant Vision LLC
- **Tanja Havemann**, Clarmondial AG
- **Kaspar Baumann**, Clarmondial AG
- **Fred Werneck**, Clarmondial AG
- **Joske Houtkamp**, Wageningen Environmental Research (WEnR)
- **Henk Janssen**, Wageningen Environmental Research (WEnR),
- **Peter Kuikman**, Wageningen Environmental Research (WEnR)
- **Wies Vullings**, Wageningen Environmental Research (WEnR)

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# Overview

**Information on the environmental impact of agriculture is sparsely collected and often difficult to access. Mobilizing such information in a consistent, science-based manner can drive the transition to sustainable agriculture by facilitating sound investment decisions, risk management, and actionable impact reporting.**

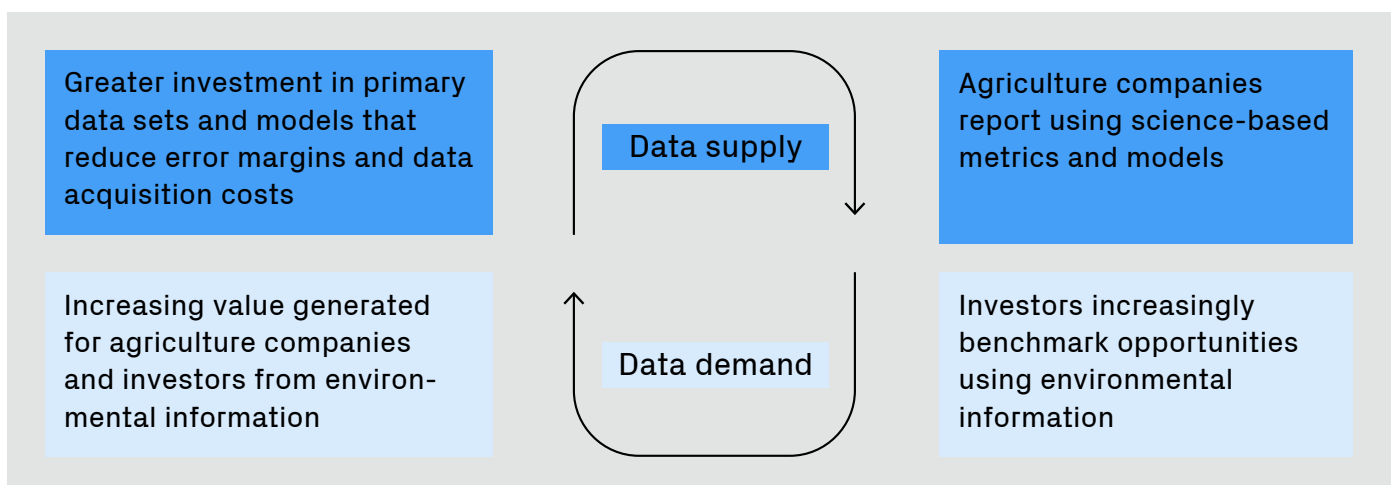
There is growing aspiration among companies in the agriculture sector to be responsible and transparent about the environmental impact of commodities they source. Recommendations for directing investment toward sustainable agriculture are abundant from the scientific community, development organizations, and NGOs. However, the level and quality of environmental impact reporting on agricultural investments,<sup>1</sup> including by impact-oriented investors, are surprisingly low.

Beyond highly synthesized information presented in sustainability reports, environmental impact information, when it is gathered, is mostly retained within companies. Science-based protocols for information collection are rarely described. This makes it difficult for companies to benchmark their environmental performance or for agriculture investors to make decisions that effectively consider environmental risks and impacts.

**The necessary capital flow for the transition to sustainable agriculture is unlikely without stronger links between demand and supply for environmental impact information, especially for investors.**

<sup>1</sup> In the agricultural sector, capital flows through complex channels. Many different types of investment decisions are made by agricultural companies, lenders, and other investors as well as governments and development finance institutions.

**Figure 1: EIRA will enable mutual reinforcement of supply and demand for environmental impact information.**



To meet agricultural sustainability goals, substantial private sector investment is needed. At the same time, investors increasingly seek to manage financial and reputational risks by integrating material environmental information into decision-making and reporting.<sup>2</sup> Lacking consistent data, investors are often limited to using corporate sustainability policies, third-party certifications, or data self-reported by their investees as proxies for good environmental performance (see Section 1).

<sup>2</sup> In this report, we use the term ‘investor’ to include equity owners (asset owners, asset managers in private and public markets) and lenders (banks, non-bank financing companies, credit funds, bond investors, etc.)

Increasing the adoption and use of environmental impact information can trigger a virtuous cycle by facilitating greater investment in primary data sets and models that reduce error margins and data acquisition costs (see Figure 1).

#### Current information systems are challenged by:

- An inability to dynamically benchmark (i.e. compare across value chains or over time);
- A lack of robustness (i.e. weak integration of scientific resources; no indication of error margins);
- Poor availability of tools or approaches that offer a demand-driven business approach to environmental impact information and few that are appropriately organized, formatted, or priced.

Agricultural companies and investors need a cost-efficient, clear, consistent, and scientifically robust tool to capture and report relevant environmental impact information in agricultural value chains. Better access to environmental data and metrics would allow investors to identify and manage environmental risks in their agriculture portfolios, consider environmental performance in their investment processes, and improve their reporting to stakeholders.

**The Environmental Impact Reporting in Agriculture (EIRA) initiative will develop a consistent and demand-driven approach for mobilizing environmental information from the agriculture sector towards risk management and investment decision making, while promoting investment in primary data.**

Clarmondial, Versant Vision, and Wageningen Environmental Research, supported by Climate-KIC, have assessed the feasibility of developing a science-based tool designed to meet the decision-making and reporting needs of investors, as well as companies, governments, and other stakeholders by:

- Consolidating and applying best-in-class scientific approaches to assess and monitor the environmental impacts of agriculture;
- Tying together highly variable agriculture-related information currently being produced by researchers, NGOs, sustainable sourcing programs, certification schemes, and others;
- Integrating user data (e.g. geography, crop type, management practices) with base layers (e.g. land cover, soil type, water resources) and vulnerability maps (e.g. high risk of degradation, biodiversity loss, climate change impacts such as increased water stress or pest outbreaks);

- Creating a mechanism for data screening and integration and an interface through which EIRA users can add available data and customize outputs to their reporting needs.

Through data aggregation and analysis of relevant dimensions of environmental impact, the EIRA tool will enable more informed assessment of risks and opportunities by agricultural value chain players and by financial institutions. Demand for EIRA has been identified from:

- Leading institutional investors seeking to sustainably manage their agricultural assets as well as mobilize their peers;
- International and regional commercial banks that want to expand their agricultural lending portfolios in a manner that contributes to good agricultural practices and improves credit risk management, in both developed and emerging markets;
- Development and research partners who can contribute existing data sources, tools, expertise, and networks;
- High-profile impact investors seeking to better monitor the environmental performance of their portfolios, target new investments, and transform food and agricultural systems.

**The EIRA initiative is a collaboration among motivated future users to design, build, and test a software tool that meets their needs for improved environmental impact information.**

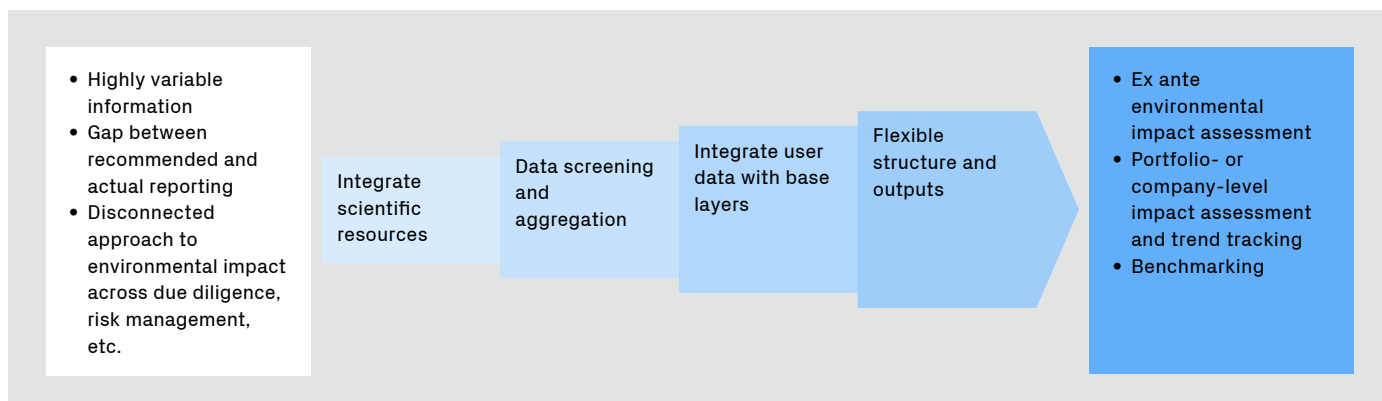
There is strong interest in EIRA especially for the following use cases (described further in Section 2):

- Ex ante assessment of environmental impact risks and benefits;
- Environmental impact assessment and trend tracking at the supply chain, company, or portfolio level;
- Comparison of environmental impact across elements within a portfolio or company (i.e. benchmarking).

The EIRA tool will integrate information from a variety of existing sources and produce output metrics tailored to user-specified geographies and commodities. Design criteria are set forth in Section 3. Key functions and the basic EIRA structure are presented in Section 4.

