

Enabling Farming Data Traceability in Mexico

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Summary Self-sovereign identity (SSI) is a digital identity that is fully controlled and owned by the individual it represents. Unlike traditional centralized identity systems, SSI allows individuals to have autonomy over their own identity, what information is shared, with whom, and for what purposes. SSI is a relatively new concept, but we argue it has the potential to revolutionize how we manage identity and privacy in digital ecosystems. To explore the potential of SSI in smallholder farmers' data sharing and management, we partnered with Bluenumber Foundation to develop a data traceability pilot in Mexico for small-scale maize producers to manage their farm management data. This progress report from Bluenumber provides an overview of the project activities in 2022.

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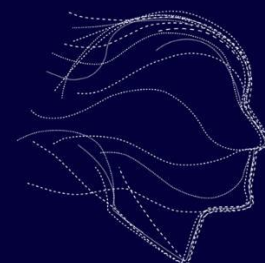
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Progress report CIMMYT- Bluenumber 2022

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1. CONTEXT OF THE PROJECT

The purpose of the collaboration between CIMMYT and Bluenumber is to deploy a pilot project to evaluate a scalable disruptive approach to integrating data for agronomy research that also incentivizes sustainable production and enables traceability using open data sharing protocol with self-sovereign identity (SSI).

This pilot project aims to introduce CIMMYT farmers to a Bluenumber platform they can use to claim and share data with their consent. This platform has end-to-end encryption (E2EE), allowing only the data's senders and receivers to access it. This platform will also give them entry to a data market where they can get economic incentives in exchange for data for qualified buyers.

The objectives of this pilot project are the following:

- To provide Bluenumber SSI to CIMMYT farmers and enable those farmers to materially benefit from permissioned use of data linked to or associated with their SSI.
- To demonstrate a mechanism to the project participants (farmers) to give consent to (i) use data about or linked to them or their farms for research, (ii) extend the use of that data to evidence 'responsible sourcing' by matching production/yield information with origination person/place data, and (iii) enable that value-enhanced data to be shared with qualified buyers and thus create additional income to farmers by using that data.
- To enable farmers to consent to their data being used for traceability, digital asset creation, and compensation/payment for data about demonstrated sustainability practices while retaining personal data privacy.
- To enable CIMMYT to leverage Bluenumber technology to bridge sustainable producers with buyer companies seeking sustainable produce. Data collected for research purposes may be aggregated with data on 'responsible sourcing' that helps farmers increase yields and produce more sustainably; such data may be compiled under farmer SSI.
- To develop and publish knowledge products from the project to offer relevant guidance to governments and partners on technology for similar use cases.
- To actively work together on developing an economy of scale for SSI and open data interoperability costs with a target of delivering such technology infrastructure at the lowest possible costs. Accordingly, Bluenumber and CIMMYT will develop a business model to ensure full self-sufficiency of the system demonstrated by the project by anticipating income from off-taking corporates making a substantial contribution margin to support SSIs for more farmers within CIMMYT projects.
- To encourage, where appropriate, each other's respective partners and stakeholders to recognize this collaboration between the Parties to avoid duplication of effort and multiply opportunities for awareness-building and outreach.

2. COMPLETED ACTIVITIES

The following points represent the activities that have already been completed or are part of the core ecosystem of Bluenumber.

2.1. SSI platform (Bluenumber creation)

The SSI platform is already part of the Bluenumber ecosystem. Currently, it is possible to create a Bluenumber for people, places, organizations, and things. This SSI creation is possible through other applications such as PMA and control tower. Bluenumber will adapt this platform for the application used for this project.

2.2. Data analysis and organization

Bluenumber received the data from the Agriba ([Link A](#)) and Aguas Firmes ([Link B](#)) projects, and it was analyzed and structured ([Link C](#)). This structure categorizes all the project information based on the data type, relevance, dependency on other data, and if it belongs to multiple parcels.

Additionally, the header of the tables in the original Agriba and Aguas Firmes files was considered the affirmation or question for the data and rewritten for clarity. The header was also considered for the structure to assign a representative attribute (Attributes are used to identify the information in the different applications) to each data point (A data point is an answer to a question or affirmation, in other words, the data with significant value. E.g., What is your crop? wheat, wheat being the data point). Finally, based on the data structure, all the information for both projects was organized and matched to the respective farmer ([Link D](#))

3. IN PROGRESS ACTIVITIES

The following points represent the activities currently in progress or waiting for approval.

