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REDD+ SAFEGUARDS INFORMATION SYSTEMS: MOVING FROM DESIGN TO OPERATION

Workbook

Version 1.2 – February 2020

This report is the product of the UN-REDD Programme, based on a workbook originally developed for a Southeast Asia Subregional Exchange on 'Safeguards Information Systems: Moving from design to operation', which was held in Hanoi, Viet Nam, in December 2019, with participants from Cambodia, Myanmar and Viet Nam. The UN-REDD Programme is the "United Nations Collaborative Programme on Reducing Emissions from Deforestation and Forest Degradation (REDD+) in Developing Countries". The Programme was launched in 2008 and builds on the convening role and technical expertise of the Food and Agriculture Organization of the United Nations (FAO), the United Nations Development Programme (UNDP) and the United Nations Environment Programme (UNEP). The UN-REDD Programme supports nationally led REDD+ processes and promotes the informed and meaningful involvement of all stakeholders, including Indigenous Peoples and other forest-dependent communities, in national and international REDD+ implementation.

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Acronyms and abbreviations

CMS	Content Management System
FAO	Food and Agriculture Organization of the United Nations
GCF	Green Climate Fund
IFEE	Institute of Forest Ecology and Environment
M&E	Monitoring and evaluation
NDC	Nationally Determined Contribution
NFMS	National Forest Monitoring System
PHP	Personal Home Page / PHP: Hypertext Preprocessor
PaMs	Policies and Measures
PLRs	Policies, laws and regulations
REDD+	Reducing Emissions from Deforestation and forest Degradation, plus the conservation and enhancement of forest carbon stocks, and the sustainable management of forests
SDGs	Sustainable development Goals
SIS	Safeguard information system
SQL	Structured Query Language
ToR	Terms of Reference
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNEP-WCMC	UNEP World Conservation Monitoring Centre
UNFCCC	United Nations Framework Convention on Climate
UN-REDD Programme	United Nations Collaborative Programme on Reducing Emissions from Deforestation and Forest Degradation in Developing Countries

1. Introduction

This workbook provides practical information, examples and exercises on a number of key aspects of SIS establishment and operation. It includes the following six sections:

- Background information on SIS and SIS design
- Information structure
- Information sharing and management
- SIS functions and database design
- Technological options and platforms
- Conclusions

Some key messages:

- SIS operations require the definition of institutional arrangements and procedures to collate diverse types of environmental and social information from different government agencies and sectors, and across all scales of REDD+ implementation – national, subnational and local/site level.
- A key technical element is the development of, or modification of, an existing database and/or online platform for the management and dissemination of safeguards information in ways commensurate with available, in-country political, human and financial capital.
- An operational SIS requires capital outlay across all three of the following dimensions:
 - Political capital and ownership among government agencies involved in SIS operations;
 - Human capital and institutional capacity in-country to run the system year in, year out; and
 - Financial capital and an operational budget to cover the recurrent costs of running the system.
- Starting with a simple, but flexible system, which can accommodate stepwise updates, improvements and future needs, should be the aim of any SIS.

2. Background information on SIS and SIS design

Countries wishing to participate in [REDD+](#) are requested by the UNFCCC to address and respect a set of seven social and environmental safeguards - commonly referred to as the Cancun safeguards - throughout the implementation of REDD+ activities. By applying these safeguards, countries can enhance the positive impacts of REDD+ and prevent or mitigate any potential adverse impacts. In addition to addressing and respecting the safeguards, countries implementing REDD+ under the UNFCCC are required to: a) develop a system for providing information on how the Cancun safeguards are being addressed and respected, i.e. a Safeguards Information System (SIS); and b) provide summaries of information on how all the Cancun safeguards are being addressed and respected throughout the implementation of REDD+ activities.

According to the UNFCCC, the SIS is a *'system for providing information on how [the 'Cancun'] safeguards are being addressed and respected throughout the implementation of REDD+ activities'*¹. This system constitutes a prerequisite for results-based payments from REDD+, for example from the funding arm of the UNFCCC, the Green Climate Fund (GCF). A SIS could also play a valuable role in contributing to the adaptive management

¹ UNFCCC [Decision 1/CP.16](#), paragraph 71d.

and strengthened environmental and social performance of REDD+ actions. Some general characteristics have been agreed for the SIS under the UNFCCC² - the system needs to:

- *‘provide transparent and consistent information that is accessible by all relevant stakeholders and updated on a regular basis;*
- *be transparent and flexible to allow for improvements over time;*
- *provide information on how all of the safeguards are being addressed and respected;*
- *be country-driven and implemented at the national level; and*
- *build upon existing systems, as appropriate’.*

In recent years, there has been significant global progress on SIS design and a number of countries - [Argentina](#), [Brazil](#), [Chile](#), [Ecuador](#), [Indonesia](#), [Liberia](#), [Mexico](#), [Pakistan](#), [Paraguay](#), [Philippines](#), and [Viet Nam](#), as of 2019 - have launched online platforms to share information with domestic and international audiences on how safeguards are addressed and respected. However, some of these systems will be updated with further information and elements in the future, and many other countries still need to finalize the design of their systems and get them operational.

2.1 SIS design considerations

There is little practical guidance on developing a SIS. Therefore, the UN-REDD Programme, consulting key stakeholders (such as donor governments, civil society and REDD+ countries) and considering country experiences, has identified four key SIS design considerations³:

- 1) SIS **objectives** that respond to domestic needs and international requirements.
- 2) SIS **information needs and structure** for reporting on how safeguards are being addressed and respected in an organised way, and that determine how the information is compiled, managed and disseminated.
- 3) SIS **functions and institutional arrangements** that explain the relevant mandates, procedures and capacities for SIS functioning, as well as the roles of government institutions and non-state actors.
- 4) SIS **technological systems requirements** that relate to the development and/or strengthening of an online interface, design of a database, and considerations of storage and access to information.

SIS design choices and processes are likely to change and improve over time – with a view to expanding or refining system objectives, structure, functions, institutional arrangements and technological requirements – and in line with the progress of REDD+ implementation.

There is not always a clear differentiation between SIS design and SIS operationalisation stages. Countries can choose to go ahead with some elements of their SIS, such as setting up institutional mandates, data sharing agreements or IT infrastructure, while they are still working on the design of other elements.

² UNFCCC [Decision 12/CP.17](#), paragraph 2.

³ Information adapted from the [UN-REDD Technical Brief v2.0 REDD+ safeguards information systems: practical design considerations](#).

This workbook will focus covers some of the practical issues that countries face once they have developed an initial understanding of the design elements, such as objectives and information content, of their SIS.

