Data Management Plan

Project:

Local Indicators of Climate Change Impacts (LICCI)

The Contribution of Local Knowledge to Climate Change Research

Grant Agreement No: 771056-LICCI-ERC-2017-COG

The project has received funding from the European Research Council

Start date of the project:

1st June 2018

Version 1.3

Submission date: 15/10/2020

Note:

This document (together with the individual DMP of each LICCI core team member and LICCI partner who conduct fieldwork) contains information that responds to Deliverables D2.2, D2.3 and D2.4, which refer to different aspects of data management. Detailed information on data collection, storage, protection, and compliance with EU regulation (D2.2) can be found in section 4 (Data summary), 5 (FAIR data), 6 (Data storage and allocated resources) and 10 (Annex). Detailed information on materials which will be imported to/exported from EU (D2.4) can be found in section 7.4 and 7.5 (data transfer).

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List of Acronyms

APC: Author Processing Charges

APDCAT: Catalan Data Protection Authority

AWS: Amazon Web Services

CEEAH: Comissió d'Ètica en l'Experimentació Animal i Humana

DMP: Data Management Plan

DOI: Digital Object Identifier

ERC: European Research Council

FGD: Focus Group Discussion(s)

FPIC: Free, Prior and Informed Consent(s)

ILK: Indigenous and Local Knowledge

IPLC: Indigenous Peoples and Local Communities

LICCI: Local Indicator(s) of Climate Change Impacts

ORD: Open Research Data

PI: Principal Investigator

PPP: Purchasing Power Parity

SSI: Semi-structured interview(s)

SubjId: Subject Identifier

UAB: Universitat Autònoma de Barcelona

1 Revision history

In this chapter, you find information on the evolvement and the revision process of the data management planning within the LICCI project, including information of the version, the data of submission, and implemented changes since the last version (see able 1).

Table 1: History of the evolvement of the data management plan (DMP) of the LICCI project

Date	Version	Implemented changes
31.01.2019	Version 1.0	First document
04.10. 2019	Version 1.1	1. Number of targeted field sites updated and raised to 50 (45 studied by LICCI partners and 5 studied by the LICCI core team) 2. Detailed description of the sampling design added and updated (including selection of LICCI partners) 3. Detailed description of site and village information added 4. Cross reference to the individual data management plans of the LICCI partners added 5. Description of data transfer tools within the LICCI project added (LICCI app and ProjectSend) 6. Costs for data storage added 7. Description of the Amazon Web Services added 8. Term of use of LICCI citizen science platform added 9. Annexes with Ethical approval by the CEEAH and examples for FPIC deleted (now found in Deliverables 2.1) 10. Revision history added 11. Logos added
26.02.2020	Version 1.2	1. Note added to explain how the document responds to the project deliverables 2. Clarification added regarding transfer of raw paper data to HI (pp.22) 3. Updated number of field sites (41 LICCI partners, 5 LICCI core team)
01.10.2020	Version 1.3	1. Additional section on the timetable of data collection and required updates and modifications due to COVID-19 2. Update of the LICCI OpenTEK citizen science platform, including the terms of use and privacy policy 3. Clarification of the anonymous character of field data 4. Additional table with the countries where field research takes place and the implemented legislation on data protection and data localization.

If you have any doubts, questions or concerns, feel free to contact the Principal Investigator, Prof. Victoria Reyes-García (victoria.reyes@uab.cat), or Anna Schlingmann (anna.schlingmann@uab.cat), the main contributor to the documentation presented in this document.

2 Executive summary

The LICCI (***L**ocal **I**ndicators of **C**limate **C**hange **I**mpacts*) project is funded with a Consolidator Grant from the European Research Council (ERC) under the European Union's Horizon 2020 research and innovation programme (grant agreement No 771056-LICCI-ERC-2017-COG) and aims at bringing insights from indigenous and local knowledge to climate change research. The project aims to fulfil the requirements for open access to publications and to research data. The project has opted in to participate in the Open Research Data (ORD) pilot and commits to apply the 'FAIR data principles' (making research data ***f**indable, **a**ccessible, **i**nteroperable and **r**e-usable*).

The LICCI project mainly collects field data and develops a web-based citizen science platform, both on local knowledge of local indicators of climate change impacts, but additionally collects secondary data (e.g., data from literature, climate data from weather stations and climate modelling). The fieldwork takes place in approximately 45 indigenous and local communities globally distributed over five different climate zones. It includes semi-structured interviews, focus group discussions and surveys, aiming to collect information on site and village characteristics, individual perception of local climate change impacts, household's vulnerability, resource dependency and adaptation strategies. To facilitate data entry and data transfer, the LICCI project developed a mobile app (thereafter LICCI app).

The LICCI web-based citizen science platform[1], is an online collection of information on local indicators of climate change impacts contributed by any interested person worldwide.

All data collection of primary data will only be carried out when the Free, Prior and Informed Consent (FPIC) of participants exist. Field data collection targets exclusively anonymous data. Persons contributing data to the LICCI citizen science platform can decide on the license and the access modality they want to assign to their own data. Publications and research data collected within the project will be made openly and freely accessible via the LICCI citizen science platform, the LICCI webpage, or/and via other online repository (principally ZENODO and Europe PMC), provided that study participants agree on publishing.

[1] https://opentek.eu/licci

3 Introduction

The LICCI (***L**ocal **I**ndicators of **C**limate **C**hange **I**mpacts*) project is funded by the European Research Council (ERC) under the umbrella of Horizon 2020 EU Framework Programme for Research and Innovation and participates in the Horizon 2020 Open Research Data (ORD) pilot. Thus, additionally to the commitment to ensure open access to all peer-reviewed scientific publications published by LICCI core team members, the LICCI project applies the 'FAIR data principles' (making data ***f**indable, openly **a**ccessible, **i**nteroperable and **r**e-usable*) to the research data generated by the LICCI project (ERC, 2016).

The LICCI project collects primary data on local indicators of climate change impacts through I) fieldwork and 2) a web-based citizen science platform and secondary data, i.e.., data related to LICCI from literature review, and recorded climate data from weather stations and climate models. The LICCI project developed a mobile app - the LICCI app - to facilitate data collection, data transfer, and data storage. Primary data will be entered in the LICCI app and subsequently uploaded to the LICCI data repository at the Universitat Autònoma de Barcelona (UAB). The fieldwork has started and is planned for 45 sites belonging to Indigenous Peoples and Local Communities (IPLCs) with high dependence on natural resources. Fieldwork is conducted in collaboration with external researchers (hereafter referred to as LICCI partners), who have received a training in the standardized field data collection protocol by the LICCI core team. Sites were selected strategically so guarantee a global distribution among the five main climates according to the Koeppen-Geiger classification system (tropical, arid, temperate, cold and polar) and different livelihoods (e.g., small-scale agriculture, livestock husbandry, fishing). Applied data collection methods include semi-structured interviews (SSI), focus group discussions (FGD), and face-to-face household surveys. Collected data contain site and village characteristics (e.g., infrastructure), information on household composition, individual and group perceptions of local indicators of climate change impacts, livelihood strategies, information on vulnerability, and adaptation strategies. The web-based citizen science platform OpenTEK is an open platform, where every citizen is encouraged to enter information (e.g., text, pictures) on observed climate-related changes in the environment and implemented adaptation measures.

This document constitutes the fourth version (version 1.3) of the Data Management Plan (DMP) of the LICCI project. This DMP includes a description of the management life cycle for all research data belonging to the LICCI project. The introduction to the LICCI project is followed by a description of the data with details on the methodology applied during the process of data collection and on the expected data structure, size, types and formats. The fifth chapter describes how the LICCI project will follow and apply each of the 'FAIR' principles. The sixth chapter includes information on the long-term data storage, the allocated resources. The last chapter discusses ethical aspects related to data collection and management, including data security.

All changes that have been realized since the first version of the data management plan are listed in chapter 1.

4 Data summary

The LICCI project collects primary data on individual perception of local indicators of climate change impacts, households' adaptive strategies and vulnerability to climate change, and site characteristics and infrastructure. Primary data are collected through fieldwork and additionally through a web-based citizen science platform. Additionally, the project collects secondary data from literature review and online research, and secondary climate data from weather stations and climate models. In the following, we describe in detail the process of data collection and the structure and the formats of the collected data.

4.1 Data collection

The LICCI team needs to collect new data in order to address the project research interests and objectives.

Data on local indicators of climate change impacts are collected through two approaches: 1) field data collection in approximately 45 study sites all belonging to IPLCs in several parts of the world (sites defined, see Table 5), and 2) a citizen science web-based application, the LICCI OpenTEK citizen science platform (see Table 2). Field data collection is undertaken by 40 LICCI partners and five LICCI core team members during a period of 18 months. The current pandemic crisis due to COVID-19 highly affects the performance of any field work, thereby affecting the schedule of data collection and potentially reducing the number of case studies of the project. The selection and training of the LICCI partners happened in 2019. For the selection of the LICCI partners, the LICCI core team targeted researchers with profound experiences in the data collection methods and with well-established field sites that are distributed among the five climate types defined by Koeppen-Geiger (i.e., tropical, arid, temperate, cold, polar) and with different livelihood activities (e.g., farming, hunting/gathering, fishing, animal husbandry/pastoralism). All LICCI partners are asked to deliver an individual DMP in which they specify the timing and location of data collection, the followed procedure for obtaining Free, Prior and Informed Consents (FPIC), the location of data storage, and the applied measures for data security and the protection. All individual DMP were delivered in a separate zip-folder. Field data collection methods will include SSI, FGD and face-to-face surveys (see llustration 1). Data entry and data transfer to the LICCI core team of primary data is facilitated through the LICCI app (see section 4.3.1). The LICCI app allows the researcher to enter village and site information, results from the SSI and FGD and includes the complete survey. Data can be entered directly during data collection or afterwards, according to the researcher's highest convenience. For each field site, the LICCI project intends to collect a limited number of geographical information data for site and village characterization (i.e., geographical coordinates and altitudes).

