



AylluDamos

Citizen-centered innovation for
climate-proofing urban infrastructure

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This project is part of the International Climate Initiative (IKI). The German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU) supports the initiative based on a decision of the German Bundestag.

01

AylluDamos

AylluDamos in a Nutshell

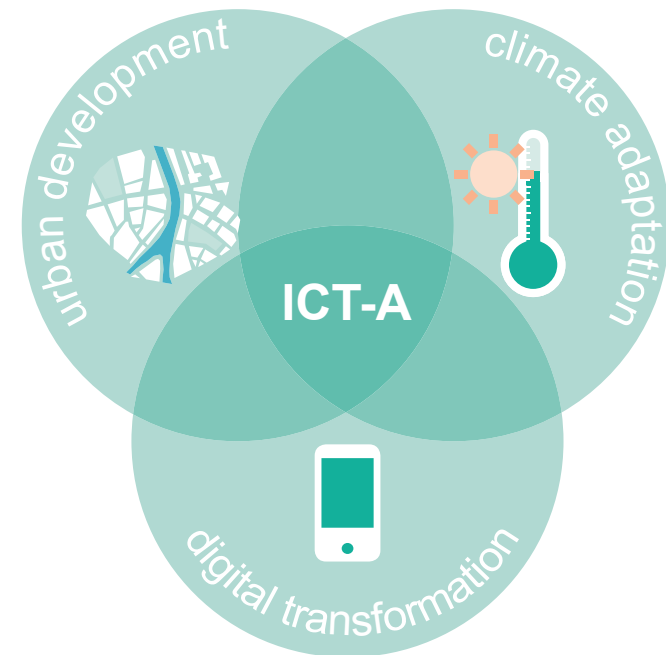
AylluDamos is a digital solution that helps citizens locate their family members and friends in cases of urban flooding. While doing so, it collects necessary flood data in real time, saving about 3 months of work to the municipal administration and contributing to climate-proofing the local infrastructure in the long term.

„Ayllu“ is Quechua and was the smallest part of the Inca society, meaning the family. AylluDamos in Spanish sounds like „ayudamos“, “we help”.

The digital solution AylluDamos has three components: (1) a meteorological station with seven sensors as a main component of the early warning system, (2) a mobile app where citizens can locate their family

and friends as well as report incidents to the municipality, and (3) a dashboard for municipality officials. A corresponding transfer package includes source codes and database, as well as a data privacy training, tutorial, manual, motivational videos, comic and two business models.

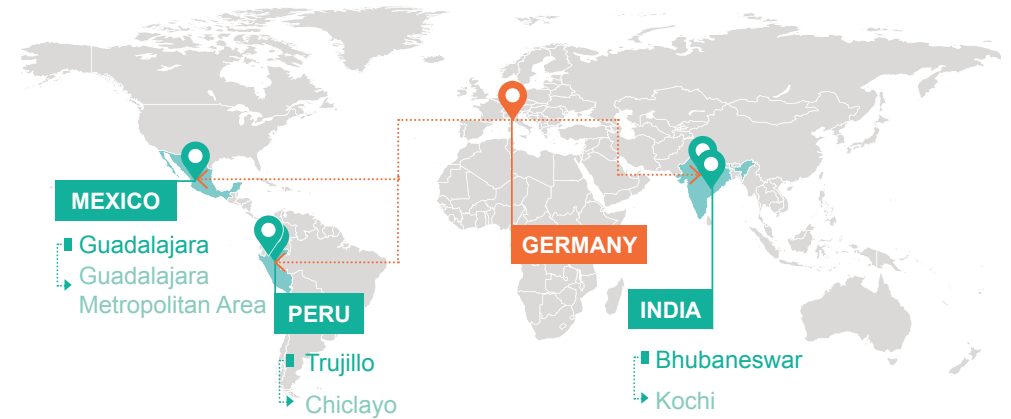
Co-created, tested and implemented in the city of Trujillo in Peru, AylluDamos aims to facilitate data exchange between citizens and the municipal administration in the event of urban flooding. Users can depict the level of flooding at their current location, facilitating the precise communication on water level and personal safety to family and friends. Simultaneously, the municipality can climate-proof urban infrastructure and services based on user-generated data, which complements data from satellite pictures and remote sensing.