The EIRA tool will offer a flexible core structure that accommodates diverse users, use cases, and data sources. A user-centered approach to tool design and testing will begin with enriching design guidance based on deeper understanding of how EIRA can align with users' current data management and decision making processes (see Section 5). To ensure the flexibility and range of the EIRA tool, initial test cases will be explicitly different from each other in terms of region, crop type, and priority impact metrics. It will be designed to evolve over time to encompass a broader range of queries and data sources.

**Figure 2:** The EIRA tool will aggregate fragmented environmental information to enable better risk management and investment decision making in agricultural value chains.



**The EIRA prototype will consist of a methodology for data screening and integration and an interface through which users can add available data and customize outputs to their needs.**

Realizing this ambition will require a stepwise approach, illustrated in Figure 2 and described in Section 6. EIRA prototype development will start with gathering design guidance from future EIRA users and aggregating a range of data sources (see Section 7). Early progress will build a foundation for more ambitious future versions that enable static and, eventually, dynamic benchmarking.

A consortium of EIRA partners will be organized by a Coordination Unit and represented by a Steering Committee (see Section 8). This consortium will co-develop a first prototype (in Phase II) and a Minimum Viable Product (in Phase III) of EIRA, working in an adaptive and user-responsive mode toward a common software structure. An adaptable governance system will accommodate shared learning among a diverse set of partners and activities (see Section 9). In its early phases of development, EIRA will be delivered through a social enterprise model and supported by a combination of public, philanthropic, and private funding (see Section 10).

The consortium will initiate the second phase of development of EIRA in Q2 of 2019 and is seeking additional partners including strategic funders, companies, and investors willing to collaborate on assembling the building blocks of EIRA. While this is a highly ambitious undertaking, the scale and quality of interest uncovered to date, the existence of useful precedent, and the urgent need to direct capital to sustainable agriculture to meet the Sustainable Development Goals (SDGs) forms a solid basis for cautious excitement and optimism.

We hope that you will be interested in accompanying us on this journey.

# 1 State-of-play for environmental impact reporting

Many environmental metrics and reporting initiatives have been put forward for the agriculture sector. However comprehensive, robust, and consistent data systems are not yet in place to support integration of environmental impact into investment and lending decisions.<sup>3</sup>

Major international impact assessment initiatives, such as IRIS (Impact Reporting and Investment Standards) and GIIRS (Global Impact Investment Rating System), are designed for users addressing a variety of sectors. Without explicit links to existing and emerging data sets or to efforts to improve data quality and availability, such initiatives do not readily translate into reporting of environmental impact and risk in agriculture nor support dynamic benchmarking. There are examples of shared financial and social outcomes information for certain types of impact investments in agriculture,<sup>4</sup> however, such efforts do not yet incorporate environmental information. There is an urgent need to support these types of initiatives, specifically for environmental issues, to ensure impact robustness.

A review of prominent impact-oriented investment funds and lenders operating in the agricultural sector revealed that publicly available impact reporting is composed primarily of:

- Estimates of farmers reached through financing activities (i.e. financial inclusion; job creation).
- Volumes of certified commodities produced or exported (e.g. organic, fair trade).
- Percentage of third-party certified clients or production areas.
- Narrative impact stories.<sup>5</sup>

**The current level of environmental impact reporting is basic and limited, in contrast with abundant and detailed guidance on appropriate metrics.**

Environmental impact reporting for agricultural investments is poorly developed. While there is ample guidance on appropriate metrics, there are significant gaps in feasible methodologies and readily available data. In recent years, several platforms for management of impact information have emerged,<sup>6</sup> however, many are limited to specific countries or user groups.

<sup>3</sup> For example, the European Union's High-Level Expert Group on Sustainable Finance (HLEG) has recommended revision of the EU's Non-Financial Reporting Directive "to improve disclosures in the agri-food sector and help to re-orient investments towards sustainable agricultural practices."

<sup>4</sup> Notably, NCREIF (the National Council of Real Estate Investment Fiduciaries), a not-for-profit institutional real estate investment industry association established in 1982: [www.ncreif.org](http://www.ncreif.org)

<sup>5</sup> A few examples also reported the areal extent of financing-related environmental impact (e.g. hectares under sustainable cultivation) and value chain impacts (e.g. quality seed distribution to smallholders).

<sup>6</sup> For example, iPAR presents a standardizing framework to communicate impact and PULSE is designed to help investors to collect, manage, and report on impact portfolio data.



## 2 Users and use cases for the EIRA tool

**The EIRA tool will enable private sector entities to better understand, manage, and report environmental impact in agricultural value chains. Potential applications encompass due diligence, risk management, impact reporting, forecasting, and business planning.**

Agriculture sector investors, consumer-facing companies, and others are seeking ways to compare the environmental impact of specific value chains (and transactions) against a baseline over time and across a potential investment portfolio. International financial institutions are increasingly interested to receive environmental impact data from their agriculture sector borrowers and investees to complement impact information gathered from investees in other sectors.

The EIRA tool will be designed to generate credible environmental impact metrics for diverse users who will then integrate them within their existing decision systems. Envisioned tool users are quite diverse and EIRA-derived metrics could be used for simple impact reporting, better informed 'day to day' investment decisions, or more strategic analysis (e.g. exposure to regulatory risk). The tool will not be designed to generate scenarios or recommendations for action.



**Table 1:** There are many potential users and use cases for the EIRA tool.

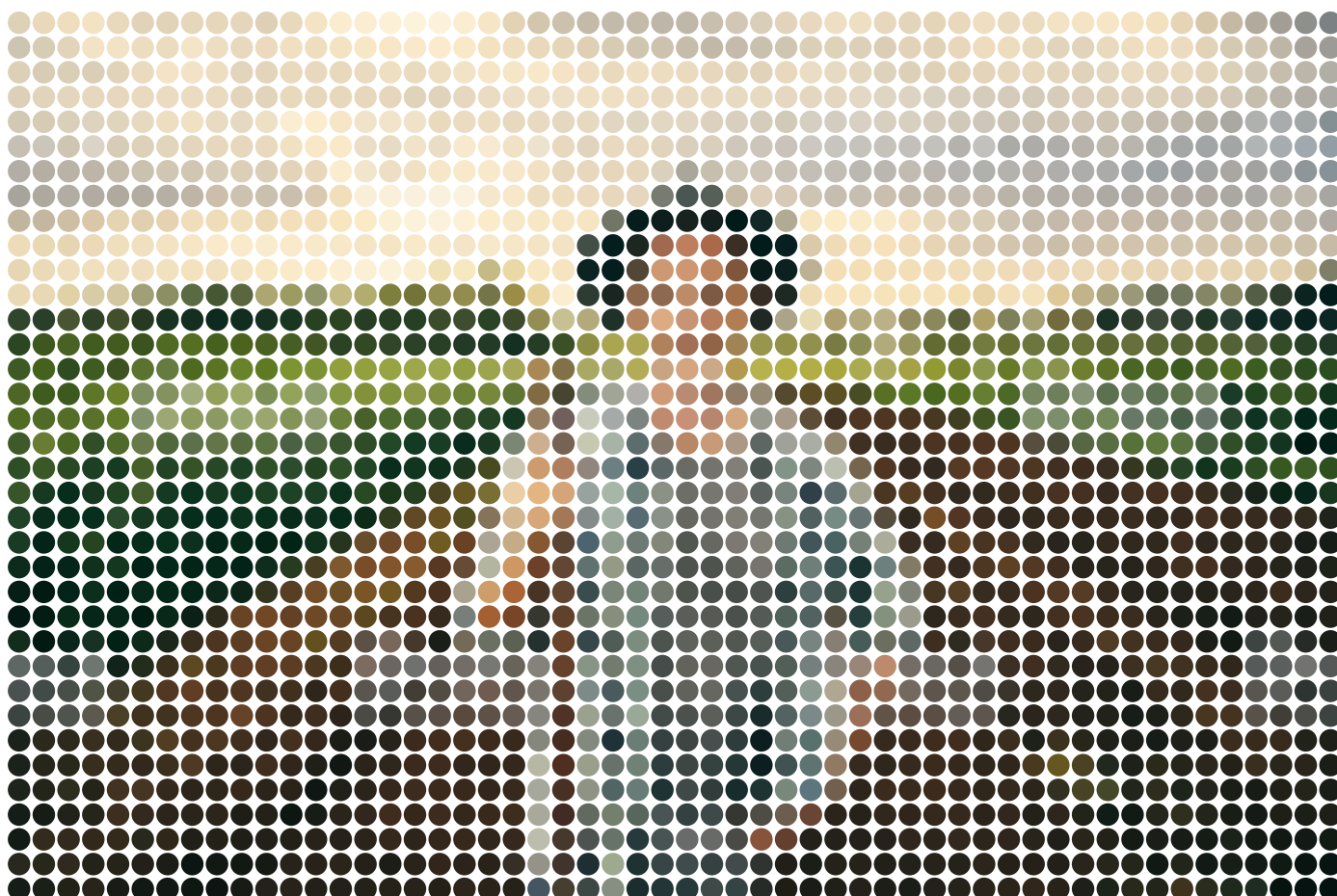
Users	Use cases
<p><b>Agriculture sector investors</b> (e.g. asset managers, banks, pension funds, insurance companies, development finance institutions, non-bank financing companies) that deploy finance to agricultural strategies either for commercial risk-adjusted returns or with an explicit impact thesis</p>	<ul style="list-style-type: none"> <li>• Assess potential loans / investments, e.g. by screening regions and crop types linked to environmental impacts.</li> <li>• Compare environmental performance of borrowers / companies in portfolios (i.e. screening transactions).</li> <li>• Update lending criteria / investment strategies to achieve better portfolio-level environmental performance.</li> <li>• Report to clients and members (e.g. against institutional commitments / public targets or climate risk reporting).</li> </ul>
<p><b>Insurance providers</b> that need to aggregate and analyze environmental and climate-related data across the regions they serve</p>	<ul style="list-style-type: none"> <li>• Assess environmental risks of different regions and crop types against a baseline over time.</li> <li>• Adjust policy offerings and pricing based on different clients' environmental risk exposure.</li> <li>• Report to company directors (e.g. against company targets; climate risk reporting).</li> </ul>
<p><b>Companies in agricultural value chains</b> (e.g. traders, importers, consumer goods / food brands) that source agricultural raw materials</p>	<ul style="list-style-type: none"> <li>• Assess potential investments in sourcing regions (e.g. support practices linked to environmental improvement).</li> <li>• Compare environmental impact of different value chains against a baseline over time.</li> <li>• Adjust management to achieve better corporate-level environmental performance (e.g. shift to less vulnerable sourcing regions).</li> <li>• Revise environmental performance requirements for supply chain partners (i.e. for suppliers to receive credit or strategic investments).</li> <li>• Report to buyers (retail companies, customers) against corporate commitments / public targets or climate risk reporting.</li> </ul>
<p><b>Governments</b> and other public good institutions concerned with the environmental and climate impact of agriculture</p>	<ul style="list-style-type: none"> <li>• More accurately assess trends and drivers of environmental impacts thereby improving reporting (e.g. UN Sustainable Development Goals; National Determined Contributions to the United Nations Framework Convention on Climate Change - UNFCCC).</li> <li>• Inform agriculture policy (e.g. public sector support to climate-smart agriculture) and development funding.</li> </ul>
<p><b>Local and international development agencies</b> that finance environmental projects</p>	<ul style="list-style-type: none"> <li>• Assess environmental risks and benefits prior to awarding development finance (e.g. grants, debt, equity, guarantees).</li> <li>• Benchmark project performance and report to donors.</li> </ul>