For more information on the safeguards and SIS design, please see:

- UN-REDD Technical Brief: [Safeguards Information Systems practical design considerations](#)
- UN-REDD Technical Resource: [Safeguards Information Systems: practical design considerations](#)
- [UN-REDD Workspace](#): Safeguards Technical Knowledge Page
- UN-REDD Workspace: [Safeguards Country Resources Hub](#)

3. Information structure

The information structure refers to how the information will be organized within the SIS. Many countries base their SIS information structure on two key documents or sets of information: 1) the national clarification or interpretation of the safeguards; and 2) an assessment of the information needs of their future SIS (i.e. what information will be needed to show that the country is addressing and respecting their nationally clarified safeguards?)

There are a range of options for structuring information within a SIS, although in most cases the foundation of the information structure is the safeguards, i.e. information will be presented safeguard by safeguard, with some variations on how that information is then presented. For example:

- Safeguard-by-safeguard **narrative summaries**, describing how each safeguard has been addressed and respected (e.g. [Chile](#));
- A **hierarchical information structure** comprising principles, criteria and/or indicators (e.g. Cote d'Ivoire, Myanmar);
- Reporting on different existing **policies, laws and regulations (PLRs)** relevant for addressing and respecting safeguards, including information on their application as well as gaps and gap-filling measures (e.g. [Mexico](#));
- Reporting against different **scales of REDD+ implementation** – national, subnational, and/or project-level – can also be reflected in the design of a SIS information structure (e.g. [Philippines](#)).

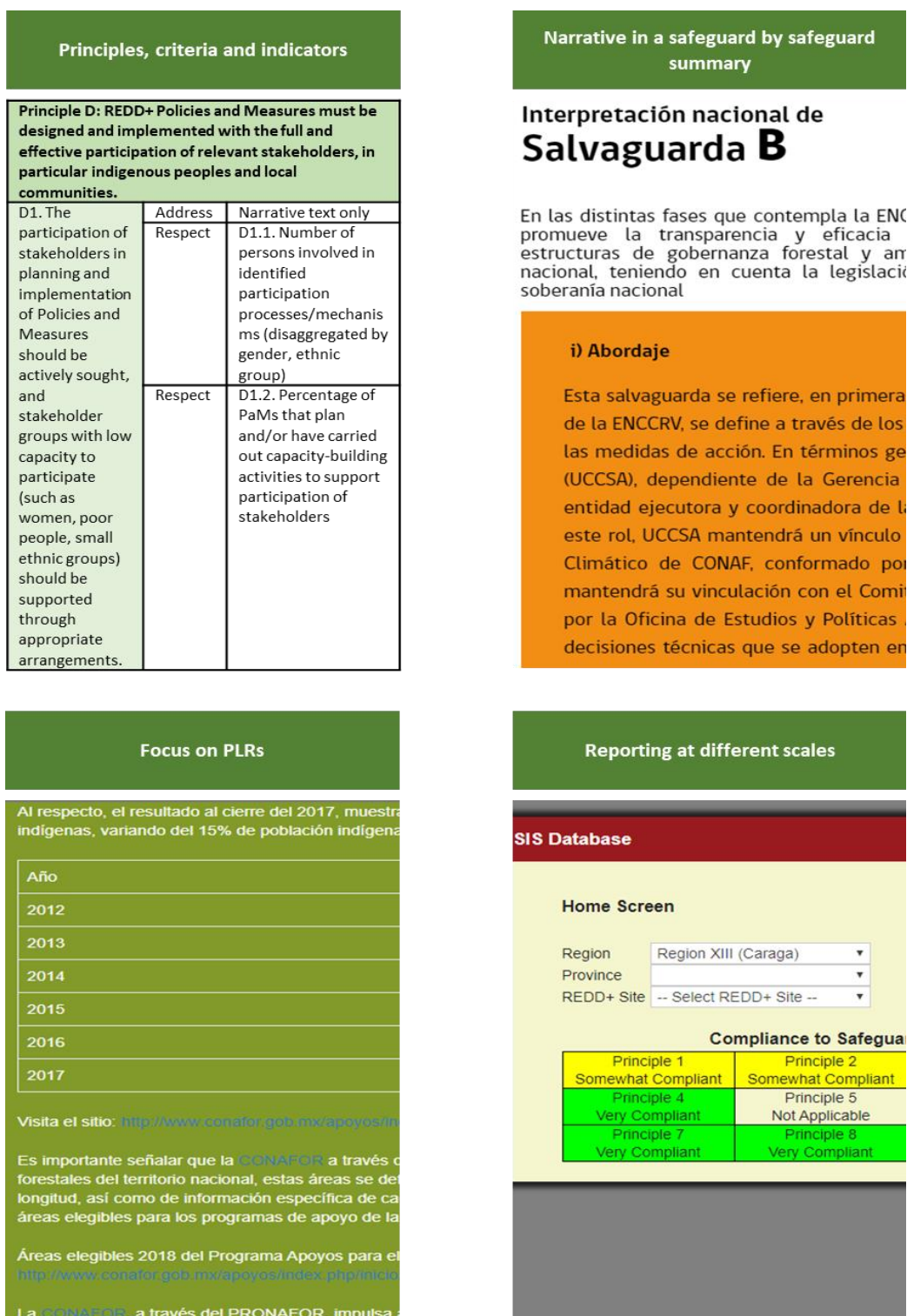
These options are not mutually exclusive; they can be combined together, and different approaches may be better suited to different safeguards. Some examples of how these options may look are provided on the following page (Figure 1).

The information structure chosen by a country can be influential over other aspects of SIS establishment and operation, such as the various functions that would need to be performed by its database (e.g. presenting information by province/region as well as by safeguard) and how information is compiled, managed and reviewed.

In addition to deciding on the topics or headlines under which the information will be organized (and the ranking of these topics if a hierarchical structure is used), it can also be useful to decide on the **type of information** (e.g. narrative text, tables, statistical figures, graphs, maps) that will be presented in each section. This is particularly relevant for sections on how safeguards are respected. Presenting information in a

standardized format from one iteration of the SIS to the next will also make it easier to track progress, and is in line with UNFCCC guidance that the information in the SIS should be ‘transparent and consistent’. One particularly useful way to present information in a form that is easy to understand and communicate is the use of indicators, which will be described in more detail in the following section.

Figure 1: Examples of different ways to present information within a SIS



3.1 SIS indicators

A number of countries have decided to include indicators in their SIS and are currently working on defining them and/or putting them into practice. At present, there are few examples of indicator sets that are fully operational and publicly available, which may be partly explained by the fact that indicators are often intended to illustrate how safeguards are *respected*, i.e. they will draw on information that will only be collected during the implementation of REDD+.

According to the UNDP Handbook on Monitoring and Evaluating for Development Results⁴, *‘Indicators are signposts of change along the path to development. They describe the way to track intended results and are critical for monitoring and evaluation’*. More generally speaking, an indicator is a measurement or value that provides information about the current situation and/or trends over time in a topic of interest. Some examples of indicators that are widely used to guide public policies are ‘average household income’ (as an indicator of economic situation) or ‘average life expectancy’ (as an indicator of health care standards).