The provided data is subsequently visualized and displayed in a dashboard at the monitoring center in the municipality. AylluDamos has been upscaled and adapted to the city of Chiclayo in Peru and the city of Kochi in India. With its approach

and areas of intervention, AylluDamos lies at the intersection of three established global trends:

- Climate Change Adaptation
- Urbanisation
- Digital Transformation



»Using AylluDamos, citizens can locate each other while providing data to make their city more climate resilient.«

AylluDamos as part of the Global Program “ICT-based Adaptation to Climate Change in Cities”

AylluDamos was conceived in the framework of activities of the Global Program “ICT-based Adaptation to Climate Change in Cities (ICT-A)”. The program’s goal is to co-create, test, implement and upscale digital solutions to support selected cities in India, Peru and Mexico in becoming more resilient to climate change. Following the program’s strategic

principles (see page 10-11) the digital solutions contribute to achieving Climate Digital Cities. ICT-A is implemented by the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH on behalf of the German Federal Ministry for Environment, Nature Conservation and Nuclear Safety (BMU) as part of their International Climate Initiative (IKI), in cooperation with the German Federal Ministry for the Interior, Building and Community (BMI).

The Climate Digital Cities Hub

The Climate Digital Cities Hub is an online platform designed to showcase digital solutions that tackle climate change in cities. Here, further information and downloads about AylluDamos and other digital solutions can be found:

www.climate-digital-cities.com

02

AylluDamos & SDGs

AylluDamos contributes to the following Sustainable Development Goals (SDG):



AylluDamos & Peru's NDC

With an urbanization of 79% and that more than two thirds of national emergencies are related to hydro-meteorological shifts, there is a clear aim towards promoting the concept of “Resilient Cities¹”, as the foundation for improved climate risk management.

Disaster risk management is a cross-cutting topic for Peru's NDCs in adaptation and mitigation, and therefore a main target of the ICT-A programme as well:

- **Goal 1** – Increasing the number of prioritized districts, due to hydro-meteorological and climate events, that are monitored.
- **Goal 2** – Increase the number of people with education and knowledge in disaster risk management and adaptation to climate change.

While not referring to the specific outlined goal, the project further contributes to the general Crosscutting area Point 2: Resilient Public Infrastructure.

AylluDamos contributes to the NDC's call for multi-level governance by offering an adaptive solution at the city level, with the option of upscaling it to further municipalities. Moreover, it helps to fulfil the identified needs of capacity building, knowledge exchange and innovation in the context of adaptation measures in the section “Capacity Building, Transfer of Technology and Finance for Adaptation”. More specifically, the digital solution directly supports the identified need of “methods and tools to assess climate impacts, vulnerability and adaptation in specific sectors and regions”.

Additionally, it supports the implementation in the area of adaptation to climate change:

- Framework Law on Climate Change
- National Climate Change Strategy
- In both, the Peruvian Government remarks that gender, age, ethnicity and culture limit adaptive capacity against risks and actions to contribute to efforts to reduce green house gas emissions.

AylluDamos also contributes to the National System for Digital Transformation and to the Digital Government Strategy of Peru:

- Pillar “State close to the Citizens”: Citizen participation, digital public services
- Pillar “Transparent State”: Open data
- Pillar “Safe State”: Digital rights of citizens

¹ <https://www.ndcs.undp.org/content/dam/LECB/docs/factsheets/Peru.pdf>

03

Strategic Principles for » Climate Digital Cities «



Created by
Adnen Kadri
from the
Noun Project

FOSTER CITIZEN ENGAGEMENT

- Carrying out the program for and with citizens;
- Supporting participation of vulnerable groups;
- Allowing a wider range of experiences and knowledge to jointly find solutions to harness collective wisdom.