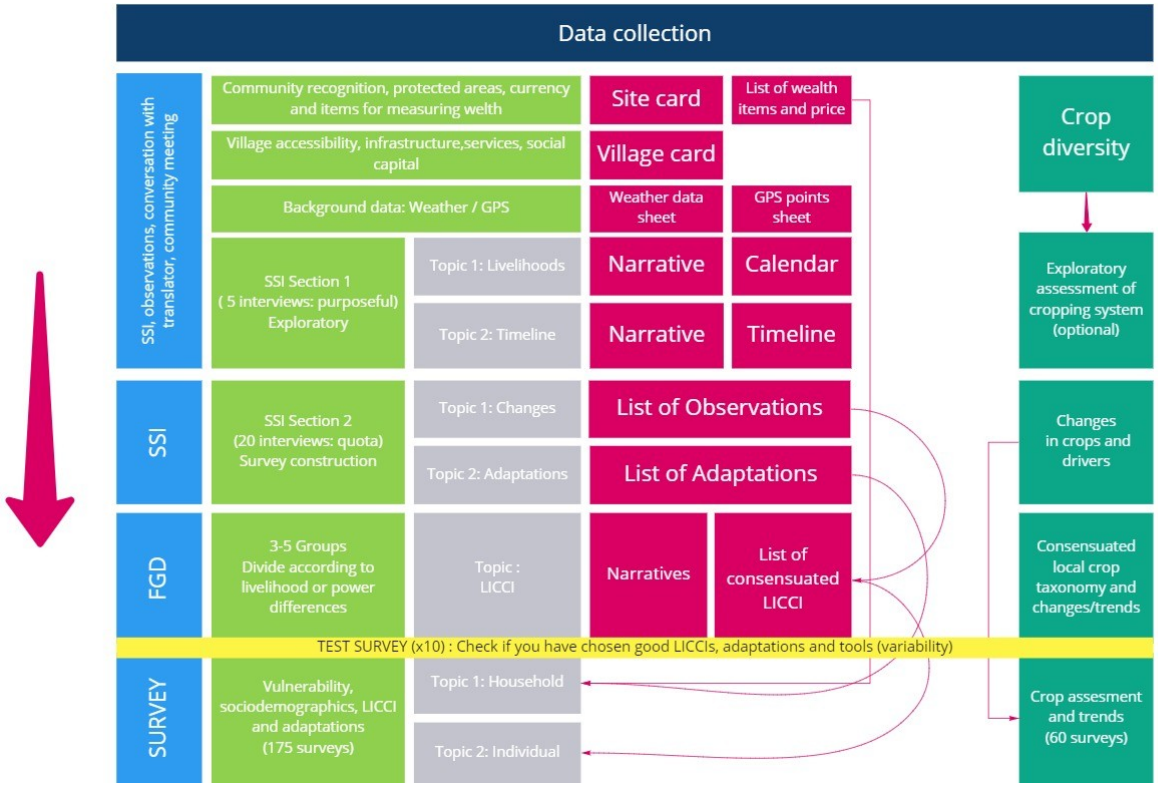

Illustration 1: Flow chart of LICCI field data collection

The LICCI project targets to work with adults in medium- and low-income countries. We are aware of ethical issues related to the research on humans and we take all necessary measures to ensure personal safety of all participants (see chapter 7). For example, no data will be collected without a Free, Prior and Informed Consent (FPIC) of participants (see section 7.2). The LICCI project will only collect anonymous field data.

Table 2: Overview of the collected data

Local Indicators of Climate Change Impacts, vulnerability and adaptation (group perception)		
Method	**Type of data**	**Sample**
Literature review	Secondary (background)	Systematic review of academic articles on local indicators of climate change impacts and adaptation published in international, peer-reviewed journals.
Semi-structured interviews (SSI)	Primary (background information)	Convenience and quota sampling of knowledgeable key informants, including elders and people considered knowledgeable by their peers.
Focus group discussions (FGD)	Primary (validation of SSI information)	Convenience sampling of elders and local experts, and people practising different primary economic activities in a village.
Face-to-face survey (household part)	Primary	Random sampling of households in the study villages.
Local Indicators of Climate Change Impacts, vulnerability and adaptation (individual perception)		
Face-to-face survey (individual part)	Primary	Convenience quota sampling of adults in a randomly selected household in the study villages.
Web-based data collection	Primary	Any citizen in the world willing to enter data.
Other data		
GPS data	Primary	Defined locations, such as location of studied villages, road access of the villages, weather stations, protected areas
Climate data	Secondary	Climate data from weather stations and climate model

4.1.1 Secondary data

Secondary data is continuously collected through a literature review on case studies previously documenting local indicators of climate change impacts (LICCI) and local adaptation to climate change impacts (LACCI). Data from the literature review are stored in an Access database and included in the LICCI OpenTEK citizen science platform. Results from the literature review on LICCIs were published in a first article and build the foundation of the design of the LICCI project (see Reyes-García et al., 2019). Other secondary data include 1) climate data from local weather stations in the study site (with emphasis on temperature and precipitation), and 2) data from global and regional climate models.

4.1.2 Site and village information

Each researcher is responsible for the selection of villages, ideally 3-5 villages per field site, that are relatively homogeneous and representative of the environmental and socio-cultural conditions of the site. The LICCI project collects data on the location, accessibility and infrastructure of the study site and villages. This includes GPS data of the central location and size of the villages, of closest airports, ports, market town(s), administrative center(s), weather station(s), and access to road infrastructure, furthermore, GPS data of protected areas in the region and officially recognized indigenous territories. If the information of the exact position of the villages is considered as sensitive, the LICCI project will modify the location by adding a random error. Apart from GPS data, site and village information include data on the accessibility and infrastructure, e.g., the availability of schools, water access, and a list of assets with a market value and their local prices.

4.1.3 Semi-structured interviews (SSI)

We obtain initial assessments of perceived local indicators of climate change impacts - LICCI - through SSI with knowledgeable key informants, including elders. Interview questions will focus on 1) local livelihoods and dependency on the natural environment (e.g., primary activity, division of labour, seasonal calendars), 2) time line of events that are important to the community, 3) perceived changes in the environment and the corresponding drivers (e.g., attribution to climate change) and 4) adaptation/coping measures. The SSI are divided into two sections, each comes with different sampling criteria, therefore the two sections should be conducted separately. To select informants for the first section (livelihood and timeline events), the LICCI project follows judgmental or convenience sampling and target persons who have lived in the study site for a long time (at least 30 years). The first section requires approximately 3 to 5 interviews per site. For the second section (perceived changes and adaptation/coping measures) the LICCI project uses quota sampling according to the categories gender, age, livelihood. The second section comprises of 15 to 20 interviewees, minimum 3 per quota (see Illustration 2.) Researchers take handwritten notes of information provided in the interviews and audio recordings if participants agree and considered useful.

		Fisher	Farmer	Hunter-gatherer	Pastoralist	Others	TOTAL (minimum)
Young	Men						3
	Women						3
Old	Men						3
	Women						3
TOTAL (minimum)		3	3	3	3	3	

Illustration 2: Quota sampling for the selection of interviewees for the second part of the SSI.

4.1.4 Focus Group Discussions (FGD)

To capture information encoded in the group social memory, in each site the researcher discuss the outcomes from the SSI through approximately 2 to 4 FGD with 4 to 12 participants. Participants are selected through convenience sampling aiming at capturing site diversity in terms of livelihood activities (e.g. farmers, fishermen, hunter-gatherers, etc.), expertise (i.e., special preference will be given to inviting elders or local experts to the FGD), age, and gender. Depending on the site, specific women and men groups are conducted separately if considered appropriate.

The researchers ask the groups a) to verify the list of LICCI that was compiled through SSI, and to identify additional LICCI that were not mentioned during the SSI, b) to discuss the directions of each LICCI, c) to provide a timeline for each LICCI, d) to discuss the potential drivers of each LICCI, e) to discuss the impact of each LICCI on individuals, households or the community, f) to clarify the names and use of plants and species in the case that climate related changes in the environment refer to changes in local flora and fauna (e.g., abundancy). With participant's agreement, FGD is audio-recorded.

As different groups might perceive different indicators or report different drivers, timeline, and impacts, the researchers combine information from various FGD to identify overlaps and differences. The participatory, collective, and iterative nature of the process will ensure that the final list of indicators reflect the group's social memory.

4.1.5 Face-to-face survey

The researchers use results from the FGD to construct face-to-face surveys. The survey is divided into two parts, one to be applied at the household level (focusing on household composition, livelihood strategies, socio-demographic characteristics and adaptation/coping measures), and the other to be applied at the individual level (focusing on perceived LICCI and corresponding impacts). The LICCI project aims at 175 individual surveys with household heads (with 150 individual surveys as the bare minimum) in at least 125 different households. If a site has more than 125 households, then the number of interviewed households in each village is proportional to the village size. Within each household, one to maximum two household heads can be interviewed for the individual part of the survey. For the selection of households and individuals, two different sampling strategies are followed: For the selection of households, simple random sampling is used; for the selection of individuals (household heads of the selected households), convenience quota sampling is used while at the same time ensuring an equal distribution across gender (i.e., 40 - 60 % of women and 40 - 60 % men).

Randomizing household selection results in variation in the degree of a households' direct dependence on natural resources, livelihood, and socio-economic characteristics. To allow for comparability, surveys are structurally identical in all the field sites, although the researchers use findings from the SSI and the FGD to create site-specific questions (e.g., including site-specific climate change impacts/LICCI and adaptation/coping measures/LACCI). The survey includes four sections: 1) socio-economic information of the household and the interviewed individuals (e.g., age, gender, household composition), 2) household's vulnerability, 3) household's adaptation/coping strategies, 4) household's direct dependency on natural resources, and 5) individually perceived LICCI and controls for individual's awareness and belief in climate change.

The LICCI project collects household-level and individual-level data on age, sex, education, livelihood activities, residence history, household composition. Rather than measuring vulnerability to climate change, the LICCI project measures household's overall vulnerability. To do so, the LICCI project selects data on the five assets that allow households to pursuit their livelihood strategies: financial (e.g., income from different sources, savings and credit), physical (e.g., ownership of productive assets, and access to communal assets, for example local infrastructure), human (e.g., education level, local knowledge), social (membership to associations, social relations in the village, perception of trust and cooperativeness), and natural capital (e.g., land ownership and access to communal assets, such as pasture, forests, fishing grounds, or water). For cross-country comparisons, all monetary values are expressed in purchasing power parity (PPP) adjusted US$.

To ask about individually perceived impacts, the researchers select site-specific LICCI and ask respondents to report a) whether they have observed the change, b) the direction of the change, and c) how much the change affects their household or livelihood. Among IPLCs, income refers to the sum of a) the cash received from the sale of goods and services, b) the value of goods and services from barter and gifts, c) the value of consumption from fields and forest, and d) the cash received from remittances or pensions. The LICCI team adopts this definition of income (i.e., cash plus consumption) to collect information on the household's income from natural resources (including income from agriculture, forest products, fishing and aquaculture, livestock, and so forth). The LICCI project considers direct dependence on natural resources as a proxy of the share of household's food and income directly derived from the natural environment.