Examples of international standards/indicator frameworks that cover REDD+ relevant areas, such as sustainable development and environmental management, include:

- Draft Architecture for REDD+ Transactions standard: <https://www.artredd.org/trees/>
- [Global indicator framework for the Sustainable Development Goals and targets of the 2030 Agenda for Sustainable Development](#)
- [Forest Stewardship Council \(FSC\) International Generic Indicators](#)
- [Indicators for the CBD Strategic Plan for Biodiversity 2011-2020](#)

Indicators can measure a **process**; for example, the number of people who participated in training can be used as an indicator for the progress of a capacity-building effort. Indicators can also measure the **results/outcomes** of an activity; for example, in the case of capacity-building, an outcome indicator could be the percentage of persons in the target group who are familiar with a certain concept, or who understand the key terminology on a subject.

Both process-oriented and outcome-oriented indicators can play a role in the SIS. Information on activities can be easier to compile, and is available earlier in the process of REDD+ implementation (“Are we on the right track?”). Information on results is often harder to collect, but has greater value for informing future actions (“Did we achieve what we wanted?”).

A good indicator should be:

- **Specific and well defined:** i.e. everybody should have the same understanding of what should be measured.
- **Valid:** there should be a clear and demonstrable link between the indicator and the topic to be assessed.

⁴ UNDP. 2009. Handbook on Monitoring and Evaluating for Development Results. Available at: <http://web.undp.org/evaluation/handbook/documents/english/pme-handbook.pdf>

- **Measurable and realistic:** there needs to be an accepted method for collecting the information, and it has to be feasible/affordable to do it.
- **Easy to interpret and explain:** for example, it should be clear whether an increase or decrease in the indicator value is good or bad.

Indicators should also be accompanied by **narrative text** that provides background information and/or supports interpretation.

Because it takes time and effort to design, implement and interpret indicators, indicator sets should be kept to a manageable size, with emphasis on measuring progress on topics that are particularly important in the country safeguards context (e.g. topics linked to key benefits or risks from REDD+). It is better to have 10 indicators that are well-defined and provide a clear message, than to have 50 indicators that are based on poor quality data or don't capture key aspects of addressing and respecting the safeguards. It is also worth mapping out and assessing other relevant national/subnational indicator sets, e.g. indicators that have already been agreed and operationalized, as these could be used to support the SIS.

In order to **operationalize indicators**, it will likely be necessary to assess their feasibility, to prioritize indicators for different phases of the SIS, and to record proposed methods for calculating, interpreting and verifying information related to each indicator. This process can help to develop operational indicators with clear and specific determination of what will be measured and reported, how this will take place and who will carry out this work. (Please also see the example indicator description sheet below in Exercise 3.2).

Tips for indicators

- Look for indicators which may be similar to other national/subnational indicator frameworks or monitoring efforts. E.g. synergies with monitoring of Nationally Determined Contributions (NDCs), SDGs, national forest inventory, etc.
- Look for opportunities to link between indicators and use the same information source across several indicators, e.g. one indicator may serve several related criteria and one source of information like the Grievance Redress Mechanism could help report against a number of indicators.
- Prioritize indicators to operationalize in different phases of SIS. It is better to start out with a small but realistic set for which data is available in the short term, than to overstretch resources and incur large delays in populating the first version of the SIS.
- Identify where safeguards indicators could be used in REDD+ monitoring and evaluation (M&E) (i.e. operational monitoring for REDD+ policies and measures, PaMs) and vice versa.
- Don't look for 'easy' indicators only; identify where investments in data collection could support valuable, important indicators. For example, if a safeguards topic is of particular interest to stakeholders but not covered by existing data, investigate if an existing monitoring scheme such as the NFI or the national census can be adapted to include relevant information. Such indicators could be prioritized for the second phase of the SIS.
- Try to avoid the following 'pitfalls' in indicator development:

- Indicators that count units of variable size or importance. E.g. number of policy documents produced (these could be long or short, influential or unambitious), number of PaMs that address a topic (these could have a large or small budget, or be wide or restricted in scope).
- Indicators that count elements out of a category that varies in size. E.g. number of new plans with a participatory process (depending on how many plans have been developed in total, the same figure might be a positive or negative sign - it is better to calculate a percentage).
- Indicators for which it is not clear whether an increase or decrease is good or bad. E.g. number of new protected area management plans developed (a decrease over time might show that most protected areas now already have a management plan, or that efforts to develop management plans have lessened).
- Indicators that are exclusively linked to a specific type of PaM, and become less useful if this PaM is changed or discontinued. E.g. number of joint border control operations with neighboring countries (if it turns out that neighboring countries are unwilling to engage in this activity, the indicator cannot continue to be used).

Exercise 3.1. Developing indicators for generic safeguards criteria

The criteria below are based the generic global UN-REDD Programme [Framework for Clarifying the Cancun Safeguards](#). For each criterion draft a useful indicator – e.g. that is specific, measurable, valid, realistic and easy to interpret - keeping in mind your own country's context. Would such an indicator work for your own SIS? An example is given in the first row.

Principle & Criteria	Proposed indicators
Safeguard A, criterion B.4. REDD+ implementation shall contribute to the achievement of the SDGs.	<i>Example: SDG 13 on Climate Action: Area (in ha) of forest land restored/reforested through REDD+ and proportion of national target for forest restoration in the NDC met</i>
Safeguard B, criterion B.6. REDD+ shall support gender equality in the design, implementation and monitoring of REDD+ actions.	
Safeguard C, criterion C.2. REDD+ planning and implementation shall respect the rights of local communities and indigenous peoples to lands, territories and natural resources.	
Safeguard D, criterion D.6. Information about REDD+ planning and implementation shall be shared transparently and appropriately, in	

accordance with national laws and regulations.	
Safeguard E, criterion E.5. REDD+ actions shall contribute to achieving priority social and environmental benefits.	
Safeguard F, Criterion F.1. The selection and design of REDD+ shall consider the risks of reversals and include measures to reduce the identified risks.	
Safeguard G, criterion G.6. The design and operation of the National Forest Monitoring System shall allow the detection and reporting of potential displacement of drivers.	

Exercise 3.2. Indicator description sheet

Indicator name/code

A short name that reflects what the indicator is measuring, e.g. Area of forest restored through REDD+ PaMs. Provide the code for the indicator if these are being used, e.g. Indicator A1.1.

Indicator type

Indicators can be process-based or results-based. Process-based indicators measure whether or how REDD+ activities are planned and carried out, e.g. percentage of PaMs for which FPIC procedures have been followed; amount of funding spent on capacity-building for participation in REDD+. Results-based indicators measure the impacts of REDD+ activities on people and the environment, e.g. trends in township vulnerability index in REDD+ areas, trends in diversity of tree species in NFI plots.

Safeguard criterion / criteria

List the safeguards criteria from the national clarification for which the indicator provides relevant information.