Additional potential stakeholders may include certification agencies (e.g. to 'bolt-on' additional environmental metrics) and research organizations (e.g. that study environmental impacts associated with different production systems).

**Initial users of the EIRA tool will pave the way for a broader set of users across the agriculture sector. In its early stages of development, the primary users of the EIRA tool are most likely to be entities that need to make 'front line' decisions about investments and lending (see Table 2).**

**Table 2:** Initial users of the EIRA tool are likely to be agricultural lenders, impact investors, and insurers.

Initial users	EIRA applications
Regional banks with agricultural lending portfolios	<ul style="list-style-type: none"> <li>• Revise priority lending areas, lending criteria, and loan products based on market and risk parameters. For example: specify thresholds of lending risks (i.e. eligibility) using spatially resolved probability of farms experiencing water deficiency, damaging weather, or other environmental risk relevant to yield and re-payment capacity.</li> <li>• Make decisions about initial and refinanced loans to farmers, farmer cooperatives, and agricultural value chain businesses.</li> <li>• Report to stakeholders to demonstrate environmental sustainability and / or acceptable climate-related risk.</li> <li>• Engage policy makers to adjust regulatory context in view of changing environmental risks.</li> </ul>
Impact funds (credit, mezzanine, equity investors)	<ul style="list-style-type: none"> <li>• Source new investments that minimize risk and maximize return, while meeting sustainability targets on an ongoing basis. For example: determine if borrowers / companies are likely to be profitable while meeting impact targets or exceeding sectoral benchmarks.</li> <li>• Make initial decisions to invest and possibly set covenants for investees. For example: Compare actual yields to regional potential to assess if a specific crop is suitable or if an operation is efficiently using natural resources and inputs.</li> <li>• Present regular evidence to investors of achieving sustainability targets / objectives.</li> </ul>
Insurance companies	<ul style="list-style-type: none"> <li>• Inform policy development / adjustment by integrating risk-mitigating factors (e.g. best practices, crop diversification, soil quality) into estimates of environmental risk for farming operations.</li> </ul>



## 3 Core design criteria

The EIRA tool design will be successful if it satisfies the following criteria:

**Broad scope.** In its mature form, the EIRA tool will facilitate environmental data<sup>7</sup> aggregation, analysis, and reporting for the full set of companies and financial institutions operating in the agricultural sector worldwide. Accordingly, at the prototype stage, it is essential that the EIRA tool should be applicable to a wide range of:

- Agricultural commodities and value chains including for row crops (e.g. cereals, sugarcane, oilseeds), and tree crops (e.g. coffee, cocoa, fruit), and eventually livestock (e.g. cattle, poultry, dairy) and aquaculture;
- Production systems (e.g. monocultures, rotations) ranging from small-holder to industrial scale;
- Geographies including the ability to analyze data at multiple scales (e.g. regional, global); and
- Environmental variables such as greenhouse gas (GHG) emissions and environmental use and condition (e.g. soil health, water use, input use efficiency).

**Heterogeneous users and use cases.** The companies and financial institutions operating in the agricultural sector are extremely diverse, ranging from small agri-food companies and local agricultural lenders to global corporations, leading international banks, and investors. Therefore, the EIRA prototype should accommodate diverse information needs by enabling users to specify the level of analysis they require (e.g. company or portfolio) and the commodities and environmental variables of interest.

Rather than generating a single index that combines multiple categories of environmental impact, the EIRA tool should aim to generate output metrics for a discrete (5-6) set of environmental domains. This will enable tool users to decide whether and how to combine metrics for specific needs. Metrics should be offered as both actual values and referenced to a benchmark (e.g. filling a yield gap; emissions reduction target).

**Relevant to private sector decision making.** For the EIRA tool to be useful to sustainability-focused companies and investors, it will need to ‘translate’ traditional approaches for monitoring environmental outcomes to impact reporting from a finance and investment sector perspective. Ultimately, EIRA-derived metrics should be integrated directly into the decision tools used by investors and supply chain companies. The EIRA tool should aggregate and integrate information (at portfolio or company level) that allows the creation of robust baselines for environmental impact metrics, regular tracking of environmental impact against established baselines, and ‘like-for-like’ sequential comparison of impact metrics across quarters or years and between companies and projects.<sup>8</sup>

<sup>7</sup> The EIRA tool will improve the flow of environmental information into users’ existing analytical frameworks and decision processes. It will enable environmental impact metrics to be considered along with metrics of social and governance impact and financial performance.

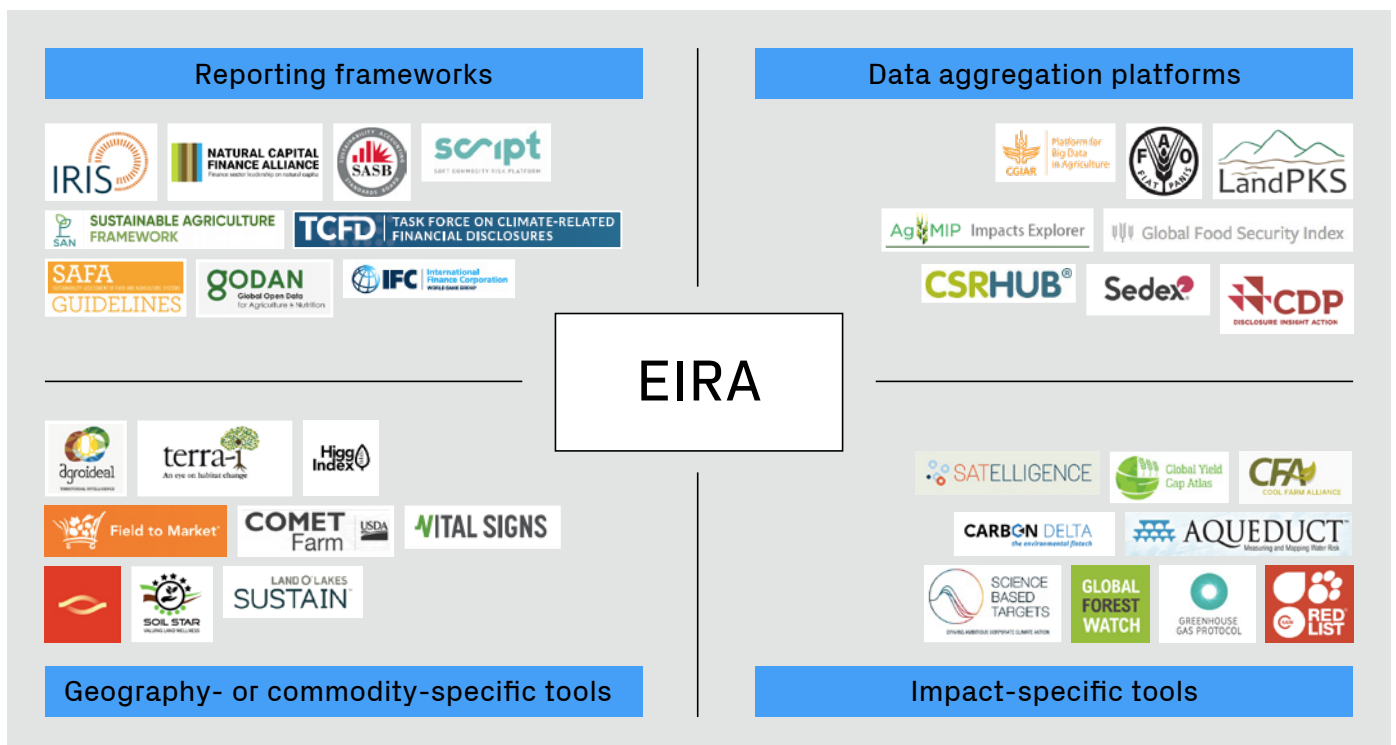
<sup>8</sup> The EIRA prototype will generate impact metrics for discrete time points (i.e. a series of ‘snapshots’). It will not be a forward-looking simulation or prediction tool, nor will it be designed to provide advice, diagnosis, or recommendations (i.e. tool users will be responsible for evaluation and action / reaction).