Created by
Creative Mania
from the
Noun Project

TACKLE LOCAL CLIMATE CHALLENGES

- Focusing on challenges identified by the citizens and that have been shown in climate scenarios, vulnerability assessments, etc.;
- Collecting and collating data and information to develop measures for climate adaptation;
- Providing inputs to guide resilience in urban infrastructure.



Created by
Martin Vanco
from the
Noun Project

CONTRIBUTE TO THE CITY'S PLANNING PROCESS

- Aligning activities to current urban planning processes;
- Identifying missing data needed to increase urban resilience;
- Anchoring collected data to current open data efforts and existing information systems.



Created by
Yu Luck from the
Noun Project

PROMOTE LOCAL CO-CREATION

- Drawing upon local innovation ecosystems;
- Supporting involvement and further development of local talent;
- Enabling social appropriation of the jointly developed measures.



Created by
BomSymbols
from the
Noun Project

PLAN & IMPLEMENT FOR SUSTAINABILITY

- Contribute to the long-term vision of the city, setting short-term actions;
- Involving a wide range of stakeholders and communicating in an easy to understand manner;
- Aligning local, regional and national strategies.



Created by
Deivid Sáenz
from the
Noun Project

FACILITATE TRANSFERABILITY & UPSCALING

- Managing knowledge, documenting innovative approaches and good practices in a precise manner;
- Feeding back lessons learned and success factors to improve the process;
- Spreading the knowledge, i.e. tools, results, etc.



Created by
Rajakumara
from the
Noun Project

MAKE A RESPONSIBLE USE OF DATA

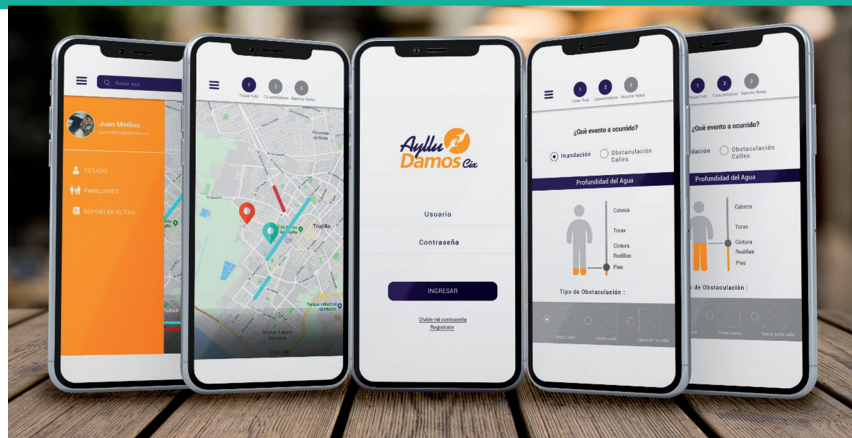
- Complying with international standards as well as national and local norms and regulations;
- Addressing and mitigating risks to data protection and cyber security;
- Strengthening the citizens digital competencies to recognize risks and threads, and protect themselves better.



Created by
Rockicon
from the
Noun Project

PRIORITIZE OPEN SOURCE

- Trying to reduce software and license dependencies for local governments and other stakeholders;
- Fostering collaboration with the local ecosystem and across sectors;
- Customizing existing open source solutions.



In Peru the program's political partner is the Secretary of Digital Government of the Presidency of the Council of Ministers (SEGDI/PCM in Spanish), in cooperation with the Ministry of Environment (MINAM in Spanish).

In India the program's political partner is the Ministry of Housing and Urban Affairs (MoHUA), as part of India's Smart City Mission.