4.1.6 Web-based data collection (LICCI citizen science platform)

The LICCI project also collects data on local indicators of climate change impacts through a citizen science platform. In a nutshell, the LICCI project has created a web-based platform where every citizen in the world is able to register and report observed changes attributed to climate change in their local environment. Users are guided to introduce information following the structure of field data (e.g., description of observed LICCI, classification of observed LICCI, names of affected species, geographical location, time frame). Besides text, users are able to upload media files (e.g., images, video and audio recordings). Every contributor can decide on the license and the access restrictions s/he wants to assign to her/his data (see sections 5.3 and 5.5.1). The platform is additionally fed with secondary data of LICCI obtained from the literature reviews and primary field data coming from FGD. The LICCI OpenTEK citizen science platform runs in a browser, is responsive and can also be used offline.

4.1.7 Additional data collection

Each researcher of the LICCI core team is encouraged to collect additional data for exploring her/his personal research questions (i.e., for PhD and postdoctoral projects). This might include additional SSI, FGD and additional questions in face-to-face surveys as well as other additional methods of data collection. The respective researcher applies for case-specific ethical clearances if required. In any case, additional data collection is always done after obtaining participant's FPIC and following regional, national and international laws and agreements.

4.2 Timetable of data collection

The COVID-19 pandemic has provoked unforeseen changes in the data collection process and schedule. Due to the risk for human health and to avoid further spreading of the virus, field data collection has been interrupted since March 2020. As a consequence, the deadline of field data submission has been extended from November 2020 to September 2021.

Recently, the LICCI OpenTEK citizen science platform has been released and has entered the dissemination phase. It will receive continuous updates extending its functionality until the end of the project.

4.3 Field data transfer tools

For the data transfer between the LICCI core team members and LICCI partners who collect data in 45 field sites, the LICCI project provides access to two data transfer tools: 1) the LICCI app whose development is completed, and 2) the ProjectSend[2] data repository (see Illustration 3). The LICCI app allows data entry and transfer for the majority of collected data. The data that is not collected with and transferred through the LICCI app, need to be uploaded to the ProjectSend data repository.

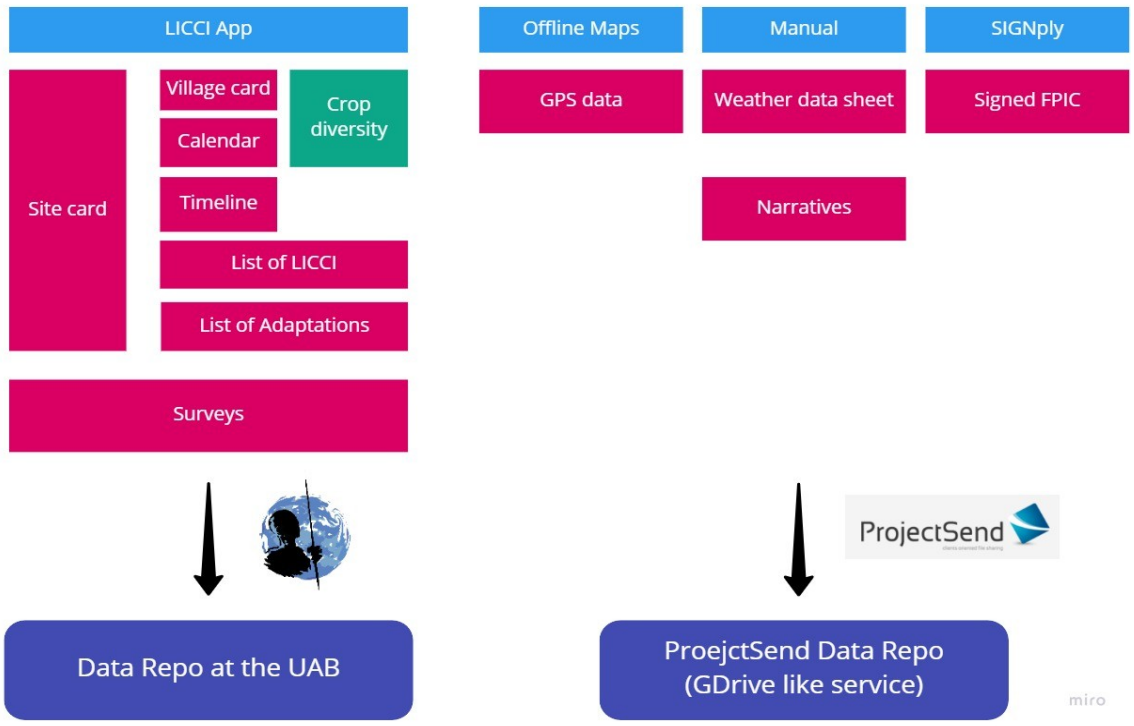

Illustration 3: LICCI data transfer tools.

[2] https://www.projectsend.org/

4.3.1 The LICCI app

The LICCI app is conceptualized to homogenize and facilitate data entry, transfer, storage and access. The LICCI app is structured according to the different sections and steps of data collection and provides data entries for most parts of the data collection process. For example, the household survey is completely implemented into the LICCI app. The LICCI app provides an upload function that allows the fast and easy transfer of entered data to the LICCI data repository located at the UAB where the data is stored. The data is stored and transmitted in json format. The LICCI core team will provide access to the data in other formats which are more convenient for further data processing and analysis (e.g. csv).

4.3.2 ProjectSend data repository

Some of the data cannot be entered in the LICCI app and thus require another data transfer tool. This refers to the narratives of important aspects of the sites and villages, narratives of the evolvements of the FGD, all signed FPIC, the secondary climate data and the GPS data. For those data, the LICCI project created user accounts for the LICCI core team members who collect field data and all LICCI partners at the web service ProjectSend. LICCI core team members and LICCI partner upload the data to their personal account. The LICCI core team has access to the uploaded data of all LICCI partners. As ProjectSend is a self-hosted application, the LICCI project will additionally use the web hosting services of SiteGround[3].

4.4 Data size

The LICCI field data collection targets 45 field sites around the world. All case-studies correspond to IPLCs who are characterized by direct dependence on local natural resources for their livelihood. Depending on the size of the field site, each researcher executes up to 25 SSI and approximately 3-5 FGD. A site might include several villages. The number of households to be sampled in a village is proportional to its population size. In each site, the LICCI project aims at a minimum sample size of 150 surveys. In total, approximately 25*45 field sites = 1125 SSI, 5*45 field sites = 225 FGD and 175*45 field sites = 7875 face-to-face surveys will be conducted. We estimate a maximum of 5 MB for data from each field site, resulting in a total of maximum 250 MB for all data from SSI, FGD and face-to-face surveys. Extra photos and audio records require additional memory capacity.

We expect that the final databases resulting from the literature reviews and containing secondary data from publications on local knowledge on climate change impacts and adaptation with information on authors, published year, title, journal, and research content will not exceed 5 MB.

For each study site of the LICCI project, the LICCI team expects some more data storage for secondary data (i.e., climate data and GPS data). The LICCI core team expects weather data not to exceed 1 MB per site and a total maximum of 45 MB for weather data from all sites. Similarly, we do not expect GPS data to exceed 500kB/field site, resulting in a maximum storage of of 22.5 MB for GPS data.

The size of the database from the web-based citizen platform highly depends on the participation and the extent of uploads of media files such as photos and videos. The platform will increase continuously over

[3] https://www.siteground.es/

time. Considering the number of entries of similar citizen science networks (i.e., LEO network[4] and Environmental Justice Atlas[5]) we estimate between 1000 and 2000 entries at the end of the project. Assuming an approximate upper boundary of 1 MB for each entry, we expect the LICCI OpenTEK citizen science platform not to exceed 2 GB at the end of the project.

4.5 Data types and formats

Whenever possible, the LICCI team uses free open source software and open formats, or widely adopted formats, such as those from Microsoft Office. The list of expected file types and formats includes:

- text documents (.txt, .docx, .odt, .pdf)
- tables (.xlsx, .ods, .csv, .dta)
- databases (.sql, .psql, .accdb, .dbf)
- images (.jpeg, .png, .tiff)
- audio files (.mp3, .wav, .ogg)
- video files (.mp4, .mov, .avi, .wmv)
- geodata: different files related to geoinformation systems, such as QGIS (e.g., .shp, .kml, .dbf, .qgz); ArcGIS will be used only in exceptional cases if work cannot be done with QGIS or if ArcGIS provides considerable advantages
- other structured data (.json, .xml)

4.6 Data processing and analysis

Data derived from fieldwork and from the LICCI OpenTEK citizen science platform will be subsequently processed (i.e., digitized, checked, cleaned, validated, and anonymized) and analyzed.

4.6.1 Statistical analysis

SSI and FGD data will be coded through qualitative content analysis (most probably using Atlas.ti). Survey data will be analyzed by applying statistical methods. Some data will be analyzed using commercial statistical programs, such as Stata, SPSS and XLStat. However, the LICCI project will put efforts towards the use of open source programs, such as R/Rstudion, PSPP, IraMuTecQ, iGraph and the programming language python.

4.6.2 Modeling process

Modeling techniques will also be used. Specifically, results from existing models, especially climate models, will be used for in-depth understandings of LICCI. The LICCI team will use freely available open source models and model results (e.g., from RegGEM, MPI-ESM, ISI-MIP).

The LICCI project is interested in modeling the relations between perception, socio-demographic factors and adaption/coping to climate change. Any developed model related to the LICCI project will be made public together with the rest of the data. Furthermore, detailed information on the modeling process, including

[4] https://www.leonetwork.org/en/docs/about/news

[5] https://ejatlas.org/

information on input data, parameters and the calibration processes for each modeling work will be provided to ensure that the modeling process is comprehensible and reproducible.

5 FAIR data

The LICCI project participates in the Horizon 2020 Open Research Data (ORD) pilot. Thus, it follows the 'FAIR data principles' by making the project's research data **f**indable, **a**ccessible, **i**nteroperable and **r**e-usable. The following sections describe how the data are organized to fulfill each requirement in an appropriate manner. The LICCI project follows the articles 29.2. (*Open access to scientific publications*) and 29.3. (*Open access to research data*) of the ERC Mono-Beneficiary Model Grant Agreement (ERC, 2016).