Relevant to which PaMs

Some indicators can cover the full range of REDD+ implementation (e.g. number of persons involved in participation processes), while others only apply to specific PaMs (e.g. change in coverage of protected areas). Note that for a small indicator set, it is better to choose indicators that cover all or most PaMs, to avoid ending up with information that is not representative of the country's efforts.

Rationale

Explain how the indicator links with the safeguards criteria, and how REDD+ planning and implementation will lead to changes in the indicator. For example, an indicator on the percentage of districts for which land use plans have been developed could be linked to criteria under safeguard B (such as improvements in governance) or under safeguard G (because land use plans can help to prevent emissions displacement).

Methodology (definitions, data sources, processing)

Explain how the data for the indicator will be obtained (e.g. data collection by REDD+ implementers, requesting household survey data from Statistical Office), what units of measurement will be used, what definitions and criteria will be applied (e.g. what types of events are counted as 'capacity-building events'), and how the information will be processed (e.g. provide the formula if an index is calculated, explain any methods used for extrapolation of data from sample sites). It is also useful to note whether the indicator requires disaggregated data or not (e.g. disaggregation by gender, livelihood activity or forest type).

Interpretation (baseline, targets, identification of external influencing factors)

Explain how the indicator will be interpreted – e.g. is the indicator expected to increase or decrease with successful application of the safeguards? Is a baseline value available? Is there a target that the country is aiming to achieve, or is the intention to continually improve performance? Are there external factors that need to be taken into account when interpreting the indicator (e.g. climate change, global economic trends)? How will their influence be assessed (e.g. are national statistics available that can show how these factors have developed, and whether they are likely to have influenced the indicator)? Note that a full statistical analysis may not be possible for all factors, and the interpretation may need to include a level of expert judgment.

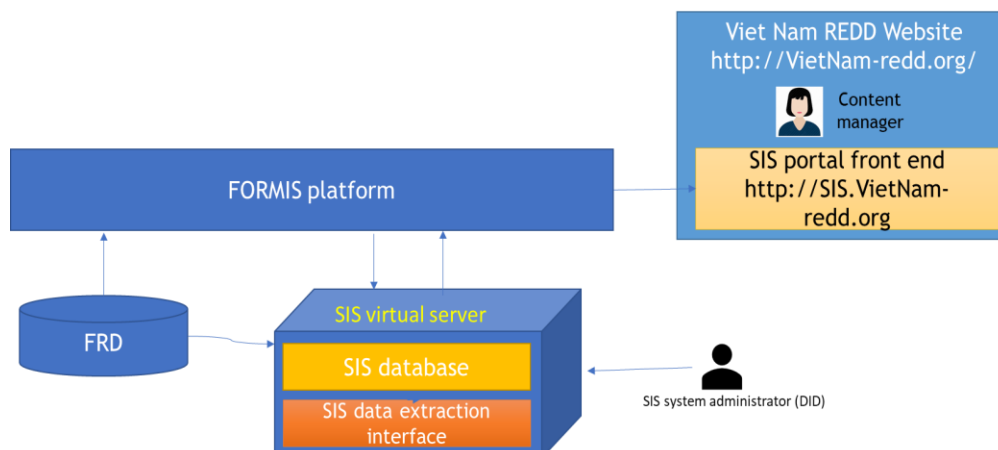
4. Information sharing and management

The Cancun safeguards are broad, covering a range of environmental, social and governance aspects. As such, the information encompassed in a SIS can be a diverse mix of environmental and social, qualitative and quantitative, narrative, spatial and statistical information, all coming from a variety of different sources. The information may also differ in terms of timeframes, geographical coverage and collection methods. Compiling all of the necessary information from different sectors (across government and sometimes civil society) and scales (national, subnational, and site levels) needs to be technically efficient, politically viable and appropriate to national circumstances (also see Box 1 on cross-sector data sharing). To support the efficient and organized compilation of data, certain tools – such as templates, protocols, direct technological solutions for establishing links between existing information systems and, ultimately, some form of database - will be needed for sharing and storing safeguard’s-relevant information.

Templates and protocols can promote standardized collection of information and can support information processing and compilation, facilitating entry into a database. A template can include multiple choice options, sections for reporting on predetermined indicators, short answers, or a format for gathering more detailed information. There might be a need to tailor the templates to accommodate the specific procedures and capacities of key information providers, and to provide support for completing them (e.g. definitions of key terms, technical guidance, explanation of the purposes for which the information will be used). It can be useful to develop information compilation protocols that indicate who (which institution or stakeholder) is reporting what (scope of information), when (periodicity), how (template or form to capture the information), and the channel used for the submission of information (e.g. physical documents or online system). The responsible parties for submitting and receiving the information should be clearly identified. If necessary, countries can start by using physical templates (i.e. paper forms) filled by the information providers, and gradually move towards automation of processes, which would allow information providers to complete and submit forms online.

Some countries, such as Viet Nam (see Figure 2 below), have sought to use **technological, automated solutions** to integrate data from certain sources into the SIS. This involves using IT solutions to integrate the SIS database in an existing information system (e.g. forest resources database) or an emerging system (e.g. National Forest Monitoring System (NFMS) or national SDGs database). This allows for the operator to extract certain data from one database and show it in the SIS database. However, it should be noted that given the breadth of information covered by the safeguards, it is unlikely that one existing information system could supply more than a portion of the information needed in a SIS.

Figure 2: Viet Nam SIS technological integration



Regardless of what method is used to collect and compile information for a SIS, it may also be necessary to create or strengthen **information sharing agreements**. In some countries, data sharing across sectors is mandated by an existing policy or regulation, but in many cases, the SIS will require that requests for data are institutionalized. The various agencies/organizations involved will need to agree on what data is provided, and how it is to be used, along with any standards to be applied. Such information sharing agreements may present a challenge for SIS operation, as the process for putting in place formal agreements can require time, effort and political capital.

Due to the variety of information that is needed for a SIS, as well as the range of functions that need to be carried out, clear and efficient **institutional arrangements** are a vital element of operationalizing the system. The hosting institution for the SIS is responsible for ensuring the running of the system, including future improvements as needed. At the same time, the management of the SIS may entail other roles and responsibilities, so other institutions will need to be involved, i.e. it is rare that just one institution will be responsible for all aspects of SIS operation. For instance, the national central statistics office or forest statistics division may be identified as the SIS host institution, but a national REDD+ office will still need to make decisions about the safeguards and help analyze the linkages between the information and REDD+. Stakeholders and civil society organizations are also likely to be involved in reviewing and validating the information in the SIS. Some of the potential roles related to SIS operation include:

- i. Leading the application of the safeguards, i.e. ensuring safeguards are addressed, respected and monitored during REDD+ implementation;
- ii. Hosting and managing the SIS database and/or online platform;
- iii. Providing information for the SIS;
- iv. Compiling information;
- v. Analysis and interpretation of information;
- vi. Prepare SIS related content, reports and responses to specific information requests;
- vii. Preparing summary of safeguard's information;

- viii. Quality control, review and validation; and
- ix. Approving the information for publication/dissemination.