**Cost-efficient and consistent data aggregation.** Most private sector sustainability initiatives will not undertake new routine field-level measurements that fall outside a business’ operating Key Performance Indicators (KPIs). By identifying, evaluating, and aggregating environmental impact information from existing sources (see section 7), EIRA will improve the quality and consistency of environmental reporting and minimize burdens associated with reporting (e.g. costly field-level measurements).

**Scientifically robust.** Self-reporting of environmental impacts is insufficient to ensure credibility and the fragmented set of certification and other measurement programs is unlikely to be harmonized in the near-term. Screening of potential data sources for EIRA will focus on how data were collected and the associated implications for relevance to different agricultural products, systems, and geographic regions (e.g. whether data sources are sufficiently granular and regularly updated). Algorithms included in the EIRA platform will be developed in collaboration with research partners to ensure these are anchored in best available scientific evidence.

**Complementary to existing standards and tools.** The EIRA tool should be additive to, rather than competitive with, existing sustainability reporting initiatives, standards, and tools. In addition to numerous impact metrics frameworks and a growing number of impact information platforms, there is a wide array of existing tools that mobilize environmental impact knowledge and data, commonly toward specific geographies, commodities, impacts, or user groups (see examples in Figure 3). Development of the EIRA tool will reference relevant design features of existing tools and specify gaps where new functions are required for environmental impact analysis and reporting in agriculture (e.g. harmonizing disparate impact data).

**Figure 3:** The EIRA tool will complement and add value to existing frameworks, platforms, and tools.



## 4 Key functions

The EIRA tool will support decision making and impact reporting by presenting spatial data and impact metrics through an easy-to-use interface. While there are examples of tools that provide some of its anticipated functions (e.g. for specific commodities or environmental domains), at this point, there is no existing tool that fills the niche that EIRA seeks to fill (see Figure 3).

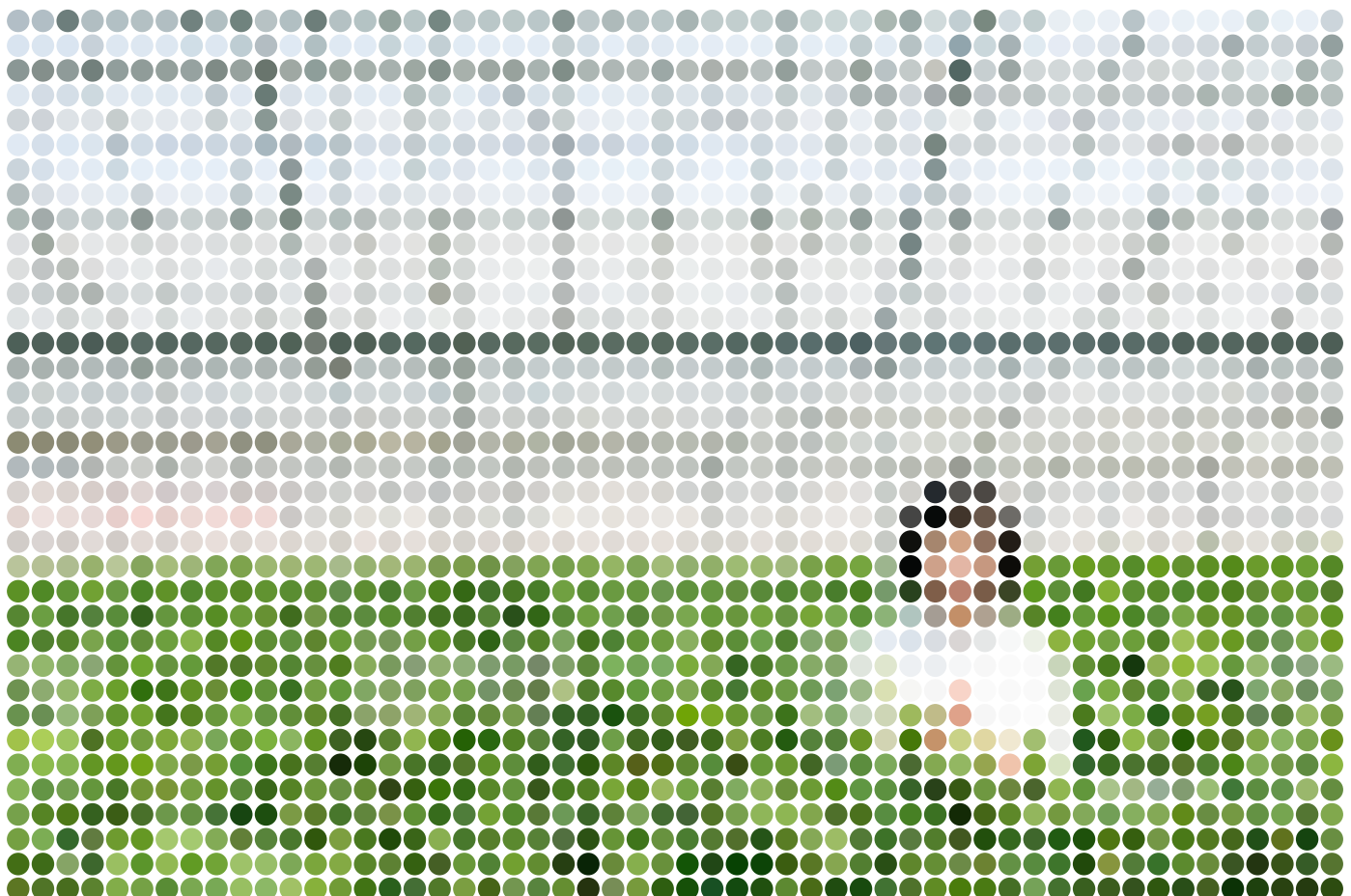
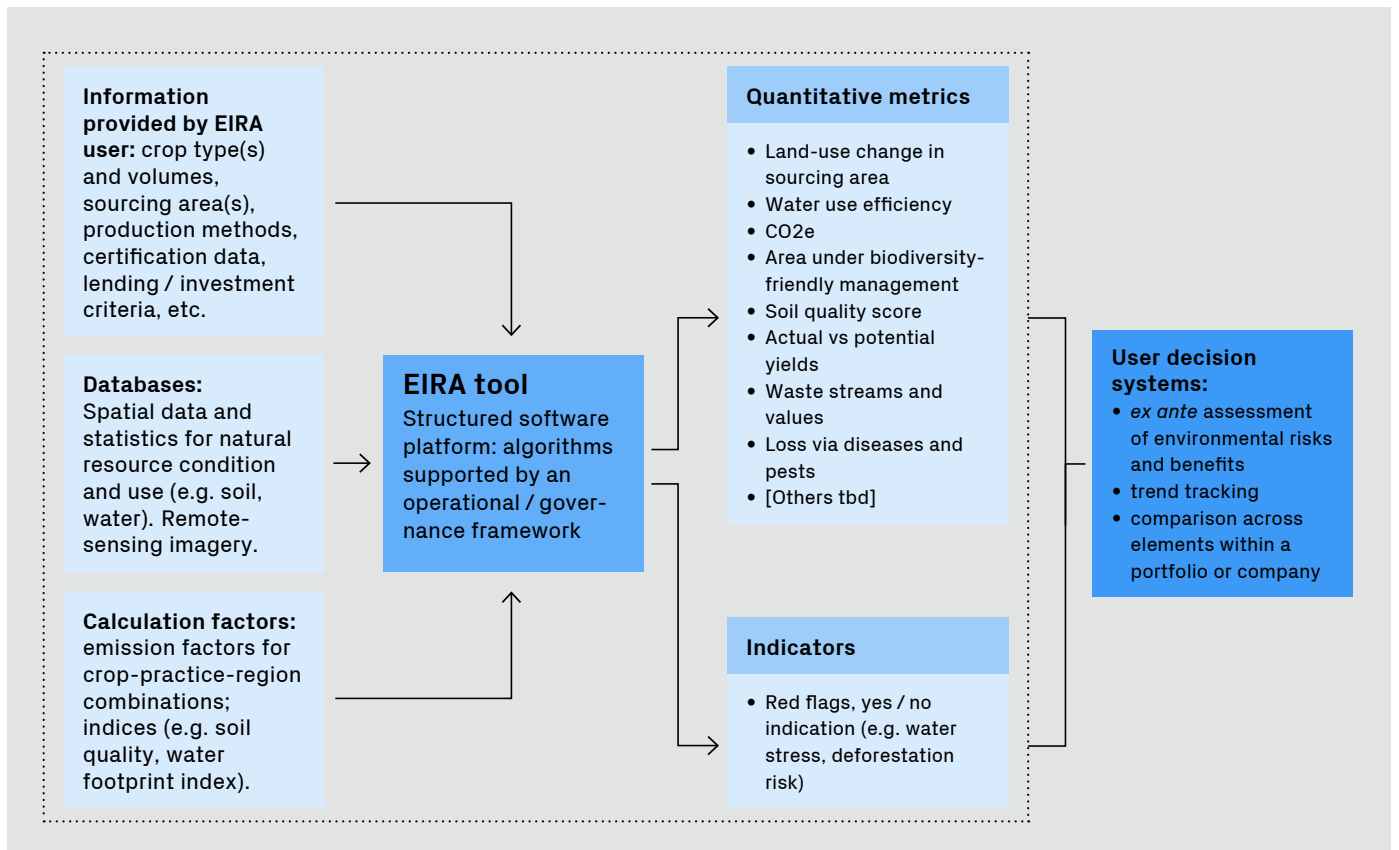
**Table 3:** Core EIRA functions.