For best compliance with the 'FAIR data principles', the LICCI project stores data on the online repository ZENODO, that allows open access, long-term storage, and downloads for all kind of data types. Moreover, ZENODO also makes data findable by providing a Digital Object Identifier (DOI), a standard for metadata, and a search engine. ZENODO links automatically to Open AIRE.

The LICCI OpenTEK citizen science platform provides search and download functions for data on the platform that is stated as 'public'.

In all publications associated with the LICCI project (including publications in peer-reviewed articles, open accessible data, and information associated with dissemination strategies), the LICCI project will acknowledge the source of funding as follows:

"The project leading to this application has received funding from the European Research Council (ERC) under the European Union's Horizon 2020 research and innovation programme (ERC Consolidator Grant No 771056 LICCI)".

5.1 Open access to publications in peer-reviewed journals

According to Article 29.2 of the ERC Multi-Beneficiary Model Grant Agreement '[e]ach beneficiary must ensure open access (free of charge, online access for any user) to all peer-reviewed scientific publications relating to its results' (ERC, 2016). The LICCI project will archive pre-prints, accepted manuscripts and published articles on openly accessible online repositories, by following the journals' open access terms and embargo periods. The LICCI project will give immediate open access to its preprints of accepted manuscripts by uploading and archiving them in four repositories: 1) the LICCI WorldPress webpage[6], 2) the repository of the UAB, 3) the Europe PubMed Central[7] and 4) the non-specific repository ZENODO. These preprints will be linked to the final publication via the DOI.

In the 'Guidelines on Implementation of Open Access to Scientific Publications and Research Data' (ERC, 2017) the ERC specifies two ways for open access for publications:

- *Green open access* (immediate or delayed open access that is provided through self-archiving): the author, or a representative, archives (deposits) the published article or the final peer-reviewed manuscript in an online repository before, at the same time as, or after publication. Some publishers request that open access be granted only after an embargo period has elapsed. In this case, they must

[6] https://licci.eu

[7] http://europepmc.org/

ensure open access to the publication within a maximum of six months (twelve months for publications in the social sciences and humanities).

- *Gold open access (*immediate open access that is provided by a publisher): an article is immediately published in open access mode. In this model, the payment of publication costs is shifted away from subscribing readers. The most common business model is based on one-off payments by authors.

The LICCI team opt for gold and green access depending on different reasons. For publications with highly impacting results, the LICCI project chooses gold open access, so LICCI researchers retain the ownership of the copyright for their work and the right to deposit the article in an open access repository. This also helps overcome the fact that projects supported by the ERC under Horizon 2020 must provide open access to publications within six months (or twelve months for publications in social science and humanities) (ERC, 2017), because the gold open access provides immediate and permanent free access to the final published article, e.g., on ScienceDirect. The LICCI project chooses green open access when the embargo period of the respective journal is consistent with the open access requirements established by the ERC. The conditions for gold and green access for some scientific journals are listed in Table 3. The LICCI project considers peer-reviewed open access and hybrid journals for publications.

Table 3: Selected journals and their conditions for green and gold access

Journal	Gold open access: publishing fee, excluding taxes	Green open access: embargo period
Climate Risk Management (Open Access Journal)	USD 1,500	No green open access
Climate Services (Open Access Journal)	USD 1,800	No green open access
Environmental Science & Policy	USD 3,550	24 months
Global Environmental Change	USD 3,950	36 months
Regional Environmental Change	USD 3,260 (EUR 2,570)	12 months
Current Opinion in Environmental Sustainability	USD 3,610	24 months
Climatic Change	USD 3,860 (EUR 3,060)	12 months
WIREs Climate Change	USD 4,300 (EUR 3,600)	12 months
Climate & Development	USD 3,500	12 months
Environmental Impact Assessment Review	USD 3,300	24 months
Environmental Modelling & Software	USD 3,300	24 months

When possible, the LICCI team attaches a Creative Commons Attribution (CC BY). In other circumstances, such as when a green open access is chosen, a Creative Commons Attribution-NonCommercial-NoDerivs (CC BY-NC-ND) license are used:

- CC BY[8]: lets others distribute, copy and reuse the article, such as to create extracts, abstracts, and other revised versions, adaptations or derivative works of or from an article (such as a translation), to include in a collective work (such as an anthology), to text or data mine the article, even for commercial purposes, as long as they credit the author(s);

[8] https://creativecommons.org/licenses/by/4.0/legalcode

- CC BY-NC-ND[9]: for non-commercial purposes, lets others distribute and copy the article, and to include in a collective work (such as an anthology), provided that they credit the author(s), and do not alter or modify the article. The exchange of the article must not be primarily intended for or directed towards commercial advantage or monetary compensation.

5.2 Making data findable

Field data will only be published if study participants agree on publication and open access. Data from FGD are among the first public data on the LICCI citizen science platform. Anonymous survey data and secondary data from the literature will be accessible together with published results, likely in an aggregated format and stored on a public data repository such as ZENODO as recommended by the ERC and the EU OpenAIRE initiative. ZENODO is a general non-for-profit depository for research data hosted by CERN. This repository allows to store the different types of data that the project will generate (e.g., plain text, structured text, raw data), both open and embargoed. The repository can receive data sets, publications but also presentations or lessons. Its initial 50 GB capacity is satisfactory for the expected volume of data generated within the LICCI project. To each uploaded file, ZENODO assigns a DOI and a URL in order to make the data findable and citable. Once the data becomes available for submission to the open repository, the LICCI core team provides the metadata to be published with the data sets. Thanks to ZENODO's search facilities, all data provided with metadata is findable.

Any modeling codes developed during the LICCI project is made accessible and stored in an open access repository, probably GitHub, that can be linked to the ZENODO data set. Alike ZENODO, GitHub also provides specific DOI identifier.

On the LICCI OpenTEK citizen science platform, data provided by users is stored in a relational database. The LICCI OpenTEK platform already provides a convenient API with a user interface (swagger-style)[10] and will include more convenient options for the users to download data in different formats. Public subsets of the data will be uploaded to ZENODO.

5.2.1 Metadata

Metadata are important to describe the underlying data with sufficient detail to be intelligible for other users. Metadata allows a proper organization, search and access to the information of interest, so that it can be used to identify and locate the data via a web browser or a web repository such as ZENODO. All metadata in ZENODO is stored in JSON format and can be exported in several schemas (e.g., MARCXML, Dublin Core, DataCite Metadata Schema). The LICCI metadata will follow a generalized scheme in ZENODO including:

- title,
- creator(s) and contact person(s): names, first names,
- date,
- version,
- location
- contributor: e.g., funding body, including the grant agreement number,

[9] https://creativecommons.org/licenses/by-nc-nd/4.0/legalcode

[10] https://opentek.eu/docs

- data format(s),
- keywords,
- identifiers: DOI and url,
- access rights: license(s),
- a suggestion for citation,
- a description of the methodology that has produced the data,
- brief description of the LICCI project.

The LICCI team will furthermore provide a README.txt file with a description of the structure of the data sets and subsets, on how the data is organized, how data sets are related to each other and on how to use the data.

Metadata of the LICCI citizen science platform will follow the Dublin Core Standard[11] or the Schema standard[12].

5.3 Making data openly accessible

The LICCI team applies an embargo period of 24 months for survey data to ensure that the person who has collected the data has a first right for publication. Thereafter, the data is made public on ZENODO. The LICCI team considers the necessity to slightly falsify sensitive GPS data by applying random errors in cases that the exact localization incorporates a risk (e.g., in cases of rare and endangered species or when communities do not wish to disclose their exact location).

The data needed to reproduce results presented in publications (e.g., in peer-reviewed journals or at conferences) is made public and available later with article's publications.

Data from the FGD collected in the 45 study sites will be immediately openly accessible on the LICCI citizen science platform and on ZENODO (this includes a short period of data processing, such as cleaning and digitization). Users of the LICCI citizen science platform who upload information have several privacy options e.g. public and restricted (e.g., private) access. However, they are encouraged to choose public access. Public data on the LICCI citizen science platform is openly accessible to everybody, not only to registered users.

5.4 Making data interoperable

The LICCI team seeks to make the citizen science platform interoperable with akin citizen science platforms that collect similar data (i.e., CONECT-e). Our aim is to bring interested platform providers together and formulate a format of exchange. One possibility we are considering is ActivityPub[13], a decentralized social networking protocol published by the W3C as recommendation, which describes a federated server to server API for delivering notifications and content. We are interested in participating in the Cos4Cloud Project[14] in order to help in designing and testing interoperability features.

[11] http://dublincore.org/

[12] https://schema.org/

[13] https://www.w3.org/TR/activitypub/

[14] https://cos4cloud-eosc.eu/

The LICCI project will provide the complete or parts of the data set in simple formats and will share them in open formats (see section 4.5). As standard for the metadata, the LICCI team will follow the Dublin Core Standards or the Schema standards to make the data interoperable (see section 5.2.1).
When uploading data, users are asked to provide further information on the data, in order to keep it consistent with the metadata format described above (e.g., title, author, date, location and so forth).

5.5 Making data re-usable

All the LICCI data disclosed to the public will be re-usable and everyone will be entitled to re-use them once the LICCI data are made freely available. A high interest of re-usability of the LICCI data is probably given for persons with a political, academic or personal interest related to the many fields incorporated in the project (e.g., climatology, environment, sociology, anthropology). Data will be especially interesting for people working in climate and environmental change issues, such as impact assessments, and policies oriented to mitigation, adaptation, and sustainability in the context of climate change.
Once made publicly accessible on the LICCI citizen platform and on ZENODO, the data will remain re-usable as long as the LICCI OpenTEK citizen science platform run and until ZENODO discontinues the data sets.
Data sets from the LICCI OpenTEK citizen science platform that is declared as ‘public’ by the author is made publicly available, either as data set downloads or through an API call against the LICCI OpenTEK citizen science platforms.

5.5.1 Data license

The LICCI project follows the recommendations stated in the Guidelines on Open Access to Scientific Publications and Research Data in H2020 (EC, 2017). The LICCI project collects data of the knowledge of Indigenous Peoples, and the team is aware of the sensitiveness of the data being collected, particularly regarding the issue of appropriation. To accomplish with the mandate of making data as open as possible, while avoiding unfair knowledge use, the LICCI project will attach the deposited data to a Creative Common license in general, and particularly to the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International (CC BY-NC-SA license). This license allows re-distribution and re-use of the licensed work and data on the condition that the creator is appropriately credited, the data is not commercially used and that modified data is distributed under the same license[15]. Additionally, the user must provide a link to the license and has to indicate if changes were made. The users of the LICCI OpenTEK citizen science platform are able to define the privacy of each entry that they make and to choose among the Creative Commons a license which they prefer.