Tips for information collection and management

- Consider existing capacities and commonly used techniques to compile data across the sectors relevant to the SIS. Which agencies or organizations are already collecting data and what processes do they follow to do so? Detailed information-flow diagrams, showing step-by-step how data is usually requested, collected, compiled, approved, etc., can help to inform processes for the SIS. (Box 1 below provides some more examples of cross-sector data sharing).
- What mandates exist or are needed for data sharing and collection? Does the mandate to request and compile data for the SIS already exist? Or is there a need to create a new mandate? For example, the agency chosen to host the SIS database may need an official request or a change to their terms of reference (ToR) to allow them to do so.
- It may help to make a case for investing in the SIS as an innovative data sharing platform. In advocacy with other agencies and organizations (e.g. those expected to contribute to the SIS) and with political leaders, emphasize how the SIS can provide data relevant to multiple objectives or add value for a range of sectors.
- Consider any regulatory requirements related to data. For example, what regulations or best practices exist related to confidentiality, sensitive data, intellectual property, and websites? Are there data quality standards or metadata standards that should be followed?
- Identify existing forms/templates or develop new forms, information sheets, or tools to standardize data collection and facilitate the compilation of information coming from different sources.

Box 1: Cross-sector data sharing

A commonly identified challenge in many countries, relevant to SIS and beyond, is how to facilitate the collection, compilation and sharing of data that comes from multiple sectors, agencies and organisations. This may be especially challenging when there is little experience with cross-sector data sharing or a lack of a legal framework to support access to information.

However, cross-sector data sharing and ‘big data’ are increasingly receiving attention by governments at multiple levels. In many countries there are now emerging examples of how relevant data can be identified and accessed, then compiled, reviewed and presented, in a way that involves the collaboration of numerous partners and sectors.

One example is the development of localised indicator sets and initial reporting on the Sustainable Development Goals (SDGs); these processes can provide useful lessons for the development of an SIS. The results of some of this work can be seen for instance on the SDGs dashboard: <http://www.sdgdashboard.org/>

At the national level, numerous countries are also making available reports on SDGs progress, such as Thailand’s [Voluntary National Review report](#) (2018).

Exercise 4.1: Assigning SIS roles and responsibilities

When determining which institutions or actors should be responsible for which roles related to SIS establishment and operation, a number of factors should be considered:

- Which institution is responsible for REDD+ implementation and the application of the safeguards?
- Which institution/s already has/have a political mandate to collect information or run databases relevant to REDD+ and the SIS?
- Which department is responsible for submitting summaries of information on safeguards to the UNFCCC?
- Who has technical capacity and budget to establish and operate a database and/or website?
- Who has the relevant expertise and experience to comprehensively analyze and interpret the information on safeguards?
- What kind of coordination mechanisms will be needed for information sharing and communication among institutions?
- How should the accuracy of information be reviewed and verified?

The following table sets out a list of general/common SIS functions or roles. Please fill this out by nominating the most likely institutions or actors in your country to fulfil each role. There is space at the end of the table to add other roles that may not appear on this list but that are relevant to your country.

SIS functions / roles	Institution/s
'Patron' of the SIS <i>This role involves high-level support for setting up the SIS, e.g. ensuring that the necessary mandates, inter-institutional arrangements and processes are put in place.</i>	
Lead institution(s) for implementation of safeguards and SIS <i>This is the institution who has the overall responsibility to ensure that REDD+ safeguards are implemented and a functioning SIS is put in place.</i>	
Host of SIS database <i>This role involves operating the SIS database and webpage, including collating data from all contributing organizations.</i>	
Providers of data / information <i>This role will likely be fulfilled by a range of organizations from various sectors, and from the national, subnational and local/site levels.</i>	

Data processing, analysis and interpretation <i>This role involves the processing of data (e.g. calculating indicators/indices, disaggregating data); interpretation of data (e.g. assessing linkages between observed trends and REDD+ implementation); and production of text/content for the database/website.</i>	
Review/validation of data and/or text <i>This role involves assessing the completeness, consistency and accuracy of information, as well as the appropriateness of the conclusions drawn from it.</i>	
Production of reports, including the Summary of Information <i>There may be a number of reporting requirements in your country related to the safeguards/SIS, beyond the Summary.</i>	
Approval of SIS content and reports <i>Who signs off on the publication of the SIS database/website and related reports?</i>	
Submission of Summary of Information to UNFCCC <i>E.g. may be the UNFCCC national focal point ministry/department.</i>	
Review of SIS operations and identification of areas for improvement <i>Who should be involved in reviewing and improving the SIS over time?</i>	

5. SIS functions, features and database design

Having assessed the information needs, identified potential information sources, determined institutional roles and responsibilities, as well as methods for collecting, compiling and managing information, countries will also need to decide the format or data management approach for their SIS. An online database is one option for organizing, storing, aggregating and presenting safeguards information. Other approaches include using the content management system (CMS) of a SIS website, offline databases in Excel or more sophisticated database management systems. Introductory information on databases is provided in Box 2 below.

Box 2: Relational databases

A database is a collection of information that allows to find information when needed. It could be manual (e.g. a telephone book) but these days' databases are mainly electronic. A relational database is a way to model entities and their relationships; it stores and retrieves data that is represented in *tables*, and consists of a collection of tables that store interrelated data.

Tables form the fundamental unit of a database, which are made up of rows and columns. Each table stores information about one thing or theme. *Entities* have *properties*, and are most often presented in rows. Their properties are types or characteristics, and are in columns. Here's a basic example:

Table 1: Parent table

client_id	Last name	First name	Year of birth
1	Smith	Emily	1975
2	Connolly	John	1964
3	Fernandez	Joaquin	1992

Keys are properties used to describe *relationships* between the information in different tables, i.e. they show how the different tables are related to one another. A 'primary key' is a column (property) that allows each row (entity) in a table to be uniquely identified, i.e. no two entities should have the same primary key value. Primary keys are usually numbers, because database management systems process number data types faster than character data types. For example, in the table above, 'client_id' is the primary key.

Different tables in the database are then related to each other using 'foreign keys'. These are a set of one or more columns in a table that refers to the primary key in another table. The table containing the foreign key is usually called the 'child table'. The database can thus present different relationships between entities, and be used to answer certain questions. For example, in the table below, order_id is the primary key and client_id (the primary key in the table above) is the foreign key.