Function	Output	Data requirements
Coarse-level ex ante assessment of environmental risks and benefits	<ul style="list-style-type: none"> <li>Red-flag high-risk regions, crop types, and potential investments based on high environmental impact or vulnerability (e.g. deforestation risk; drought risk).</li> </ul>	<ul style="list-style-type: none"> <li>EIRA user data (i.e. geography, crop type)</li> <li>Base layers (e.g. land cover, soil type, water resources)</li> <li>Vulnerability maps (e.g. high levels of degradation or biodiversity loss, water stress, land cover change, pest / disease outbreaks)</li> </ul>
More granular-level assessment of environmental impacts	<ul style="list-style-type: none"> <li>Rate, screen, or select investment options based on estimated change in environmental impact associated with an existing or planned intervention (e.g. change in sourcing strategy, lending criteria, or insurance pricing; infrastructure development).</li> </ul>	<ul style="list-style-type: none"> <li>More detailed EIRA user data (e.g. commodity volumes, production methods, certification audit report, borrower profiles, specific geographies)</li> <li>More granular base layers (e.g. emission factors for different production methods)</li> </ul>
Portfolio- or company-level environmental impact assessment, i.e. benchmarking	<ul style="list-style-type: none"> <li>Compare environmental impacts of elements within a portfolio or company.</li> <li>Track trends over time for different environmental dimensions (e.g. GHG emissions, water footprint, climate risk).</li> </ul>	<ul style="list-style-type: none"> <li>EIRA users provide comparable information for all portfolio / company elements</li> <li>Base layer data for all relevant geographies and commodities</li> </ul>

**The primary value proposition of the EIRA prototype will derive from a methodology for data screening and integration and an interface through which EIRA users can add available data and customize outputs to their needs (e.g. specific geographies and commodities).**

The EIRA tool will incorporate vetted data from a variety of sources and enable users to specify the type and format of output metrics. This requires a robust mechanism for identifying, accessing, screening, transforming, and interpreting many different datasets. The software platform will (i) accept user queries and inputs, (ii) access relevant datasets, (iii) perform any required operations such as extracting values from datasets, or calculating impact metrics, and (iv) display the outputs to the user.

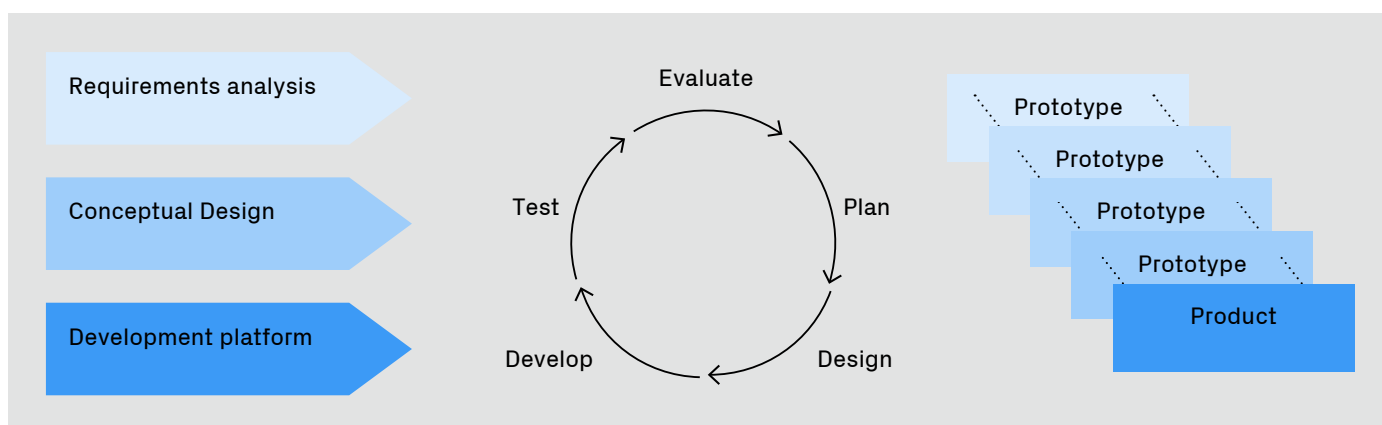
**Figure 4:** The EIRA tool will screen diverse data sources and apply science-based algorithms to generate quantitative environmental impact metrics.



## 5 Design and testing

The EIRA tool will be developed with **user-centered design techniques**, in which the identified needs of primary users are paramount, and a **focus on data integration** to produce impact metrics.

**Figure 5:** An iterative design and development process will produce the first EIRA prototype.



An iterative prototype design and development process will define high-priority functional requirements (e.g. output metrics) and data needs through targeted engagement with future tool users. Cycles of software development will drive toward a flexible core structure that accommodates diverse use cases. In each cycle, further software components will be added based on enhanced understanding of user needs, resulting in intermediate prototypes to be tested and evaluated by tool users.

Over time, the EIRA tool will grow to address a broad range of environmental impact information needs. Early versions of the prototype will be tested against use cases representing different regions, crop types, value chains, and metrics of interest as well as different levels of complexity (e.g. from relatively simple data filtering and aggregation to more advanced estimation of output metrics).

Tool design will adapt to the quality and applicability of available data. Agriculture and natural resource related datasets, created for scientific or policy applications, can be re-purposed for agricultural investment decision making. However, the expertise of technical and scientific partners (e.g. research institutions; tool developers) will be essential for harmonizing datasets that differ extensively in their technical structure and content (i.e. units, scale, and meaning of data).

The design process will explore how the risks and opportunities revealed through EIRA-generated impact metrics can best be integrated into users' current data management and decision models (including stimulating new types of internal evaluations).



## 6 Development trajectory

To build the foundation for a globally relevant tool, the first EIRA prototype will adapt to the needs of diverse companies and financial institutions operating in the agricultural sector. Early versions of the EIRA tool will be developed around multiple use cases representing a range of geographies and commodities. Test cases might include:

- Pulling in, interpreting, and combining existing data layers to enable **screening or risk management** (e.g. areas or commodities an EIRA user should avoid to comply with their investment thesis).
- Developing and applying 'factors' to these and other databases to estimate metrics of interest (e.g. GHG emissions) for **impact reporting** purposes.

Development of a Minimum Viable Product version of the EIRA tool can be pitched toward several different levels of ambition.

- Geoportal: basic infrastructure with search, map navigation, and comparison functionality applied to a limited number of datasets
- Built-in data products: limited number of built-in metrics / graphs for spatial data analysis
- Customized queries: own data input and on-the-fly calculations



Pragmatically, EIRA prototyping should start with data aggregation while building a foundation for future versions that calculate proxy metrics and static and, eventually, dynamic benchmarking (see Table 4). An early prototype could test a range of variables before identifying a smaller set of feasible reporting metrics.

**Table 4:** Anticipated evolution of EIRA capabilities from data aggregation to dynamic benchmarking.

Level of complexity	Description	Approach
Aggregate selected environmental indicators from existing tools	<ul style="list-style-type: none"> <li>Restricted to existing sources and tools (typically static, no error margin, no benchmarking).</li> <li>Shows areas of low / medium / high risk, or red flags, on a map.</li> </ul>	<ul style="list-style-type: none"> <li>Determine relevant indicators from identified use cases.</li> <li>Determine data availability for region, crop, economic / environmental parameters, etc.</li> <li>Select priority and feasibility for implementation.</li> <li>Evaluate with users.</li> <li>Design visualization.</li> </ul>
Define and calculate impact metrics based on proxy values	<ul style="list-style-type: none"> <li>Access existing tools that combine input from users (e.g. geography, crop, production type) with proxy values to calculate quantitative environmental impact metrics.</li> <li>Identify gaps where new databases and calculation tools are required.</li> </ul>	<ul style="list-style-type: none"> <li>Determine relevant metrics from identified use cases.</li> <li>Determine data availability for calculating metrics and conduct expert assessment of issues of geographic resolution, reliability uncertainty, etc.</li> <li>Identify gaps and possible gap-filling.</li> <li>Select priority and feasibility for implementation.</li> <li>Evaluate with users.</li> <li>Develop calculation method.</li> <li>Design visualization.</li> </ul>
Benchmarking selected metrics using static datasets	<ul style="list-style-type: none"> <li>Compare calculated impact metrics to relevant benchmarks.</li> </ul>	<ul style="list-style-type: none"> <li>Determine relevant metrics from identified use cases.</li> <li>Identify available benchmarks.</li> <li>Evaluate usefulness of the comparisons with users (e.g. regarding resolution, uncertainty).</li> <li>Develop tool component for benchmarking, including data presentation and visualization.</li> </ul>
Dynamic benchmarking of indicators among peers	<ul style="list-style-type: none"> <li>Information is sourced from a group of peers to calculate benchmarks.</li> <li>Independent organization collects, anonymizes, and processes information.</li> </ul>	<ul style="list-style-type: none"> <li>Determine required metrics from identified use cases.</li> <li>Select users to determine benchmarks and evaluate usefulness of the results; identify issues regarding data.</li> <li>Develop tool component for benchmarking, including data collection and processing, data presentation and visualization.</li> </ul>

## 7 Data sources

Data sourcing for the EIRA tool will focus on careful selection of datasets and integration methods with a view toward credible representation of uncertainty and gaps in coverage.