[15] https://creativecommons.org/licenses/by-nc-sa/4.0/legalcode

6 Data storage and allocated resources

In the following, the long-term storage of the data as well as the data security structure are explained. Issues related to ethics (e.g., security of data) are presented in chapter 7.

6.1 Long-term data preservation

The digital data will be kept stored for as long as possible at the UAB under the responsibility of the principal investigator (PI). During the duration of the project, data is only destroyed if requested by participants. Digital copies of signed consent forms obtained from the participants are kept at the UAB until three years after the end of the project. After that period, they will be destroyed.

Table 4 provides an overview of the life cycle of the collected data and the designated duration of storage to open access.

We uses the UAB repository for internal data storage and ZENODO and the LICCI OpenTEK citizen science platform for open access after embargo periods. Data stored on ZENODO is expected to be archived as long as possible and beyond the end of the LICCI project.

Similarly, the LICCI OpenTEK citizen science platform is expected to run beyond the duration of this project, by handing over the responsibility of maintaining the online platform to a responsible non-commercial third party. For running the LICCI OpenTEK citizen science platform, the project uses the web hosting service of Amazon Web Services (AWS), a cloud computing platform. The data uploaded to the LICCI citizen science platform is stored at the AWS server in Frankfurt (Main)/Germany. For further information on the AWS data policy and data security, see Annex 9.2. Data that is uploaded on ProjectSend and the LICCI webpage is stored on the SiteGround server in Amsterdam/Netherlands.

Table 4: Overview of the life cycle of collected data (We only collect signed FPIC for those researchers who will collect field data under the Review Board of the Universitat Autònoma de Barcelona. For researchers who conduct field work under the Review Board of their home institute, we will only collect the respective proof).*

Method	Foreseeable period(s) of collection	Embargoed	Date for deletion	Permanent storage in Open Access?
Literature review database, keywords and categories	continuously	No	None	Yes (LICCI OpenTEK citizen science platform and ZENODO)
Semi-structured interviews (SSI)	Month 18-36	No	None	Yes (LICCI OpenTEK citizen science platform and ZENODO)
Focus group discussions (FGD)	Month 18-36	No	None	Yes (LICCI OpenTEK citizen science platform and ZENODO)
Online citizen science platform	Month 18-60 (and potentially beyond)	No	None	Yes (LICCI OpenTEK citizen science platform)
Face-to-face surveys	Month 18-36	24 months after cleaning	None	Yes (ZENODO)
Proof of Ethical clearance of home institue / Signed FPIC*	Month 18-36	No	3 years after project ends	No

6.2 Long-term data storage locations

As soon as possible, electronic copies of the research data are transfers to and stored on a secure server at the UAB (during or after the fieldwork). The server of the UAB complies with the relevant EU legislation and is characterized by high security standards and by strong and comprehensive security and protection measures for storage of data. The security is overseen by the UAB security officer who has provided a detailed description of the security measures for this DMP (see Annex 9.3). The server and the data are physically located within the IT campus facilities. In case the LICCI core team or LICCI partners collect data on paper, they will be required to keep it securely on site preferably in a locked file cabinet at her/his home institution.

6.3 Costs for data storage and open access publications

Some costs arise from long-term data storage and open access publications.

1) For running the LICCI citizen science platform, the LICCI project has chosen the AWS ‘Amazon Lightsail’ service. Associated costs amount to 10 $/month or rather 120 $/year which equals 9.07 €/ month or rather 108.89 €/year (date: October, 16, 2019).
2) The annual costs for the LICCI data repository located at the UAB are approximately 100 €.
3) The annual costs for the hosting service of GroundSite are 187.73 €. The GroundSite host service is used for the LICCI webpage and for the data transfer tool ProjectSend.
4) For the publication in gold and green access, we estimate total costs up to €15,000, which are included in the current budget of the project.

7 Ethical aspects

LICCI plans to be working with adults in medium- and low-income countries, who will be asked to provide personal data. Thus, ethical aspects play a crucial role in the LICCI project and will be addressed in this chapter. However, as most issues have been addressed in specific deliverables (especially in the Deliverable 2.1), the chapter on ethical aspects provides an overview and will focus on ethical remarks related to data management.

LICCI will use FPIC to recruit participants. In all cases, participation is strictly voluntary and include the right to withdraw at any moment (see section 7.2).

7.1 Legal framework for the collection of personal data

The DMP has been created by taking into account several recommendations and guidelines and involving institutions regarding the ethical conduct of research and data / privacy protection:

- The research complies with the Directive 95/46/EC of the European Parliament and of the Council of 24 October 1995 on the protection of individuals with regards to the processing of personal data and on the free movement of such data.
- We have consulted the Catalan Data Protection Agency (Catalonian Government), the competent Institutional National Data Protection Authority, which mentioned that from 25th May 2018 the European Code for Data Protection will not require to register files with personal data, for which there is no need to legalize the file beforehand. Nevertheless, once data collection starts, we will register files with personal data at the Catalan Data Protection Authority (APDCAT) in order to allow users to exert their rights ("Ley Orgánica 15/1999, de 13 de Diciembre, de Protección de Datos de Carácter Personal" and EC 45/2001 on the protection of individuals). We have already informed on the need to create this database to the responsible for data protection at UAB (see Annex 9.4). Overall, the research process will follow the European Commission General Data Protection Regulation adopted by the EU in April 2016."
- The ethical issues related to data collection and storage during the lifetime of the research project will be supervised by the Comissió d'Ètica en l'Experimentació Animal i Humana (CEEAH) at UAB (ceeah@uab.cat), – an independent organism appointed by the Council of the UAB, which will supervise the research process. CEEAH members do not have any conflict of interests when making their deliberations – and comply with relevant EU legislations (e.g., the European Charter of Fundamentals Rights). The ethical approval of the Institutional Review Board of the host institution to conduct the research proposed here has already been obtains (for further information see the Deliverable 2.1). If any unforeseen ethical issues arise during the project, the PI will consult with the ethics specialists at the CEEAH-UAB.
- The LICCI project also counts with an ethical advisor, Dr Prof. Dr Michael Schoenhuth, Chair of anthropology / Abt. Soziologie - Fach Ethnologie, University of Trier, who will be supervising ethical aspects of this project and reporting to ERC.

7.2 Procedures for obtaining Free Prior Informed Consent

Before the onset of data collection, each researcher obtains Free, Prior and Informed Consent (FPIC) from the communities where s/he aims to work and from all study participants. Participants' involvement in the LICCI project is strictly voluntary, and all participants have the right to choose not to participate or to withdraw at any moment. A description of the procedure to obtain FPIC is provided in Annex 9.6. Detailed information on FPICs and ethical approvals from the ethical commission of the UAB, both for LICCI core team members and LICCI partners, are available in the Deliverable 2.1.

7.3 Data protection

The LICCI core team and the LICCI partners will treat any information provided by study participants with a high level of consideration, privacy and ethical practice.

In the field, all digitalized data stored on electronic devices is protected by password to ensure that it is accessible only to the researchers. Field data only includes anonymous, thus non-personal, data. None of the openly accessible data from fieldwork will contain any information that would allow the identification of any specific person. Similarly, presentations of intermediate or final findings (e.g., publications or presentations at conferences) will take care to withhold any information which will allow to identify participants in order to protect their anonymity.

No data, other than a count for an anonymous person unwilling to participate, will be kept from persons who do not want to participate in the study. The LICCI core team keeps record of the number of people deciding not to participate to assess whether this type of attribution bias research results.

In order to ensure the safety and confidentiality of the information collected, all electronic data (questionnaires, audio, transcripts) are safely stored in an electronic database only accessible to team members with passwords.

Before archiving video files, we will pixel (digitally obscuring) name badges and faces. Regarding protection issues, the project might apply an error to the GPS data for example to hide the exact position if the community does not wish to expose their exact living position.

7.4 Transfer of non-personal (anonymous) field data

The research within the LICCI project is conducted in approximately 45 field sites in countries that allow data cross-border transfer to the EU under the following circumstances 1) a FPIC has been signed by the person providing the data, 2) collection of only non-sensitive data (i.e. for data other than racial or ethnic origin, political opinion, religious or philosophical belief, trade union membership, health data) and 3) anonymization of data is guaranteed. As all data collected under this project will meet these requirements (the LICCI project collects only collect anonymous field data), the LICCI project do not expect any problem with importing collected field data to Spain. In addition, in most of the cases, the project will be developed in collaboration with national universities and research institutes. If authorizations for data export are required, they will be obtained and send to the ERCEA Ethics Review and Expert Management Unit before data is transferred. No personal data will be exported to or from the EU to countries outside of the EU. Details on current data localization legislation in the countries where field data collection is planned, are provided in the

supplementary materials, Table 5. We also consulted the responsible person for data protection issues at the UAB with regard to cross-border transfer of non-personal data. This person has confirmed that anonymous field data are not subject to legislation which address personal data. Consequently, the respective person does not foreseen any problems with the cross-border transfer of anonymous, hence non-personal, data to the EU.

7.5 Treatment of data provided through the LICCI citizen science platform

The LICCI OpenTEK citizen science platform only collects and archives data given and uploaded by users voluntarily. The LICCI citizen science platform stores only data that is important for the project (e.g., location and date of media files) but does not store any data that is not related to the purpose of the project (e.g., browser fingerprints, device type). The LICCI OpenTEK platform allows both, submission of information by registered users and anonymous submission by non-registered platform users. In the latter case, provided information from anonymous users will be reviewed and edited by a qualified person before being published. Registration to the LICCI OpenTEK citizen science platform is free of any charge and implies the acceptance of the platform’s terms of use and privacy policy, which is designed in line with the FPIC used during fieldwork (see Annex 9.6). For the registration, the provision of a valid email address and a public name is sufficient but mandatory. The provision of any other information is voluntary. Only the provided public name, the profile picture and the user's description will be open to the public and visible for other users.