The development partners for each phase are the following:

PHASE 1

Co-Creation & Implementation

- **Time frame:** 2017 - 2018
- **Partner:** Municipality of Trujillo, Peru

PHASE 2

National Upscale

- **Time frame:** 2018 - 2019
- **Partner:** Municipality of Chiclayo, Peru

PHASE 3

International Upscale

- **Time frame:** 2019 - 2020
- **Partner:** Kochi Municipal Corporation, India

Co-Creation, Implementation & Upscale of AylluDamos in Peru and India

FACTS

- > In March 2017, 67 people lost their lives due to heavy rainfall and 11 000 houses were damaged.
- > 25 mio. Peruvians live in cities that can be reached using the transfer package. That's about 79% of the total population.
- > In 2017 it took employees of the city administration of Trujillo 3 months for the analogue mapping of urban floods.
- > Using AylluDamos, data can be collected in real time during flooding events or practice scenarios with the Civil Defense Service.
- > Particularly successful was the cooperation with the social enterprise "Laboratoria" from Peru, which offers programming courses for young women from disadvantaged neighbourhoods. The winning team from the hackathon in Trujillo included three young women from Laboratoria. #eSkills4Girls work!



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05

Fighting Urban Flooding with AylluDamos

Exposed to El Niño-Southern Oscillation (ENSO), Trujillo has been suffering frequent floods (seven floods in 2017 alone), risking the health of their residents and posing challenges to their infrastructure. As part of these extreme weather events, roads

and streets are regularly flooded. Simultaneously, debris leads to blockages and damages to urban infrastructure. Throughout an innovative co-creation process, the Municipality of Trujillo identified the need of gathering data for climate-proofing urban infrastructure that

cannot be collected from sources such as satellite photos and remote sensing. At the same time, in the event of urban flooding Trujillo's citizens place heavy emphasis on one question: „Where is my family and are they in danger?“ AylluDamos is an answer to both

needs and a contribution to adapt the city to the impacts of extreme weather events like floods. It was developed in co-creation with the citizens and local digital ecosystem. In the future, the obtained data can contribute to reducing the impact of urban floods in the city.

EXTREME WEATHER EVENTS



Citizen-centered innovation for **climate-proofing** urban infrastructure.

Raise awareness about **climate change** impacts on cities.

URBAN FLOODING



Citizen-Centered innovation process



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»Agile methods fostering citizen-centered innovation laid the groundwork for AylluDamos' work. Cross-sector collaboration then built upon these findings.«

Digitally enhanced public services and citizen science have great potential to increase climate resilience in cities, providing platforms for inclusion and data exchange as well as improving the dialog between city administrations and citizens. Yet tendencies to prioritize technology ahead of citizen's perspectives jeopardize their sustainability and scalability.

AylluDamos was conceived putting citizens – not technology – at the core of its development. The digital solution is the result of an innovative co-creation process carried out under a citizen-centered innovation approach. It was the first time the city of Trujillo developed a public service solution using such an

approach. The co-creation process included a Hackathon and Design Thinking Sprints – a multi-stakeholder method to develop digital solutions and meet the city's and citizen's needs and desires in a technologically feasible manner. This process fostered cross-sector collaboration among several city departments. It brought together representatives from different areas including those of urban planning, environment, disaster management, as well as universities, training institutes, start-ups, private companies, citizen representatives and associations.

This process promoted an inclusive process building on local strengths.

07

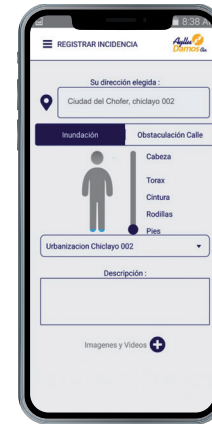
AylluDamos Digital Solution with three components

As a digital solution, AylluDamos consists of three components: Meteorological sensors, the mobile phone application, a dashboard for municipality officials. The data from the sensors and the mobile phone application are sent to the municipality's monitoring center.