<sup>9</sup> For example, remote sensing imagery (e.g. via radar, lidar) and data from sensor networks.

The tool will be designed to aggregate and integrate heterogeneous data such as:

- Spatial data<sup>9</sup> and statistics for natural resource condition and use compiled by governments, research organizations, or commercial entities.
- Scientifically credible calculation factors (e.g. GHG emissions associated with crop-practice-region combinations).
- Information collected through due diligence processes related to producer characteristics (e.g. farm sizes / locations, production methods, soil types, use of financing, repayment rates) and through sustainability programs such as third-party certification.

The feasibility study identified over 50 regional and global datasets that could potentially serve as data sources for the EIRA tool. Phase II activities will include exploration of additional information sources, free or commercial, that could be linked to EIRA (e.g. information reported under certification schemes and climate disclosure programs).

Users of the EIRA tool can also utilize data available to them to define queries that parameterize desired outputs (e.g. regions, crop types, time periods of interest).

**Table 5:** Data sources held by different user groups.

EIRA users	Data type
Investors	<ul style="list-style-type: none"> <li>• Lending / investment screening criteria.</li> <li>• Characteristics of loans (e.g. geographies, crop types, repayment rates, use of financing).</li> </ul>
Companies in agricultural value chains	<ul style="list-style-type: none"> <li>• Volumes / area of products, inputs (fertilizer, seeds).</li> <li>• Production methods (e.g. irrigation, tillage).</li> <li>• Producer characteristics (e.g. farm sizes, soil types).</li> </ul>
Insurance providers	<ul style="list-style-type: none"> <li>• Volumes / area of products, inputs (fertilizer, seeds).</li> <li>• Production methods (e.g. irrigation, tillage) and producer characteristics (e.g. farm sizes).</li> <li>• Spatial data and statistics for natural resource condition and use (e.g. soil, water).</li> </ul>
Research organizations	<ul style="list-style-type: none"> <li>• Datasets built through data mining / meta-analysis.</li> <li>• Factors (e.g. GHG emissions, water use) for crop-practice-region combinations.</li> </ul>

There are, however, gaps between available data sources and EIRA requirements such as:

- Low temporal (e.g. decadal time step) or spatial resolution (e.g. data collected as national statistics);
- Limited coverage (e.g. only major commodity crops; geographic gaps);
- Inconsistent monitoring (e.g. lack of international standards; varying methods used);
- Simplification of underlying environmental phenomena (e.g. data extrapolation to unmonitored crops or regions) or varying degrees of data accuracy (e.g. compilation from diverse studies);
- Interpretation requires complementary data (e.g. climate, crop, and socio-economic data) or specialized expertise.

Central to the EIRA development process, data discovery will result in clearer definition of the available 'patchwork' of data and enable targeted exploration of gap-filling strategies. The EIRA tool may include mechanisms for estimation of environmental metrics where those are not measured.<sup>10</sup>

<sup>10</sup> Models are typically used when it is either impossible or impractical to directly measure environmental variables of interest (e.g. groundwater flows are typically simulated using hydrological models) and it is common to adapt existing models to generate proxy metrics.



## 8 EIRA consortium

A global consortium of partners, organized by a Coordination Unit and represented by a Steering Committee, will co-develop a first prototype (Phase II) and a Minimum Viable Product (MVP) (Phase III) of EIRA.

Essential partner roles include:

- **Design guidance:** Diverse types of future EIRA users will provide detailed information about their information needs (e.g. priority impact metrics) to shape initial and evolving guidance to the Coordination Unit.
- **Technical implementation:** Working from design guidance distilled by the Coordination Unit and engaging with data partners, a commercial software developer will construct iterative versions of the prototype software structure and interface in an adaptive, user-responsive mode.
- **Validation of tool design:** A discrete set of committed partners will test iterative versions of the tool for suitability, functionality, and ease of use and provide feedback to the Coordination Unit.
- **Demand building:** Institutional investor partners (e.g. banks, pension funds) will catalyze interest in EIRA among potential users and funders by signaling demand for robust environmental impact information.<sup>11</sup>

A **Steering Committee** will guide the functioning of the **Coordinating Unit**, which will translate design guidance into mandates for the **software developer**, mediate access to iterative prototypes, and engage with **data partners** (e.g. data sourcing arrangements, gap-filling).

**Investors** will participate in the EIRA Steering Committee and engage directly with the Coordination Unit to define core interests (e.g. industry benchmarking, trend tracking) and inform EIRA design while contributing to funding of prototype development and signaling commitment to improved environmental impact reporting.

A core group of motivated potential **EIRA users** (e.g. regional banks, impact funds) will provide tool development test cases representing different regions and production systems.

These partners will be selected based on (i) a high need for an EIRA-style tool; (ii) having relevant data to use for testing EIRA; (iii) availability of other data sources needed to estimate output metrics.