Table 2: Child table

order_id	Order number	client_id
1	2321	3
2	4531	3
3	2341	2

Tables in a relational database can be linked to each other in three main ways: 1) One-to-One, 2) One-to-Many (or Many-to-One) and 3) Many-to-Many. The above example is a 'One-to-Many' relationship, meaning that each client in Table 1 (parent table) can have many orders in Table 2 (child table), but an order in Table 2 can only have one matching row (client) in Table 1. In a One-to-One relationship, a row in the parent table has only one matching row in the child table, and vice versa. In a Many-to-Many relationships, a row in a parent table can have many matching rows in the child table, and vice-versa. An example of this would be a relational database containing information on employees and projects (each employee can work in many projects at a time, while each project may be implemented by many employees as well). There are good practices rules to take into account these types of relationships in the design of a relational database. The example in Figure 3 below also shows links between tables.

Other objects also make up relational databases. *Indexes* allow us to quickly find or look up information, like an index in a book. *Views* refers to computed tables, i.e. tables that are created when a user asks to see certain sets of data computed from the underlying tables of the database. *Users* are people who can access the database, and permissions can be set for each user or groups of users, so that confidential or sensitive information is managed properly. *Queries* refer to how data is retrieved from the database.

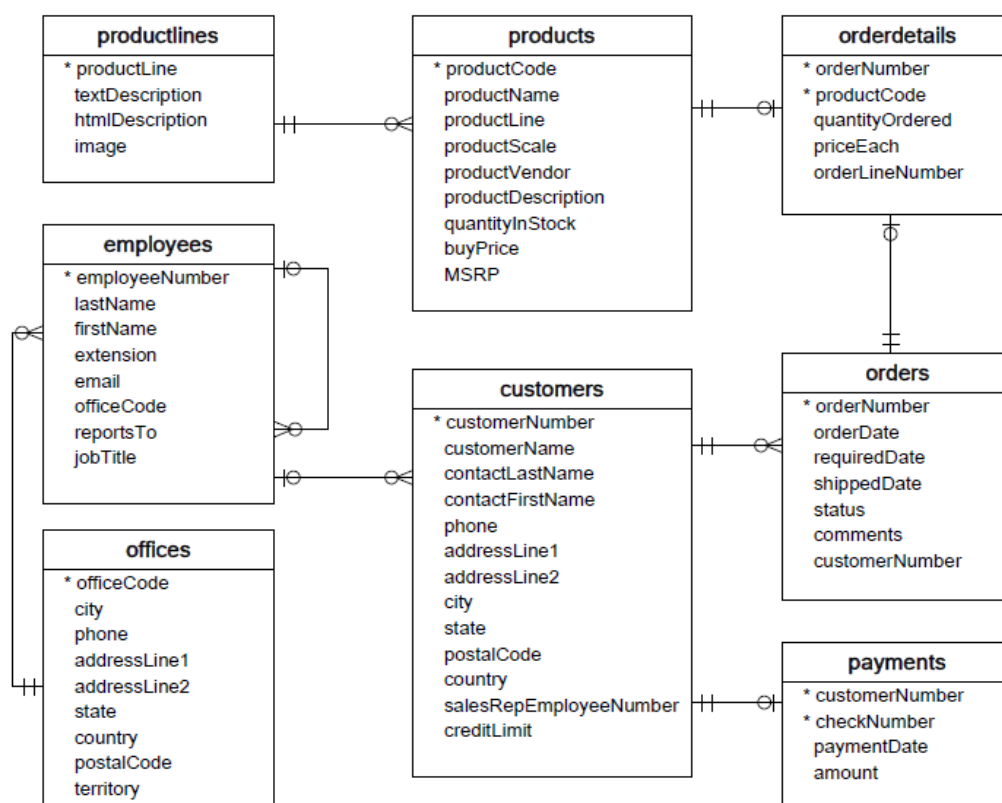
Sources:

<http://www.upi.pr.it/docs/easfg/easvrfq5.htm#CONCEPTS>

<https://www.essentialsql.com/what-is-the-difference-between-a-primary-key-and-a-foreign-key/>

<https://courses.cs.washington.edu/courses/cse100/02wi/lectures/GBW-introdb.pdf>

Figure 3: Example database structure (SQL)⁵



There are a number of **principles of good database design** that can help to ensure that a database yields benefits to its end users. These include⁶:

- *Appropriate planning process.* Designing a database involves a number of steps to ensure it is meeting the requirements of users and stakeholders, such as developing a system requirement specification that identifies its key functions, users and technological solutions, designing the database, and then testing it through a prototype.
- *Standards and conventions.* These are consistent naming conventions and standards on what objects belong in the database.
- *Documentation.* The objects, functions and protocols for using and managing a database should be documented comprehensively and kept up to date. For example, this can be done in a standard operating procedure or manual for the database.
- *Access levels.* When designing a database, the types of data included within it and the needs of users should be considered and defined at an early stage, with reference to regulations and data

⁵ SQL stands for Structured Query Language and is a language used in programming, designed for managing data held in a relational database. Source for this figure: <http://www.mysqltutorial.org/mysql-sample-database.aspx>

⁶ Sources for these principles include: <https://towardsdatascience.com/good-database-design-starts-here-15ebcaf5dd80>; <https://courses.cs.washington.edu/courses/cse100/02wi/lectures/GBW-introdb.pdf>; <https://support.office.com/en-us/article/database-design-basics-eb2159cf-1e30-401a-8084-bd4f9c9ca1f5>

management standards in the country. For example, can all users access all data in the database? Is some data confidential or restricted? Who should be able to modify or edit entries in the database?

- *Avoiding redundancy.* Information is redundant if it is stored in multiple places in a database. Relational databases may minimize redundancy by creating tables that store information on one theme (see also Box 2).
- *Minimum units of data.* Information should be stored in its smallest logical parts. This means that more than one kind of information should not be stored together in a field; for example, separate fields should be used for first names, last names, product names, categories, etc. This makes it easier to retrieve individual pieces of information later and to draw relationships between them.
- *Ensuring data accuracy and consistency.* Making sure that data will be recorded exactly as intended is important when designing a database. Standard procedures and rules, including various error-checking methods and validation procedures, can be applied to ensure this.

In the case of **SIS databases**, there are also a number of more specific considerations that will inform the database design. For example:

- How will the information structure be reflected in the database design? For example, will indicators be used to present the information, or does the database need to accommodate a more narrative approach to presenting information on safeguards?
- What functions is the database/website expected to perform? Which types of queries is the database management system expected to fulfill? For example, will it need to be searchable by year, by level (e.g. national/subnational) or location (e.g. by project site)?
- What types of information need to be included and presented to users? For example, will the SIS include statistical or spatial data?
- How much storage capacity is needed? This relates to the type of data included, as well as how many years of data should be stored.
- Are there any restrictions related to security, privacy and access to information that need to be considered? Data within SIS databases may need to have levels of access applied or to be processed/aggregated in ways that ensure confidential or unpublished data are not shared with all users. For instance, what information collected through a Grievance Redress Mechanism is considered confidential? Can all types of land tenure information be shared? Is some spatial data considered significant for national security reasons?
- How often will data in the SIS be updated, and how? This may link to annual REDD+ review processes, the preparation of Summaries of Information, or the update schedule of underlying data sources (e.g. how often an NFI or census is carried out).
- How should data be presented in the end user application? For example, should users be able to view all or only a part of the underlying data? Do certain computed tables or views need to be provided? Can the data be downloaded in another format, e.g. PDF?