8 References

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9 Annex

9.1 Terms of use and privacy policy of the LICCI citizen science platform

9.1.1 Terms of use

Registration in OpenTEK implies the express free informed consent of the user or its carer/guardian to participate and transfer their personal data and traditional knowledge to the platform under the following conditions:

- All information in the platform will be anonymized and only used for research and advocacy purposes, without it being transferred to third parties.
- All users have the right to withdraw from the project and delete their profile at any time they wish.
- The personal profile data voluntarily provided by the user will be treated confidentially and only used for research purposes, without it being public.
- The traditional ecological knowledge voluntarily provided by the user will be shared under the privacy and license options the user selects
- Users agree that the data which they provide will be transferred to and stored within the borders of the EU.
- All users have the right to present claims to the Catalan Data Protection Authority and to reach out to the UAB data protection service (proteccio.dades@uab.cat). For more information about your rights as a research subject, you can also contact the Ethics Commission of the Autonomous University of Barcelona at ceeah@uab.cat

9.1.2 Privacy Policy

OpenTEK only collects data the user is freely and willingly providing. We do not use cookies nor do we include any 3rd party cookies. We only store the data that you directly provide in your public user profile or in the entries you create or contribute to.

9.2 Data policy and data security of the AWS

In the following, a summary of the most relevant aspects of the data policy and data security measures applied by AWS[16], a subsidiary of Amazon, are listed (AWS, 2018):

- AWS complies with ISO 27018, a code of practice that focuses on protection of personal data in the cloud. It is based on ISO information security standard 27002 and provides implementation guidance about ISO 27002 controls that is applicable to personally identifiable information (PII) processed by public cloud service providers.
- The customer maintains ownership of the content, and selects which AWS services can process, store, and host the content. AWS do not access or use the content for any purpose without the consent of the customer. AWS never use customer content or derive information from it for marketing or advertising.
- The customer controls the content: The costumer determines where the content will be stored, including the type of storage and geographic region of that storage. The consumer chooses the secured state of the content. AWS offer customers strong encryption for the content in transit and at rest, and AWS provide the costumer with the option to manage the own encryption keys. The customer manages access to the content, and access to AWS services and resources through users, groups, permissions, and credentials that the customer controls.
- The AWS customer chooses how the content is secured. AWS offer strong encryption for the content in transit and at rest, and AWS provide the customer with the option to manage her/his own encryption keys. These features include:
    - Data encryption capabilities available in AWS storage and database services, such as Amazon Elastic Block Store, Amazon Simple Storage Service, Amazon Relational Database Service, and Amazon Redshift.
    - Flexible key management options, including AWS Key Management Service (KMS), allow customers to choose whether to have AWS manage the encryption keys or enable customers to keep complete control over their keys.
    - AWS customers can employ Server-Side Encryption (SSE) with Amazon S3-Managed Keys (SSE-S3), SSE with AWS KMS-Managed Keys (SSE-KMS), or SSE with Customer-Provided Encryption Keys (SSE-C).
- The IT infrastructure that AWS provides to its customers is designed and managed in alignment with security best practices and a variety of IT security standards, including: SOC, 1/SSAE 16/ISAE 3402 (formerly SAS70), SOC2, SOC3, FISMA, DIACAP, and FedRAMP, DOD CSM Levels1-5, PCI DSS Level1, ISO 9001 / ISO27001, ITAR, FIPS140-2, MTCS Level3[17]

[16] See https://aws.amazon.com/compliance/data-privacy-faq/ (consulted online on 04/10/2019)

[17] See https://aws.amazon.com/compliance/programs/ (consulted online on 09/10/2019)

9.3 Security measures of the UAB NEBULA server

Security and protection of the Data Centre and Informatic Services at the UAB protecting the NEBULA system:

The principal security and protection measures of the Nebula system, a document repository intended for collaborative management, are as follows:

- From the perspective of informatics and communication, and generally for the whole of the data-centre systems:
    - Perimeter network security: new generation perimeter firewall, IDS (intrusion detection system) and antivirus.
    - Logical segmentation of the internal corporate communications network.
    - Zone segmentation and definition of demilitarized zones (DMZ) for the different types of data-centre servers, via internal firewalls.
    - Logical rules, implemented on the internal firewall, access to network resources and applications.
    - Identity Management System to manage user-authentication and access permissions to applications and platforms.
    - Workstations with anti-virus and anti-malware (anti-malware programs), and personal firewalls managed from a centralized console.
    - Normative policies to regulate access to and use of computer resources.
    - Policies for the management of data backup and recovery, and custody of the physical media of the copies.
- Specifically, for the Nebula platform:
    - Segmentation of zones between the public part of the system (frontend segment) and the private part (backend segment).
    - Access to the system by user and password through a web application (located in the frontend segment). Authentication of university users is based on an identity-management system. External users invited to access the platform can register by creating a password that remains encrypted within the system.
    - Data distributed in an Oracle database and Network File System:
        - NFS access is facilitated by a disk system device not accessible at the operating-system level.
        - Nebula is a service based on the Alfresco content management product. The metadata of the files are stored in a database and on the NFS repository the files are stored without any structure that refers to any user or group and under a name different from the original. In this way, the NFS directory structure does not facilitate the file identification of any specific user or group.
        - The NFS database and repository are located on a private subnet of the Firewall (backend segment) only accessible from authorized servers on the subnet of the frontend segment to which the users are connected. Access from other network segments or from other servers is not allowed.
        - In addition, to facilitate interaction, users can access their repository using DFS/CIFS file-system services after user authentication and password acceptance.

9.4 Certificate by the UAB for application to APDCAT

UAB
Universitat Autònoma de Barcelona

Responsable de Protecció de Dades
Edifici A · Campus de la UAB
08193 Bellaterra (Cerdanyola del Vallès) · Barcelona · Spain

Agustí Verde Parera, Data Protector Officer in Universitat Autònoma de Barcelona,

HEREBY CERTIFIES:

Than an application for the legalization of the data file to the APDCAT (the Catalan Authority for Data Protection) has been submitted by Victoria Reyes Garcia on behalf of the project behalf of the project "Local Indicators of Climate Change Impacts. The Contribution of Local Knowledge to Climate Change Research" (ERC-2017-CoG - 771056 LICCI). According to the application and material submitted, the procedures and organization of data-collection, protection, transfer, storage, retention and destruction comply with the regulations of the Spanish data protection law.

Therefore, proceedings have been initiated to legalize the database and its registration in the Catalan Data Protection Registry, according to the Law 15 of 1999 (Spanish Data Protection) and the Law 32 of 2010 (Catalan Data Protection Authority).

Signature, Bellaterra (Cerdanyola del Vallès), on December 5, 2017

UAB
Universitat Autònoma de Barcelona

9.5 General considerations on coding

Here are some general rules on coding:

- The codes already assigned should not be changed. In general, for both common and country-specific codes, new items and codes will be added as the needs arise.
- All common codes are compiled in the Excel document “Master Compilation of LICCI Codes”, which is always stored an updated in a shared folder in the cloud.
- Once in the field, the researcher can only assign codes to persons in their community, or to new country-specific products or items that arise during the fieldwork.
- The coding procedure for all country-specific variables (e.g., villages) is that the code always starts with the first digit being the country code, so information can later be clumped into one with additional coding if wanted/needed.
- Everything lacking a code should be sent to the team at UAB, which will assign a new code and incorporate these into the code lists and the database.

The following codes will be consistently applied in all study sites and by all persons participating in the LICCI project:

- Yes/No/Don’t know: Several questions are 1-0 questions, where 1 = yes and 0 = no, and -9 = don’t know/don’t remember
- 0 and missing values: Some questions may not apply or the respondent simply cannot answer. The following codes are used for that:
    - 0: the person answers and the value of the answer is 0 (e.g., the value of products sold is 0 because s/he sold nothing).
    - -8: When the question does not apply (e.g., to ask a man if he is pregnant) you must not put zero; instead you record -8 (minus 8) to indicate that the question “does not apply” to the circumstances of the respondent(s).
    - -9: If the person does not know or remember the answer to the question (but you asked the question), then you record -9 (minus 9) to indicate that the respondent (or the researcher) “does not know”. Naturally, one should aim to minimize the use of this response, but in some cases it is unavoidable.
    - -10: If a response on the data sheet needs a code, but does not yet have one, record -10 (minus 10), and the name of the item to be coded in the column “notes” (this will make it easier for the cleaning phase). Later, the -10 will be replaced by the new code for that response/item. If a value is missing (the person is away and you could not ask the question, or you forgot to ask it), then you should leave the cell blank. Missing values must be replaced with real values, so if you forgot to ask a question, return as soon as possible to collect the missing data, or if the person was away, collect the data upon his or her return.
    - -11: this code is to be assigned if the person clearly knows (or has) an answer to the question posed, but refuses to share the information, for whatever reason (e.g., because it is too sensitive, a secret, a cultural taboo, etc.)
    - Every data sheet must have a notes section where the researcher can record non-coded items and explanations for any entry that differs from the format.
- Dates: All years are written with 4 digits, i.e., yyyy. All dates should always be written in the date-month-year format, i.e.: ddmmyyyy
- Age: For adults (we consider persons of 16 years and older as adults although the age of majority is country-specific): If the respondent does not know his or her age, write down the age range in which they belong. To write a range, you must add 900 to the estimated age. Write the lowest number in a range of 5 years. For example, if you believe that the person is between 40 and 45, put 940. For children (younger than 16 years):

Estimate the age in years, not as a range. For example, if the interviewer believes that the child is 3 years old, put 903 (not the range, which would be 900).

9.6 Procedures for obtaining Free Prior Informed Consent

Before the onset of data collection, we will obtain Free, Prior and Informed Consent (FPIC) from the communities where we aim to work. To do so, the LICCI team will use different documents and methods: information sheets, informed consent forms (representatives and individuals), oral consent scripts and oral consent cards. Depending on where the study sites will be located, we will additionally comply with national guidelines and protocols.

Following best practices in the field (see Alaei et al. 2013), at least one week before the start of data collection, we will conduct an initial meeting in which we will explain the study aims and methods to local leaders and encourage them to talk to potential participants about the research process in their own terms. At this point we will obtain their written consent to conduct a village meeting. Explaining the project to village leaders some time before data collection starts gives prospective participants enough time to consider potential issues related to the research, so they can freely discuss doubts with local authorities, family, neighbours, and friends. Then, we will conduct a community meeting in which we will present detailed information on the objectives of the study, the participation of subjects, and the costs and benefits associated with their participation. Researchers will be encouraged to work out with the communities and the relevant indigenous organizations to produce 'Community/Indigenous Engagement Protocols' or other forms of agreements. Those agreements will contain detailed explanations of the project's objectives of collaborations, expectations, and return of information. They will also include detailed information about the rules of conduct researchers should follow while in the field. The agreement will also detail issues related to payments to the local translators and guides. During this meeting, participants will be encouraged to discuss issues or questions related to the project such as confidentiality, data protection, risks, and the like. During the meeting, we will also explain the differences between written and oral consents.