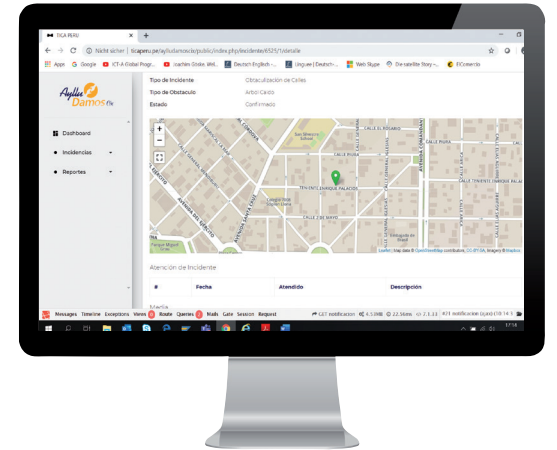
Here, the data is analysed and appropriate responses can be initiated in an evidence-based approach.



METEOROLOGICAL SENSORS

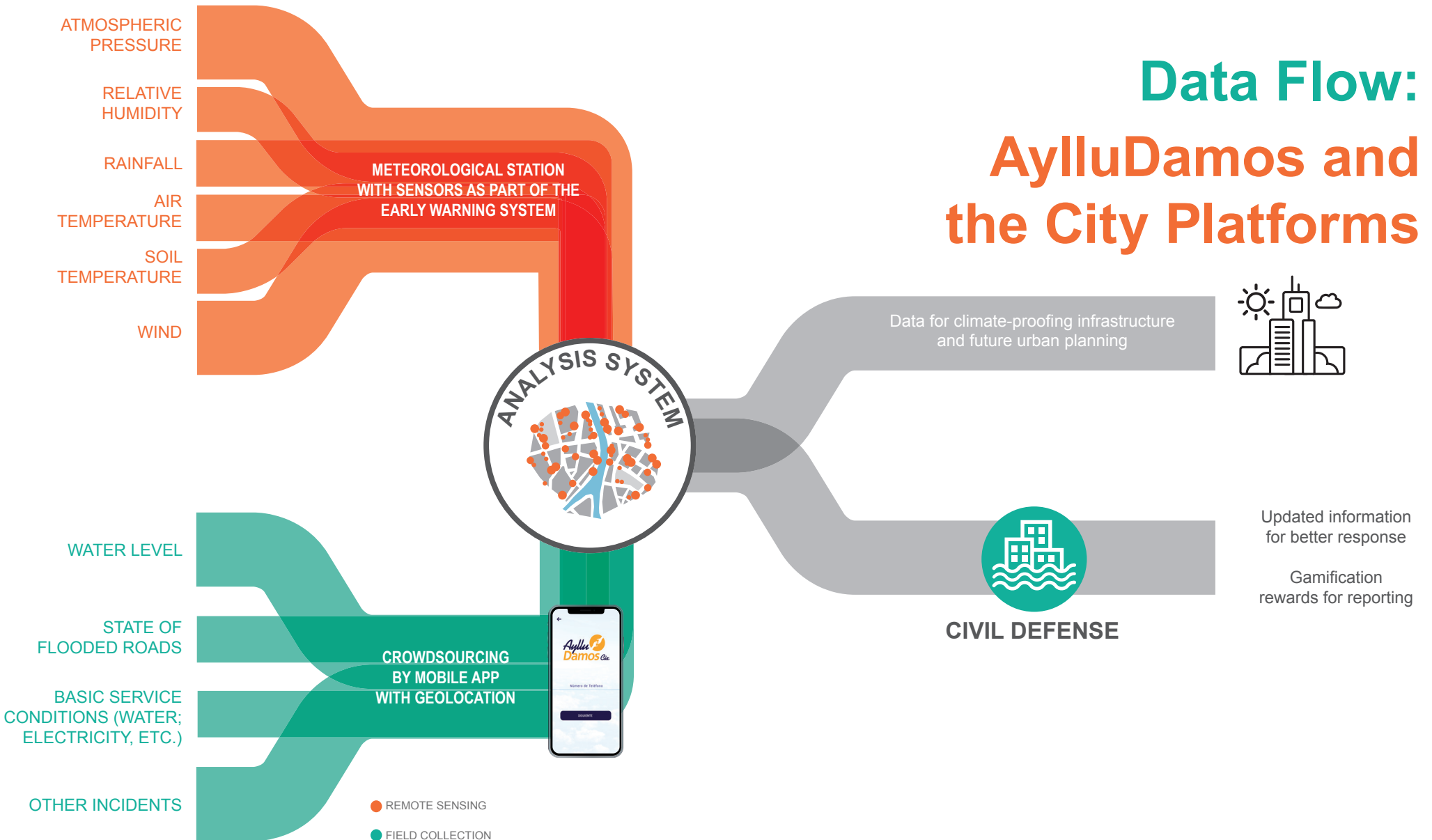


HYBRID APP FOR SMARTPHONES



DASHBOARD FOR MUNICIPALITY OFFICIALS

Data Flow: AylluDamos and the City Platforms

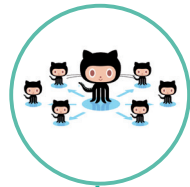


08

Digital Citizen Engagement & Inclusion

INCLUSION:

Prototyping and testing the digital solution with citizens from informal settlements. Visiting markets and schools with tablets and a TV to include those citizens without internet access, in hand with other on-site activities like mappathons to promote digital inclusion.



UPSCALING

Documentation of the solution and coding. The transfer package, including the source codes are made publicly available to be utilized by others.

AylluDamos promotes local co-creation involving citizens and city decision makers in the co-creation of their digital solution enabling social appropriation.

We promote local co-creation drawing upon local innovation ecosystems and supporting involvement and further development of local talent.

AylluDamos leaves no one behind, enabling participation of citizens

GENDER

Ex. Close work with social enterprises that empower young women to work in the digital sector.



from informal settlements. In Peru, the first version of AylluDamos was co-created, tested and implemented with and for the citizens of the informal settlement of Mampuesto in the city of Trujillo.

Particularly successful was the cooperation with the social enterprise "Laboratoria" from Lima, Peru, which offers programming courses for young women from disadvantaged neighborhoods.



PRIVACY
ICT-A Privacy and Data Protection Training aimed at public officers and citizens.