Figure 4: Example data table (basic Excel table)

ID	Safeguard - level 1	Criteria - level 2	Indicator – level 3	Indicator type	Data type	Year of latest entry	Official data	Availability in Phase 1	Year of next update
1	SG A	A1. Consistency with national forest programmes	A1.1. Objectives of the National Forest Strategy 2010-2020	Address	Narrative text	2010	YES	Available	2021
2	SG A	A1. Consistency with national forest programmes	A1.2. Objectives of the National Reforestation Action Plan 2015-2020	Address	Narrative text	2015	YES	Available	2021
4	SG A	A1. Consistency with national forest programmes	A1.3. Objectives of the National REDD+ Strategy	Address	Narrative text	2019	NO	Available	2025
5	SG A	A1. Consistency with national forest programmes	A1.4. Percentage of National Forest Strategy forest cover target achieved	Address	Statistics	2015	YES	Available	2021
6	SG A	A1. Consistency with national forest programmes	A1.5. Hectares of forest land reforested through REDD+	Respect	Statistics	---	YES	Not available	2023
7	SG A	A2. Consistency with international agreements	A2.1. Objectives of NDC related to forest	Address	Narrative text	2012	YES	Available	2020
8	SG A	A2. Consistency with international agreements	A2.2 Objectives of National Biodiversity Strategy and Action Plan	Address	Narrative text	2015	YES	Available	2021
9	SG A	A2. Consistency with international agreements	Link to A1.3	Address	Narrative text	2019	NO	Available	2025
10	SG A	A2. Consistency with international agreements	A2.3. Contribution of REDD+ to reduction in GHG emissions	Respect	Statistics	---	NO	Not available	2023

Exercise 5.1. Database design questions and features

The following questions can be used to facilitate discussion and gather information from key staff involved in designing/establishing a SIS database. The questions could be the starting point for a questionnaire/interview with the SIS host/lead agency, or for discussion at a workshop.

1. How are you currently managing SIS relevant data, or perhaps wider REDD+ data?
2. What are your security or regulatory requirements?
3. Do you need to be able to check/audit record changes? Who will be able to make such changes?
4. What internal controls or requirements do you need reflected or enforced in the database?
5. How do you need the data populated initially? Who will be doing this and what are their needs?
6. How do you need to update the data – and how often?
7. How do you want to display the data?

After gathering the information through these or similar questions, it's useful to then consider how the answers may affect or inform the design for the SIS. Here's an example – a simple table diagram using a hypothetical case – done with participants at the 2019 Southeast Asia Subregional Exchange on SIS.

Database design needs →	Possible design features
Country A is currently managing safeguards data in an excel table, NFMS data is displayed in a geoportal, and the Development Council also uses excel type database.	Simple to use, excel type tables are preferred. Easy to share and people are familiar with them.

Data made public in Country A must be official data. Other types of data are just for reference.	A more time consuming vetting process will be needed, but with advantages of government support, confidence and proper referencing of the data.
Country A feels it is important to be able to check/audit any changes made to the data. A person will be delegated to do this.	A ToR for this position is to be developed, and training provided. Access levels will also need to be determined, so the CMS must allow logins and tracking of changes to data.
There are a number of existing internal controls on managing and publishing data that should be followed, e.g. Minister must approve all content before it can be published on the website.	The content must be provided to Minister in document form for approval. Appropriate timelines for approving and publishing the information need to be built into the process.
For populating the SIS, information providers will input data directly into the database. For the published reports, data needs to be analyzed and then reports prepared by the REDD+ team.	Appropriate templates need to be developed for information providers and they need training on how to fill them out. The REDD+ team needs capacity building on how to analyze the information.
Updates need to align with information becoming available in the NFMS and the timing of Summaries of Information.	An update schedule needs to be prepared for different types of information in the database.
The database is for internal use. The SIS website will show summary reports only.	Access levels need to be defined for database, as above. The SIS website design will focus on communicating what is in the reports.

6. Technological options and platforms

When it comes to accessing and disseminating safeguards information, attention has largely focused on online solutions - a form of webpage, platform or portal linked to, ideally, a database that can be searched or queried. There is no explicit UNFCCC requirement to develop an online platform for the SIS. An online SIS, however, helps meet some of the key UNFCCC-expected characteristics of the system, namely transparency and accessibility. The experience of those countries that have launched an online SIS platform is, that the publicly available online information helps to fulfil stakeholder expectations, particularly of government institutions and international donors. In addition, an online SIS solution is a requirement of the GCF's pilot programme for REDD+ results-based payments - provision of a link to an online SIS is requested in the concept note and proposal templates.

The **content** of an online SIS can incorporate diverse elements:

- Introductory and background text, e.g. on REDD+ in the country, how the SIS operates, on the national safeguards clarification, etc.;
- Narrative and quantitative reporting against the safeguards, e.g. by safeguard, by principles, criteria and indicators;
- Visual aids, such as figures, graphs, maps and photographs, and even videos⁷.

The core information expected to be shown in the SIS is the report on how safeguards have been addressed and respected. This can be a direct mirror of the information found on a database – assuming all the information in the database can be accessed by the public – or a different presentation of the information. It may also be useful to share information on the country's approach to meeting UNFCCC and other (such as GCF) safeguards requirements, as well as descriptive details of the SIS's design and operations. Some countries have added information and allowed access to grievance redress mechanisms, safeguards communications materials, participation platforms, and a library of safeguards-relevant documents. Certainly any SIS platform should include access to Summaries of Information on safeguards.

In addition, the development of an online SIS platform should consider the languages for presenting the information – both for the database and the webpage - and the need for a mobile friendly version. An example of content from an SIS, shown in a site map, is available on the Viet Nam SIS website: <http://sis.vietnam-redd.org/web/guest/site-map>.

There are also a range of options when it comes to which **platform** to use for an online SIS. As far as possible, countries are encouraged to build their SIS on existing systems, and it can be strategic to link the SIS to an existing online platform. There are usually already official government standards in place that constitute a starting point for strengthening an existing online platform. Emerging platforms under development may also be designed to accommodate the SIS, such as REDD+ geoportals or new climate change reporting platforms. Other countries choose to create a new platform or website dedicated to the SIS. Box 3 below provides some examples of online web development / hosting platforms that could be used to create an SIS website/platform.

⁷ For example, Mexico's SIS includes an introductory video on the safeguards: <http://sis.cnf.gob.mx/salvavidas-redd/>

Box 3: Example web platforms

There are numerous options in terms of software/web platforms to support SIS websites. The right platform for a country SIS's website will depend on a range of factors, such as cost, technical capacity, and compatibility with existing infrastructure and legacy systems provided by the host organization.