Then, we will visit each household individually and ask adults for consent to participate in the research. We will provide written information and a consent form to subjects who are literate but give the possibility to give oral consent to participants who are illiterate or not sufficiently at ease with printed material.

In previous research of Dr Victoria Reyes-García, she has found that among illiterate people it is better to explain the project orally than through print. Part of the target populations will have had little schooling and very little exposure to Western customs that involve mastery of concepts such as agreements, legal contracts, or 'informed consent'. Consequently, many will not understand the implications of signing a form and might feel 'non-trusted'. In contrast, they are comfortable providing informed consent verbally. Anthropologists (and professionals from other disciplines working with illiterate populations) have developed a set of standard procedures for obtaining 'Oral informed consent' (see for example the guidelines of the American Association of Anthropologists[18], the IRB for SBS of the University of Virginia[19] and published articles on the topic, e.g., Alaei et al. 2013).

To obtain oral informed consent from participants who are not at ease signing the standard 'Informed Consent form (Individuals)' developed for this project, we will follow a two-step process. First, researchers collecting information under the framework of this project will present sufficient information to participants. To do so, researchers, with the assistance of a trained interpreter will present the relevant information orally to the participant. The relevant information to be presented include the 'Oral consent Script', where the general goal of the project and the information to be collected are described, and the 'Oral Consent Card'. 'Oral Consent Cards', typically used in anthropological studies, provide consent information in a bulleted list so that the researcher can refer to each point as s/he obtains consent from the participant[20]. The investigator, with the assistance of the interpreter, will then answer any questions from the prospective subject (including questions raised by the reading of the Card, or in previous discussions with village

[18] See: http://www.americananthro.org/ParticipateAndAdvocate/Content.aspx?ItemNumber=1652

[19] See: http://www.virginia.edu/vpr/irb/sbs/forms_consent.html

fellows). In the second step, the documentation of the consent will be done in the presence of a witness. In general, the interpreter (who will be fluent in the language of the oral presentation) will act as a witness to the oral presentation and sign the copy of the 'Informed Consent form (Individuals)', together with the researcher obtaining consent.

The signed consent forms obtained from the participants will be kept by the PI until three years after the end of the project.

Before any user of the LICCI citizen science platform can provide information, we will ask them for a FPIC, that follows the above described procedure but is adapted to the different circumstances and conditions of an online platform.

[20] See: http://www.virginia.edu/vpr/irb/sbs/forms_consent.html

9.7 National data protection laws and regulations

9.7.1 Countries' national laws and regulations on data protection and transfer

Table 5: Selected countries for field studies and their national laws and regulations for data protection. If not otherwise declared, this table summarizes information from the following sources: UNCTAD1, DLA Piper2 and Cory 2017.

Country of field site and national data protection authority	Data localization / Restrictions on cross-border transfer of non-personal data to a EU country
Algeria	**No data blocked** Legislation: Loi n° 09-03 du au 25 février 2009, modifiée et complétée relative à la protection du consommateur et à la répression des fraudes (In French) No cross-border transfer restrictions for non-personal data to the EU.
Argentina Pursuant to Decree 746 of 2017, it is the Agency for Access to Public Information (Agencia de Acceso a la Información Pública). Av. España 2591, 3°, Ciudad Autónoma de Buenos Aires, C1107AMF Email: infoleg@jus.gob.ar; datospersonales@aaip.gob.ar Website: https://www.argentina.gob.ar/normativa/consulta-particular	**1-2 types of data blocked: Personal data** Legislation: Argentina's Personal Data Protection Law 25,326 / Ley 25.326 de Protección de los Datos Personales (in Spanish) No cross-border transfer restrictions for non-personal data to the EU. Restrictions only for personal data: "Argentina's Data Protection Act prohibits the transfer of personal data to countries that do not have an adequate level of protection in place, but so far Argentina's government has not determined which countries fall within this category. However, the Act states that the prohibition is not applicable when the data subject has given express consent to the data transfer." (Cory 2017, p. 20) In addition, Argentina's National Directorate for Personal Data Protection issued Provision no. 18/2015, which

	stated that cloud storage is considered an international transfer of data, so that software application that send data abroad must comply with the Data Protection Act. The cross-border transfer of personal data is prohibited to countries or international or supranational organization which do not provide adequate protection to such data, unless: • The data subjects expressly consents to that transfer • The transfer is necessary for international judicial cooperation • The transfer takes place as part of certain exchanges of medical data • Bank or stock exchange transfers, in the context banking or stock exchange transactions • The transfer takes place as provided in the context of international treaties to which Argentina is a party • The transfer has as its purpose the international cooperation between intelligence agencies engaged in combating organized crime, terrorism and drug traffic
Austria (EU) **Österreichische Datenschutzbehörde** Barichgasse 40-42 1030 Wien Tel. +43 1 52152 2550 Email: dsb@dsb.gv.at Website: http://www.dsb.gv.at/	**No data blocked** Legislations: The General Data Protection Regulation (Regulation (EU) 2016/679) (GDPR), Regulation (EU) 2018/1807 No cross-border transfer restrictions for non-personal data to the EU. Free movement of non-personal data within the EU
Bolivia, Plurinational State of The Personal Data Authority, is the Agency of the electronic government and information technologies and communication (AGETIC). Email: contacto@agetic.gob.bo	**No data blocked** Legislation: Bill of Personal Data Protection and Ley general de Telecomunicaciones, Tecnologías de Información y Comunicación – Ley 167 de 08 agosto de 2011 (in Spanish) No cross-border transfer restrictions for non-personal data to the EU. Nothing in the Bill of Personal Data Protection is established concerning transfer.

Website: https://www.agetic.gob.bo/#/	
Brazil The LGPD (as amended) established the National Data Protection Authority (ANPD)	**1-2 types of data blocked: Governmental and public data blocked** Legislation: Brazilian General Data Protection Law (LGPD), Federal Law no. 13,709/2018, Protection of Personal Data Bill 2011 (in Portuguese) Brazil's new Data Protection Regulation (LGPD), which come into force in August 2020, follows a model relatively similar to the GDPR (World Economic Forum 2019). No cross-border transfer restrictions for non-personal data to the EU. In September 2013, Brazil began considering a policy that would have forced Internet-based companies, such as Google and Facebook, to store data relating to Brazilians in local data centers. It withdrew this provision from the final copy of the bill. Furthermore, in 2016, Brazilian government agencies, including the Secretary of Information Technology of the Ministry of Planning, Development, and Management, have included forced data localization as a requirement for public procurement contracts involving cloud-computing services. The transfer of personal data to other jurisdictions is allowed only subject to compliance with the requirements of the LGPD. Also, prior consent is needed for such transfer, with only few exceptions.
Cameroon	**No data blocked** Legislation: No data protection legislation No cross-border transfer restrictions for non-personal data to the EU.
Canada Office of the Privacy Commissioner of Canada ('PIPEDA'): Office of the Privacy Commissioner of Canada	**1-2 types of data blocked: Governmental and public data blocked** Legislation: Personal Information Protection and Electronic Documents Act (PIPEDA) Personal Information Protection Act ('PIPA Alberta') Personal Information Protection Act ('PIPA BC')

30, Victoria Street, Gatineau, Quebec, K1A 1H3 Online form: https://services.priv.gc.ca/q-s/allez-go/eng/8b62761b-7100-4016-886c-0279a78670d6 Website: https://www.priv.gc.ca/en/contact-the-opc/	No cross-border transfer restrictions for non-personal data to the EU. "While Canada's national law, the Personal Information Protection and Electronic Documents Act (PIPEDA), 14 does not prohibit the transfer of personal data outside of Canada, cross-border data flow faces provincial prohibitions. Two Canadian provinces, British Columbia and Nova Scotia, have enacted laws requiring that personal information held by public institutions—schools, universities, hospitals, government-owned utilities, and public agencies—to be stored and accessed only in Canada unless one of a few limited exceptions applies." (Chander 2014, p. 9)
Chile In Chile, there does not exist an authority dedicated to overseeing matters related to data protection with regard to processing activities performed by private persons or entitities	**No data blocked** Legislation: Personal Data Protection is regulated in different laws. e.g., Law 19.628 of 1999 (in Spanish) No cross-border transfer restrictions for non-personal data to the EU.
China There is no single PRC regulatory authority which deals exclusively with data protection / privacy matters. The Cyberspace Administration of China (CAC) is currently generally considered the primary data protection authority in the PRC, although various other legislative and administrative authorities have claimed jurisdiction over data protection matters.	**3+ types of data blocked: Personal data, financial data, data referring to emerging digital services, and other** Legislation: PRC Cybersecurity Law, 2017 No cross-border transfer restrictions for non-personal data to the EU. Data localization only for personal, business and financial data: Since 2017, the Cybersecurity Law requires "critical information infrastructure operators [...], including telecommunications, information services and fincance, to store certain personal and business infromation in China"[21]. China has one of the widest sets of data-localization policies, which stops the flow of data between China and the rest of the world. This includes : • personal financial information (incl. credit information)