3.1. Application

To give easy access to the farmers to their data, create their SSI, and introduce them to the concept of sharing data with consent, an application with the following functionalities is being developed:

- Create an SSI (Bluenumber) for the farmers
- Create a Personal Data Vault (PDV) linked to the SSI, allowing farmers to store their data.
- Transfer the data CIMMYT collected about the farmers in their parcels to the farmer's PDV under their consent.
- Visualize all the information provided by CIMMYT.
- Ask the farmer if the data is correct and belongs to them.
- Ask for the consent of the farmers to use this data to create a report.
- Temporarily collect information to transfer the economic incentive for participating in the project (The data will be deleted after the farmer confirms the payment).
- Allow the farmers to access the application to visualize their data anytime.
- Allow the farmers to localize their parcels to assign an SSI.

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- Allow the farmers to see certificates about their data

The application is currently in the prototype stage ([Link E](#)). After the approval that the structure is correct, we will proceed with the development.

3.2. Data management in the application

All the application functionalities and a translation to English have been created to understand it ([Link F](#)). This document presents the source of the information and endpoint in a workflow ([Link G](#)).

This workflow presents the following databases:

- YouTube: The application will have a video tutorial embedded from YouTube. If there are any changes to the source of the video, this database may change.
- BLLC: This database refers to the platform in charge of creating the SSI.
- PDV: This database refers to the PDV of the farmers.
- Other databases: This is a temporal database that Blunumber will host for the application. It will temporarily store the data from the Agriba and Aguas Firmes projects, the personal data for the incentive, and a PDF given to the farmers after completing their registration in the application.

The screens presented in the workflow match those in the functionalities and translation document.

3.3. Presentations

On the day of the event, two presentations will be held. The first one ([Link H](#)) is an introductory presentation to the event and how the application works. The second ([Link I](#)) presentation presented by Blunumber includes a summary of the role of Blunumber and the possibilities of the data the farmers received at the time of the event.

Currently, changes to both presentations are expected to match CIMMYT's branding and for clarity for the farmers.

3.4. Payment method

Currently, Blunumber is holding tests using Western Union as the payment method with the help of five persons in Mexico, part of CGIAR provided by CIMMYT.

3.5. Additional data

Based on the Agriba and Aguas Firmes projects, valuable information for third parties (or Donors) was identified. This information consists of data points for third parties to decide about the farmer's produce. However, the information available for each farmer is not the same. For this reason, an ODK form was created that allows farmers to populate their PDV with more valuable information.

This ODK form includes questions based on the relevant information for third parties. The form is linked to Control Tower (B#Sky), a Blunumber data management platform. This platform allows the captured information to be saved directly into the farmer's PDV. Blunumber creates this form with the

information of CIMMYT’s projects. Still, any organization can create it via Control Tower to allow the collection of more data outside the one used in this project.

Currently, the form is being adjusted to make it easier for the farmers to read and understand all the information. Some missing information is being collected for missing options in the form.

4. REMAINING ACTIVITIES

The following points represent the activities in the pipeline waiting for previous tasks to be completed or for the event with the CIMMYT farmers to occur.

4.1. Video Tutorial

As mentioned previously, the application will have a video tutorial. This video tutorial will be a simple explanation of how the application works. The creation of this video will start near the end of the development of the application.

4.2. White paper

After the event, Bluenumber will create a comprehensive document including information regarding the process of achieving this project. This white paper will include statistics based on the registration and consented data of the farmers.

5. BCX (DATA MARKET)

The BCX or Bluechip Exchange is a data market using Bluenumber technology. The BCX allows a connection with the PDV of the farmers through a BLLC gate. This gate only shares attributes and tags of the information under the consent of the PDV owner. In other words, the data points are never present in the BCX to keep the privacy of the farmers.

The BCX allows certified buyers to see the relevant information of the data points, so they can check the information they are buying. This market will allow farmers to sell the data they consent to, giving them an economic benefit.

Currently, the BCX is in maintenance to include new features and projects, and a temporary website is available ([Link J](#)).

6. LINKS

In the following table, a list of previously mentioned links can be found:

Name	Links
A. Agriba data	Link
B. Aguas Firmes data	Link
C. Data Structure	Link
D. Organized data	Link

Name	Links
E. Application prototype	Link
F. Functionalities and translation of the application	Link
G. Application data source workflow	Link
H. Introductory presentation	Link
I. Blunumber presentation	Link
J. BCX	Link