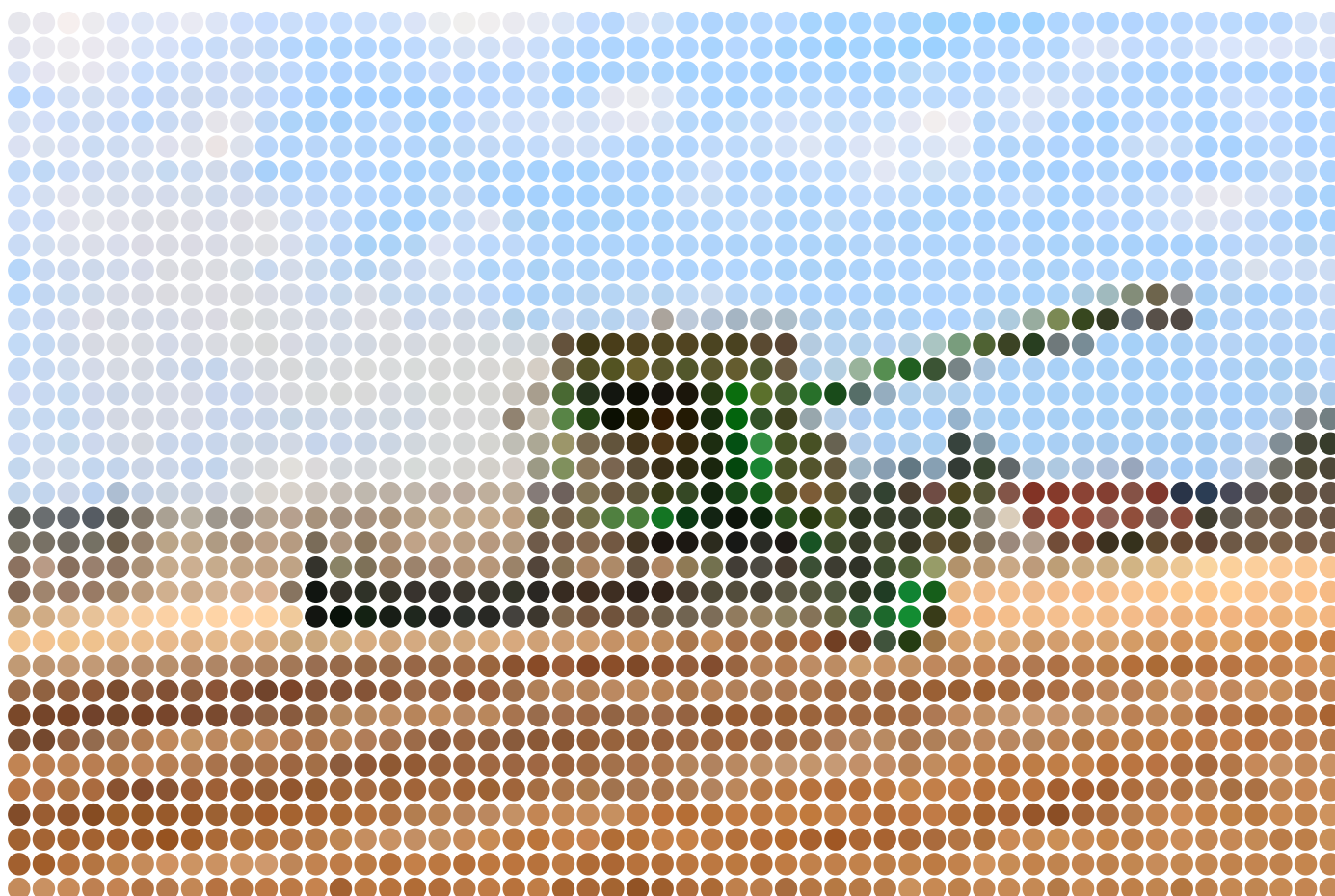
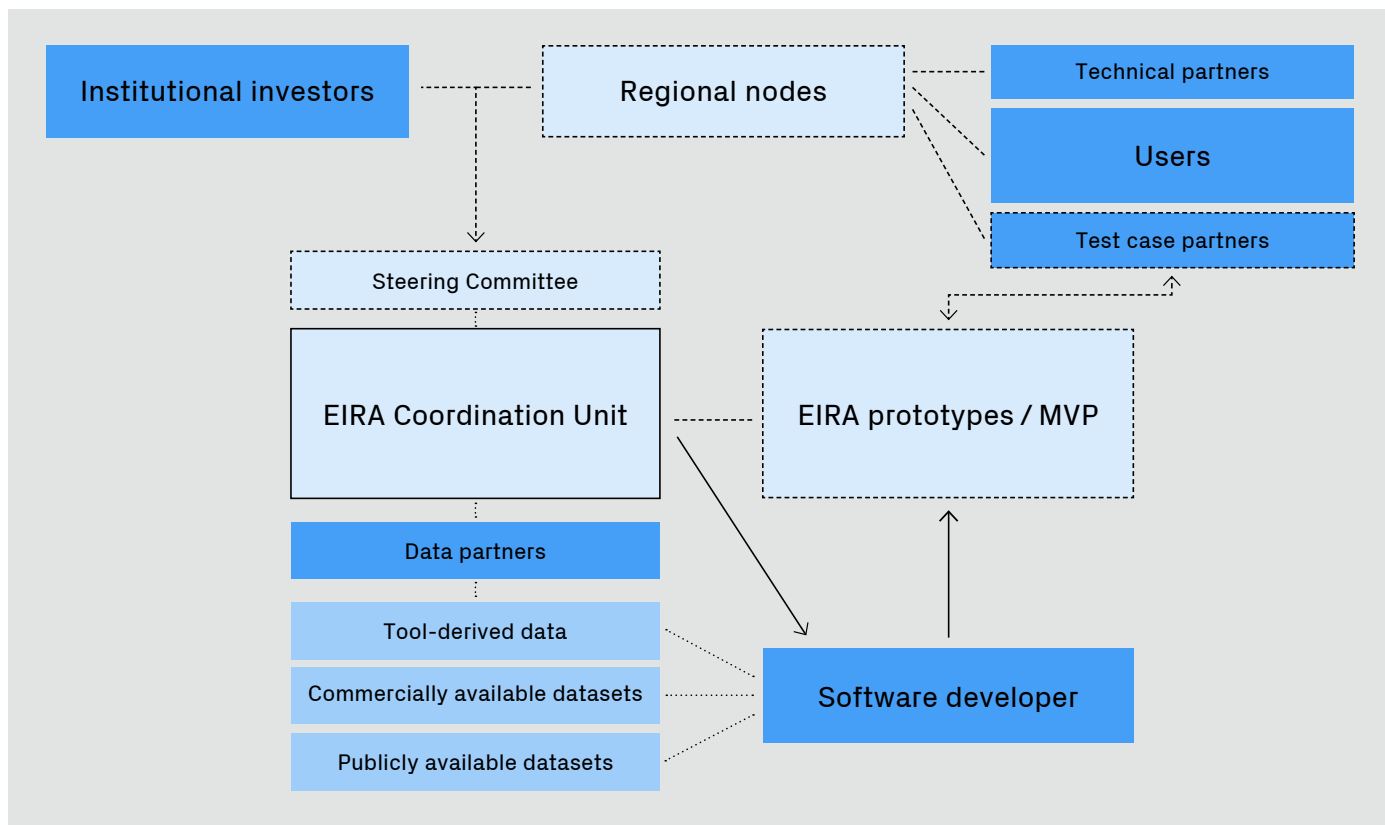
A set of **technical partners** will contribute experience with tool development for a core set of environmental domains.

To ensure that it can be flexibly deployed for diverse applications, the EIRA tool is envisioned as a structured software platform populated with data and tested by partners. Test case partners, other interested EIRA tool users, and technical partners will inform EIRA design and validate prototypes through **regional nodes**,<sup>12</sup> which will be moderated by focal point organizations that serve on the Steering Committee.

<sup>11</sup> Broad uptake of the EIRA tool will rely on early testing and adoption by a committed cohort of leading companies and investors, cultivated and engaged through regional nodes. Roll-out of a Minimum Viable Product will be supported by a dedicated technical assistance function and will be targeted to entities that make 'front line' investment decisions.

<sup>12</sup> Agricultural value chains and data systems are quite different across regions of the world. Regional nodes have been identified as an appropriate functional unit for developing tool design guidance and scanning data resources. In Phase II, regional nodes will operate as counterparts contributing to an integrated EIRA prototype, while gathering insight regarding future governance and business models for EIRA maintenance and evolution as well as ongoing data resource development.

**Figure 6:** The EIRA consortium will engage future users from around the world to design and test the EIRA tool.



# 9 EIRA governance and management

## Independent social enterprise model

A flexible, adaptable governance structure will be needed for the first several years of the EIRA initiative to accommodate a diverse set of partners and activities in a learning mode. During this period, management of EIRA development and maintenance can best be accomplished through a mission-focused social enterprise (i.e. a not-for-profit) model.

It is critical that EIRA is:

- Independent (i.e. fire-walled management, technical, data, and financial operations);
- Legally able to receive funding (e.g. public / private / philanthropic funding; user fees);
- Able to maintain all intellectual property rights associated with the initiative.

Over time, as a Minimum Viable Product is produced and tested by a broader set of users, the market potential of the EIRA tool will be better understood. At that point, it may be appropriate for EIRA to function as a fully independent, dedicated legal entity (e.g. a newly established foundation or company that owns, maintains, and further develops the software platform).

## Learning from the NCREIF example

Several decades ago, institutional investors grouped together to demand consistent and regular reporting by asset managers in the US real assets sector to create a reliable dynamic benchmark. This led to the formation of a not-for-profit industry association called the National Council of Real Estate Investment Fiduciaries (NCREIF), which developed and routinely produces the Property Index, a quarterly time series composite total rate of return measure of investment performance of a very large pool of individual commercial real estate properties acquired in the private market for investment purposes.<sup>13</sup> This has

now been extended to include timberland and agricultural land. As a 'white label' software system developed, maintained, and updated with the support of and in the service of user-members, on a pre-competitive and not-for-profit basis, NCREIF offers a valuable model for development of the EIRA tool. There are important differences as NCREIF focuses on financial, rather than non-financial, benchmarking and all data originate from NCREIF members. However, they have pioneered an effective governance structure for aggregating data to produce specific data products in a transparent, consistent, and pre-agreed manner as decided by steering committees.

<sup>13</sup> [https://www.ncreif.org/public\\_files/Users\\_Guide\\_to\\_NPI.pdf](https://www.ncreif.org/public_files/Users_Guide_to_NPI.pdf)

## Principles for EIRA development

- Informed by science and transparent about uncertainty and error margins.
- Minimal cost by integrating existing environmental impact data rather than imposing major new monitoring costs.
- Independent governance “by the industry for the industry,” not owned by a single investor or manager.
- Demand driven and user-centric – EIRA primarily seeks to meet investor demand.
- Complementary and additive to existing standards and tools.<sup>14</sup>
- Professionalism and integrity – Information provided by users of EIRA will be treated with strict confidentiality.

<sup>14</sup> The EIRA tool is not intended to function as a new impact standard, but rather as a data aggregation tool that can help users to report against a range of existing and emerging standards.

As some EIRA partners, particularly tool users, are likely to be market competitors, it is critical for EIRA to have a transparent governance structure and to handle user data confidentially (see Box 1). The Steering Committee, which will include partner representatives, will establish clear guidelines for defining and managing confidential data. Such guidelines will begin by specifying that confidential information will be handled only by the EIRA Coordination Unit and the software developer under protocols negotiated collectively among partners. The Steering Committee will not have access to user data and confidential data will only be shared with technical partners on a need-to-know basis and under non-disclosure agreements.