The online SIS established so far are mainly built with Content Management Systems (CMS), such as WordPress (e.g. Mexico), PHP*-based (e.g. Ghana), Liferay Portal (e.g. Viet Nam) and Wix. Most of these are free and open-source software, with the exception of [Wix](#), which is a low-cost commercial solution.

[WordPress](#) is an easy to use CMS solution that is used to build organizational websites and blogs, and which can be modified to create a SIS website. WordPress has features such as menu and page hierarchies, categories and tagging, which provide the basic functions needed to organize indicators/information into SIS structures. Similarly, [Drupal](#) is another PHP-based CMS with more flexibility, extensibility and customizability, but the learning curve to develop and manage a Drupal site is higher.

[Liferay Portal](#) is a Java-based full-fledged web portal solution that can be used for large and complex enterprise websites (e.g. for banking institutions, universities, government). Liferay provides a customizable CMS that can be used to create a SIS website with a more complex structure such as multilevel indicators, complex logic and relationships between indicators, parameters and higher-level objectives. Liferay also offers a built-in user management system that allows the creation of role-based workflows for administrators, editors and reviewers. Additional functionality such as document libraries, user forums, wikis, and full-text search, are part of the platform's default modules. On the other hand, Liferay is more complex and requires a more powerful hosting server.

Usually, Liferay or similar portal based websites will require an independent Virtual Private Server while WordPress and Drupal can be installed on a low-cost shared hosting.

**PHP is an open source general purpose programming language.*

To avoid building a system that is too complicated or difficult to manage, a **phased approach** can be taken to establishing the SIS. The first version of the system may focus on immediate needs and priority information. Later, following a stepwise approach, as advocated under the UNFCCC, further information can be added to enrich the system's database and what is accessible online, in line with changing country needs. For example, some countries have decided to focus initially on publishing online information about addressing and respecting safeguards at the national level; they then plan to incorporate information on safeguards processes and results at the subnational level later. This approach also recognises that not all information needed by the SIS may be available right away.

It is key to involve **stakeholders** such as focal points of institutions that are priority information providers during the development of the SIS online platform, as well as likely end users. As with good database design (see section 4) partner institutions and end users should be canvassed to obtain feedback on the structure and functioning of the platform, and a prototype tested with these stakeholders. On-going training and capacity building for administrators, data providers and users will almost certainly be needed during the stepwise development of an online SIS, along with documentation on how to use and maintain the platform.

It is worth noting that an online solution might not be enough by itself for **disseminating and communicating safeguards information** to certain stakeholders, such as indigenous peoples and local communities. To facilitate the access of information by all relevant actors, complementary approaches could be used such as videos, village meetings, distribution of printed information, radio broadcasts and visual communications products. These approaches should be in line with a country's wider communications/engagement strategy for REDD+; the communication of safeguards information should be tailored to the target audiences and the most appropriate communications channels, which may be similar or different to those identified in a broader communications strategy. Exercises 6.1 and 6.2 below relate to planning for communications on safeguards.

Exercise 6.1. Identifying communications needs and options for safeguards

The following questions can be used to better understand the communications context and needs for safeguards and SIS; they also form the key elements of developing a communications plan.

1. **Situation analysis.** Where do you currently stand in terms of communications on safeguards? How aware are stakeholders about the REDD+ safeguards, the SIS and key messages? What kinds of communications channels or formats have been used to date? Is there an existing or planned communications strategy for REDD+?
2. **Define objectives.** What do you want to achieve through communications on safeguards?
3. **Key audiences.** Who are the people or groups of people you want to communicate about safeguards with? Why do you want to communicate with these target audiences? This is an important reflection exercise, as your audience will determine the tone/language you use. (The example table below in exercise 6.2 may help summarise information on key audiences, messages and channels).
4. **Key messages.** What are the key messages you would like to deliver about the safeguards? Keep this to around three main messages. Don't have too many or your message will be diluted.
5. **Communications channels.** In order to reach these target audiences, and deliver the key messages, what channels or formats are most appropriate? Consider available resources, appropriate languages and stakeholder interest in the topic as well.
6. **Action plan.** Prioritise key actions that can be taken to launch and deliver your communication's approach. These could include things like integrating safeguard's communications into the overall REDD+

communications strategy, ensuring SIS has a mobile version, developing some summary communications materials in local language, etc. Make sure your action plan is tied to specific calendar deadlines. If you already know the date of your SIS going live, for instance, you can have a forward-looking plan so you can make a big splash around its launch. Don't wait until an event has already passed to start planning its communication, or it will be too late.

7. **Evaluate the results.** It's always important to measure your results to understand whether you achieved your objectives. If you aren't satisfied with the results, make necessary adjustments in order to perform better next time. Your evaluation might take the form of the following:
 - a. Annual reports.
 - b. Monthly reports.
 - c. Media mentions/Media Tracking

Exercise 6.2. Identifying target audiences, key messages and communications channels

Use the table below to identify and prioritise who are the target audiences for communications on safeguards, including via the SIS, the key messages for these audiences, and the channels that would be best used to reach them. Remember that communicating on safeguards is not the same as communicating on REDD+ as a whole – you target audiences, messages and channels may differ.

Target audience	Key message/s for this audience	Priority communication channel to reach them

7. Conclusions: Creating an enabling environment

The development of the SIS is a key requirement for finalising the REDD+ readiness phase; the operation of the system will continue to play an important role during the implementation phase and in accessing results-based payments of REDD+. Establishing and maintaining SIS operations however also demands in-country resources in terms of political, human, and financial capital outlay.

Political capital refers to the challenge identified by those countries operationalizing their SIS in securing national government ownership and political support for the continuous operation of the SIS. Political support at the appropriate level and the commitment of all relevant institutions is essential. Emphasizing the need for an online SIS as a prerequisite for results-based payments from the GCF, together with expectations for reinvestment of some of those REDD+ revenues in improved SIS functioning, should help to incentivize political commitment to establishing and maintain the SIS. Communicating the ways that the SIS can help to achieve multiple goals may also be valuable, e.g. accessing results-based payments, adaptive management of REDD+, promoting cross-sector information sharing, supporting communications with stakeholders, etc.

In order to develop, manage and maintain the SIS there is also a need for investments in **human capital**, involving the organizations contributing information, those administering the database and/or website, and those reviewing and validating safeguards information. Investments in staff, expertise and training ideally should be forecast at an early stage, setting out what is needed to maintain and improve upon the system in the long run.

The **financial capital** - costs for building a database and online platform, for maintaining operation of the SIS, for upgrading the system step-by-step, and for building capacity - should be calculated upfront, ideally in the design phase. The level of financial capital needed, will depend on the existing country circumstances and capacities, degree of information complexity, level of SIS functionality, diversity of REDD+ actions comprising the national strategy, etc. Such costs should ideally be reflected in the expected funding needs for the National REDD+ Strategy and/or investment plan.