09

International transfer

**I want AylluDamos in my city!
How can I transfer it?**

As an open source technology, AylluDamos is fully replicable! We are currently working on a transfer-package to upscale the digital solution to other cities. The idea is to make the digital solution available to other cities using web-based hosting services so that they can easily transfer and customize it to their specific needs, capacities and IT requirements. So, if you are thinking about developing something similar in your city, this is an option that can be easily transferred and tailored to fit your needs!

For further information and downloads of AylluDamos please visit the Climate Digital Cities Hub:

www.climate-digital-cities.com



List of Abbreviations

- BMI** Bundesministerium des Innern, für Bau und Heimat (German Federal Ministry of the Interior, Building and Community)
- BMU** Bundesministerium für Umwelt, Naturschutz und nukleare Sicherheit (German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety)
- GIZ** Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH
- ICT** Information and Communication Technology
- ICT-A** Global Program ICT-based Adaptation to Climate Change in Cities
- IKI** Internationale Klimaschutzinitiative (International Climate Initiative)
- KMC** Kochi Municipal Corporation
- MINAM** Ministry of Environment of Peru
- MoHUA** Ministry of Housing and Urban Affairs, India
- MPCH** Municipality of Chiclayo
- MPT** Municipality of Trujillo
- NDC** Nationally Determined Contributions
- SDG** Sustainable Development Goals (17 goals of the 2030 Agenda for Sustainable Development developed by the UN in 2016 for a more sustainable future)
- SEGDI/PCM** Secretary of Digital Government of the Presidency of the Council of Ministers of Peru

Team