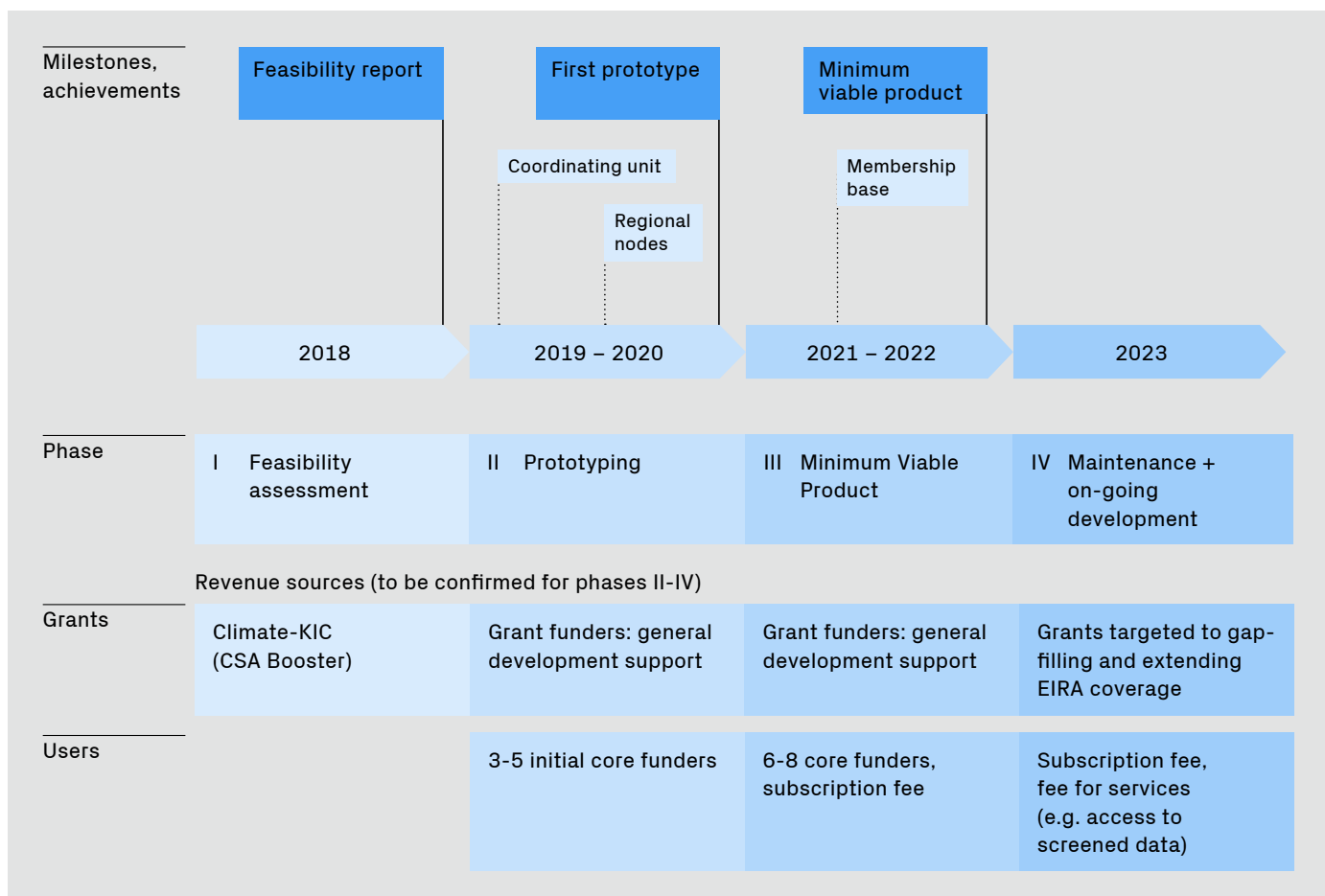


# 10 Development phases and funding

The EIRA tool will be developed in four phases:

- I. Feasibility assessment** – Survey of user needs, data sources, and tool development options (completed).
- II. Prototyping** – Iterative development of a structured software platform populated with data and tested by partners working in nodes representing different regions and production systems.
- III. Minimum Viable Product** – Software platform sufficiently mature to support impact reporting needs of defined types of tool users and use cases (i.e. geoportal with data layers and built-in data products) and testing of revenue models.
- IV. Maintenance and ongoing development** – Tool provision and support (via online portal), software updates, and governance activities, complemented by addition of new features and extension to additional geographies, commodities, scales, etc.

Figure 7: Development phases of the EIRA initiative.



Having completed the feasibility assessment, immediate next steps include:

- Assembling a group of leading stakeholders such as institutional investors, corporates, and government agencies;
- Developing a detailed implementation plan and securing financial resources;
- Convening regional nodes to initiate prototype development.

As a mission-focused social enterprise, the EIRA consortium will seek to be self-sustaining while also providing a critical public good, making parts of the tool freely accessible to research organizations, governments, and other public institutions that promote sustainable agriculture, drive research, and inform policy-making.

Grant support will be needed for the first prototype and MVP development phases. In future phases, evolution and maturation of the EIRA tool will require financial support from a combination of tool users as well as philanthropic sources. This could include fundraising to fill in high-priority data gaps and extend coverage of the EIRA tool to new geographies, commodities, scales, and environmental variables.

The EIRA tool will allow for the generation of revenue from two groups: investors and agricultural companies. Potential revenue models include: (i) a subscription model; (ii) pay-per-use; and / or (iii) free access financed by donations.

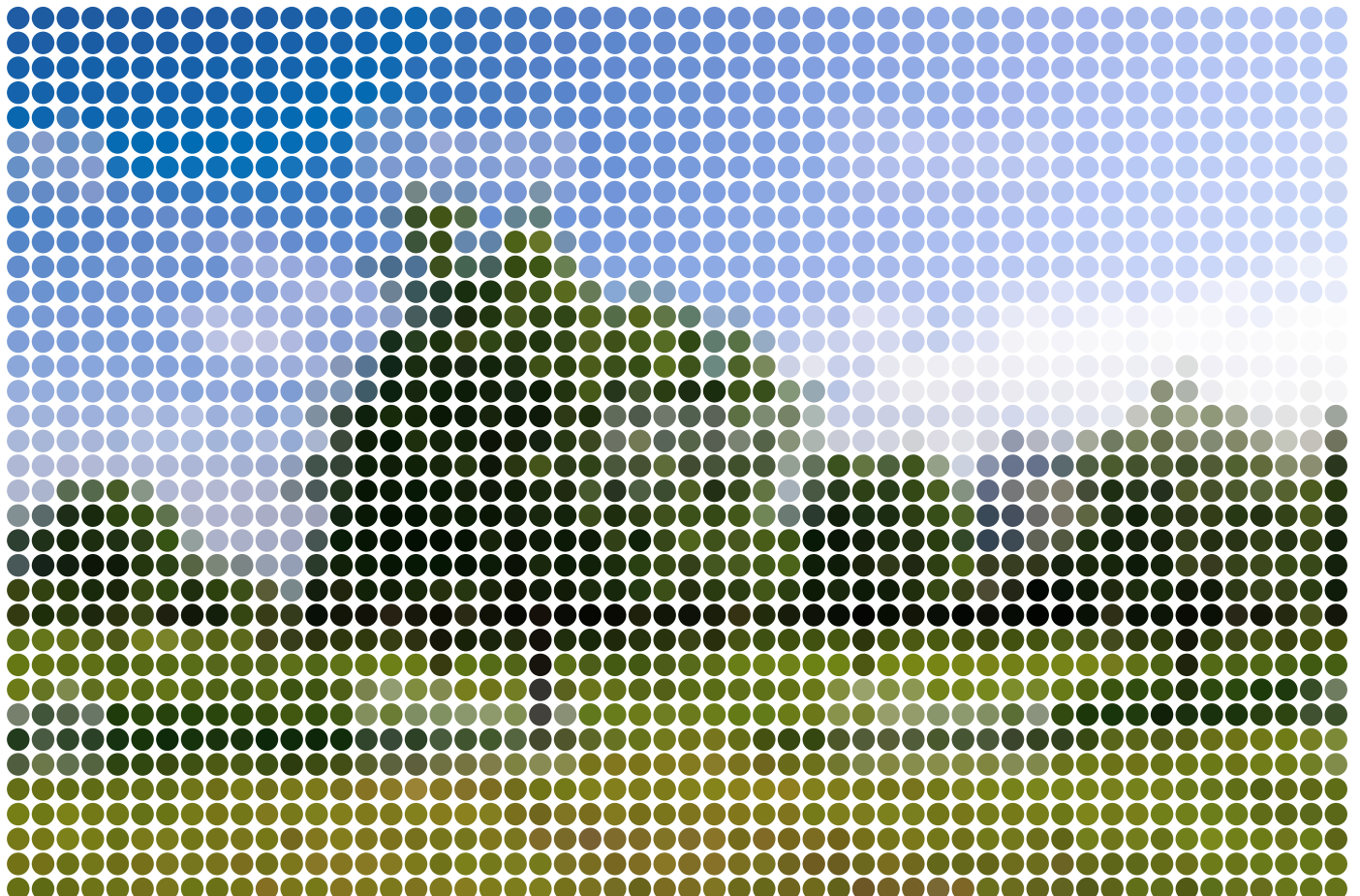


# 11 Conclusion

Growing the sustainable agriculture sector requires capital matched to the risk, duration, and market demand of the goods and services being produced. Flow of this capital is being impeded by weak decision-level information and laborious, bespoke due diligence and impact monitoring processes. The agriculture sector is facing challenging data gaps that will need to be filled over time. But, in the near-term, better aggregation and analysis of existing, disparate data can enable more informed assessment of risks and opportunities.

In addition to developing a practical tool, the EIRA consortium will contribute to a better global understanding of what is needed and what is possible for environmental impact reporting in agriculture by creating a structured mechanism for diverse stakeholders to engage with one another.

Through a recent feasibility assessment, we have a clearer understanding of the highest priority use cases and the most motivated users of an environmental impact assessment tool for the agriculture sector. Armed with insights about the key functions, design principles, and initial data sources for the EIRA tool, a consortium of partners will collaborate through a governance framework designed to efficiently and pragmatically produce and test EIRA prototypes. The ultimate aim is to disrupt the inertia around sustainable agriculture investing by building the foundation for dynamic benchmarking.



**Aiming to lay the foundation for dynamic, globally-relevant benchmarking, the Environmental Impact Reporting in Agriculture (EIRA) initiative convenes motivated agriculture sector investors, companies, researchers, and others to design, build, and test a software tool that delivers information needed for directing capital toward agricultural operations with better environmental performance and lower risks.**

For further information, contact Dr. Christine Negra, Versant Vision LLC  
(Christine@VersantVision.com)

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