	• health and medical information • information on online publishing • user's personal information and important business data • telecommunication data • data from insurance industry • any outbound data transfer if it brings risks to the security of the national political system, economy, science and technology or national defense Where the sharing, disclosure or transfer of the personal information is to a third party outside of the PRC, additional rules will apply. Data localization is an increasing trend in the PRC, with various draft measures as well as sector-specific regulations prohibiting the transfer of certain personal information outside the borders of the PRC. Although to what extent these rules apply remains unclear and further clarification from the regulators is expected, there has been more guidance publish.
China (continued)	For example, establish data transfer agreements with all offshore data recipients; submit annual report to the CAC on the status of cross border transfers and the performance of data transfer agreements; maintain a log of all cross border transfers of personal information for at least give years. In addition to the above requirements, additional restrictions apply to transfers of certain types of information outside of the PRC, for example (this is not a comprehensive list): • certain categories of regulated (personal and non-personal) data are not permitted to leave the PRC at all, such as state secrets; • the People's Bank of China (PBOC) requires all onshore banks to store, handle and analyse personal financial information collected in China, and not transfer abroad such data unless otherwise permitted by law or approved by the PBOC; • all medical, health care, and family planning service entities are required to store population and health

	information on onshore servers; and • data relating to human genetic resources cannot be transferred abroad without the approval of the Ministry of Science and Technology.
Congo, The Demogratic Republic of	**No data blocked** Legislation: No data protection legislation No cross-border transfer restrictions for non-personal data to the EU.
Fiji	**No data blocked** Legislation: No data protection legislation No cross-border transfer restrictions for non-personal data to the EU.
Ghana Data Protection Commission ('Commission') Pawpaw Street, East Legon P.O. Box CT7195 Accra, Ghana Email: info@dataprotection.org.gh	**No data blocked** Legislation: Data Protection Act (Act No. 843) 2012 - DPA (in English) No cross-border transfer restrictions for non-personal data to the EU.
Greenland (Denmark/EU) Datatilsynet (’DPA’) Borgergade 28, 5 DK 1300 København K	**1-2 types of blocked data: Personal and financial data** Legislations: The General Data Protection Regulation (Regulation (EU) 2016/679) (GDPR), Regulation (EU) 2018/1807, Act on Processing of Personal Data (in English) No cross-border transfer restrictions for non-personal data to the EU. Free movement of non-personal data within the EU

Guatemala	**No data blocked** Legislation: No data protection legislation No cross-border transfer restrictions for non-personal data to the EU.
Haiti	**No data blocked** Legislation: No data protection legislation No cross-border transfer restrictions for non-personal data to the EU.
Hungary (EU)	**No data blocked** Legislations: The General Data Protection Regulation (Regulation (EU) 2016/679) (GDPR), Regulation (EU) 2018/1807 No cross-border transfer restrictions for non-personal data to the EU. Free movement of non-personal data within the EU
India No such authority exists.	**1-2 types of blocked data: Governmental, public and financial data** Legislation: Bill - Personal Data Protection, 2019, Information Technology Act 2000 (in English) No cross-border transfer restrictions for non-personal data to the EU. Since 2018, all payment related data must be stored in India. In 2020, the Personal Data Protection (PDPA) Act will come into force[21]. The Information Technology Rules prohibit the transfer of "sensitive personal data or information" abroad unless the data subject consented to the transfer or the transfer is "necessary."[20]

[21] https://www.deltapartnersgroup.com/data-localisation-information-protection-balkanisation-internet

Iran, Islamic Republic of There is no national data protection authority in Iran. There is no requirement to appoint a data protection officer.	**1-2 types of blocked data: Data referring to emerging digital services** Legislation: Iran has not enacted comprehensive data protection legislation. However, several laws and regulations incorporate data protection provisions, e.g., Law on Electronic Commerce (in English) No cross-border transfer restrictions for non-personal data to the EU. Since December 2013, consumer and government data must be stored locally[19]. In May 2016, Iran ordered foreign messaging apps, such as WhatsApp and Telegram, to store data from Iranian users locally. The Charter of Citizen's Rights prohibits personal data transfers without express data subject consent. Under the ECL, third party and extraterritorial data transfers are subject to: • data subject consent • assurance that adequate security levels are in place to protect personal data in accordance with data subject rights and freedoms
Kenya	**No data blocked** Legislation: The Data Protection Act, 2019 No cross-border transfer restrictions for non-personal data to the EU. The transfer of personal data outside Kenya is highly regulated under the Act. Prior to any transfer the data controller or data processor must provide proof to the DPC on the appropriate safeguards with respect to the security and protection of the personal data including jurisdictions with similar data protection laws. The consent of the data subject is required for the transfer of sensitive personal data out of Kenya.
Madagascar The Data Protection Law provides for the	**No data blocked** Legislation: Law No. 2014-038 relating to protection of personal data is the main regulatory framework in

creation of the C*ommission Malagasy sur l'Informatique et des Libertés* ('CMIL').
However, the CMIL has not yet been established.
	Madagascar
	No cross-border transfer restrictions for non-personal data to the EU.
	The transfer of a data subject's personal data to a third party country is allowed only if the country guarantees to individuals a sufficient level of protection in terms of privacy and fundamental rights and liberties.
	The sufficiency of the protection is assessed by considering all the circumstances surrounding the transfer, in particular the nature of the data, the purpose and the duration of the proposed processing, country of origin and country of final destination, rules of law, both general and sectorial in force in the country in question and any relevant codes of conduct or other rules and security measures which are complied with in that country.
	Data controllers may transfer personal data to a third country that is not deemed to offer adequate protection only if:
	• the data subject consents and duly informed of the absence of adequate protection
	• the transfer is necessary:
	  • for the performance of a contract between the data controller and the individual, or pre-contractual measures undertaken at the individual's request
	  • for the conclusion or the performance of a contract in the interest of the individual, between the data controller and a third party
	  • for the protection of the public interest
	  • for consultation of a public register intended for the public's information
	  • to comply with obligations allowing the acknowledgment, the exercise or the defence of a legal right.
	In all cases, the data recipient in the third party country cannot transfer personal data to another country, except with the authorisation of the first data controller and the CMIL .

Northern Mariana Islands (USA)	**1-2 types of blocked data: Governmental, public and financial data** Legislation: Privacy Act of 1974 (in English), Federal Trade Commission Act 15 The US has several sector-specific and medium-specific national privacy or data security laws, including laws and regulations that apply to financial institutions, telecommunications companies, personal health information, credit report information, children's information, telemarketing and direct marketing. No cross-border transfer restrictions for non-personal data to the EU.
Mexico	**No data blocked** Legislation: Federal Law on the Protection of Personal Data held by Private Parties (*Ley Federal de Protección de Datos Personales en Posesión de los Particulares*), 2010 No cross-border transfer restrictions for non-personal data to the EU.
Mongolia	**No data blocked** Legislation: No data protection legislation No cross-border transfer restrictions for non-personal data to the EU.
Nepal	**No data blocked** Legislation: Right to Information Act, 2064 (2007) (in English) No cross-border transfer restrictions for non-personal data to the EU.
Niger	**No data blocked** Legislation: Loi n°2017-28 du 03 Mai 2017 relative à la protection des données à caractère personnel, révisé en

	2019 (In French) No cross-border transfer restrictions for non-personal data to the EU.
Nigeria There is no specific authority bestowed with the responsibility of the protection of data, however sector specific regulatory agencies including NITDA and NCC provide services relating to the protection of data.	**1-2 types of blocked data: Personal and financial data** Legislation: Nigeria has not enacted comprehensive data privacy and protection legislation. However, various pending and enacted sector-specific laws contain privacy and data protection provisions. Data Protection Bill 2011: "Guidelines for Nigerian Content Development in Information and Communications Technology (ICT)," No cross-border transfer restrictions for non-personal data to the EU. Data localization only for government data: Nigeria National Information Technology Development Agency's Guidelines for Nigerian Content Development in Information and Communications Technology require ICT companies to host all consumer and government data locally within the country[22]. • several restrictions on cross-border data flows and mandated that all subscriber, government, and consumer data be stored locally Nigeria's Central Bank: • all point-of-sale and ATM transactions to be processed locally
Paraguay	**No data blocked** Legislation: Several laws and regulations incorporate data protection provisions. Ley 1682/2001 Reglamenta la Informacion de Caracter Privado (in Spanish) No cross-border transfer restrictions for non-personal data to the EU.

[22] http://law.emory.edu/elj/content/volume-64/issue-3/articles/data-nationalism.html#section-42a569788a760913c2201c109f2fa7e8

Peru	**No data blocked** Legislation: Personal Data Protection Law N° 29733 (PDPL), 2011/ Ley N° 29733 - Ley de Protección de Datos Personales (in Spanish) No cross-border transfer restrictions for non-personal data to the EU.
Romania (EU)	**1-2 types of data blocked: Data referring to emerging digital services** Legislations: The General Data Protection Regulation (Regulation (EU) 2016/679) (GDPR), Regulation (EU) 2018/1807 No cross-border transfer restrictions for non-personal data to the EU. Free movement of non-personal data within the EU
Russia (incl. Siberia) Federal Service for Supervision of Communications, Information Technologies and Mass Media or, in short, *Roscomnadzor* (‘Agency’) Build. 2, 7, Kitaigorodskiy proezd Moscow, 109074 http://www.rsoc.ru/	**1-2 types of data blocked: Personal data and data referring to telecommunication** Legislation: Federal Law No. 242-FZ, 2014, Federal Law Regarding Personal Data 2006 (in English) No cross-border transfer restrictions for non-personal data to the EU. Data localization only for personal data: Since September 2015, the Federal Law No. 242 prohibits the storing of Russians’ personal data outside of the Russian Federation. Thus, "any personal data must be stored in Russia." [19, 20, 23] • mandates that data operators who collect personal data about Russian citizens must “record, systematize, accumulate, store, amend, update and retrieve” data using databases physically located in Russia. This personal data may be transferred out, but only after it is first stored in Russia. *(Russia has threatened to shut down and fine websites, such as LinkedIn, that refuse to store data locally.)* • telecommunication data: requires companies to store the actual content of users’ communications for six

[23] https://www.jurist.org/commentary/2017/01/Courtney-Bowman-data-localization/

	months, such as voice data, text messages, pictures, sounds, and video, not just the metadata (the who, when, and how long of communications).
Senegal	**No data blocked** Legislation: No data protection legislation No cross-border transfer restrictions for non-personal data to the EU.
Solomon Islands	**No data blocked** Legislation: Loi n° 2008-12 du 25 janvier 2008 sur la protection des données à caractère personnel (in French) No cross-border transfer restrictions for non-personal data to the EU.
Tanzania	**No data blocked** Legislation: Organic Law 15/1999 on Personal Data Protection (in English, unofficial translation) No cross-border transfer restrictions for non-personal data to the EU.
Ucrania	**No data blocked** Legislation: Law of Ukraine No. 2297 VI 'On Personal Data Protection', 2010 No cross-border transfer restrictions for non-personal data to the EU.
Zimbabwe	**No data blocked** Legislation: The protection of privacy is a principal enshrined in Zimbabwe's Constitution. While there is no designated national legislation dealing with data protection yet, there are existing laws that have a bearing on the right to privacy and protection of personal information for specified types of data, or in relation to specific activities. Draft Data Protection Bill 2016 (in English) No cross-border transfer restrictions for non-personal data to the EU.