Naturvation Atlas

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Group 9
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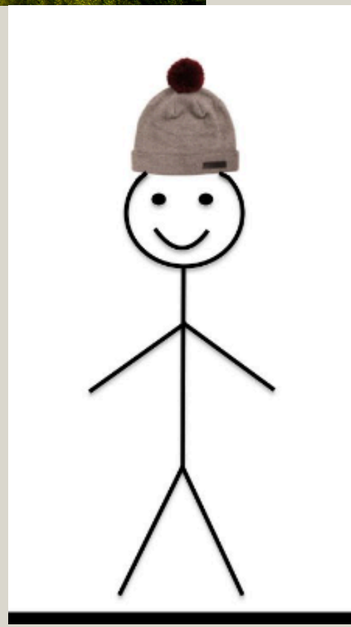
Context

Who is Bob?

- Environmental scientist specialising in urban sustainability & NbS
- Conducts comparative, cross-city analysis of NbS effectiveness
- Works with complex, multi-dimensional datasets
- Needs tools for spatial analysis & multi-criteria evaluation



Decision-Making Problem

Core Problem:

How can Bob systematically explore, compare, and evaluate NbS across cities to generate robust, evidence-based insights?

Bob’s decision-making process:

1) Exploration and Hypothesis Generation
2) Comparative Evaluation
3) Case-Level Deep Dive

Data

↓

Started with the Urban Nature Atlas
1141 rows and 44 columns

Ended with a fully cleaned dataset
Futureproof and expandable

Used features

No preprocessing needed

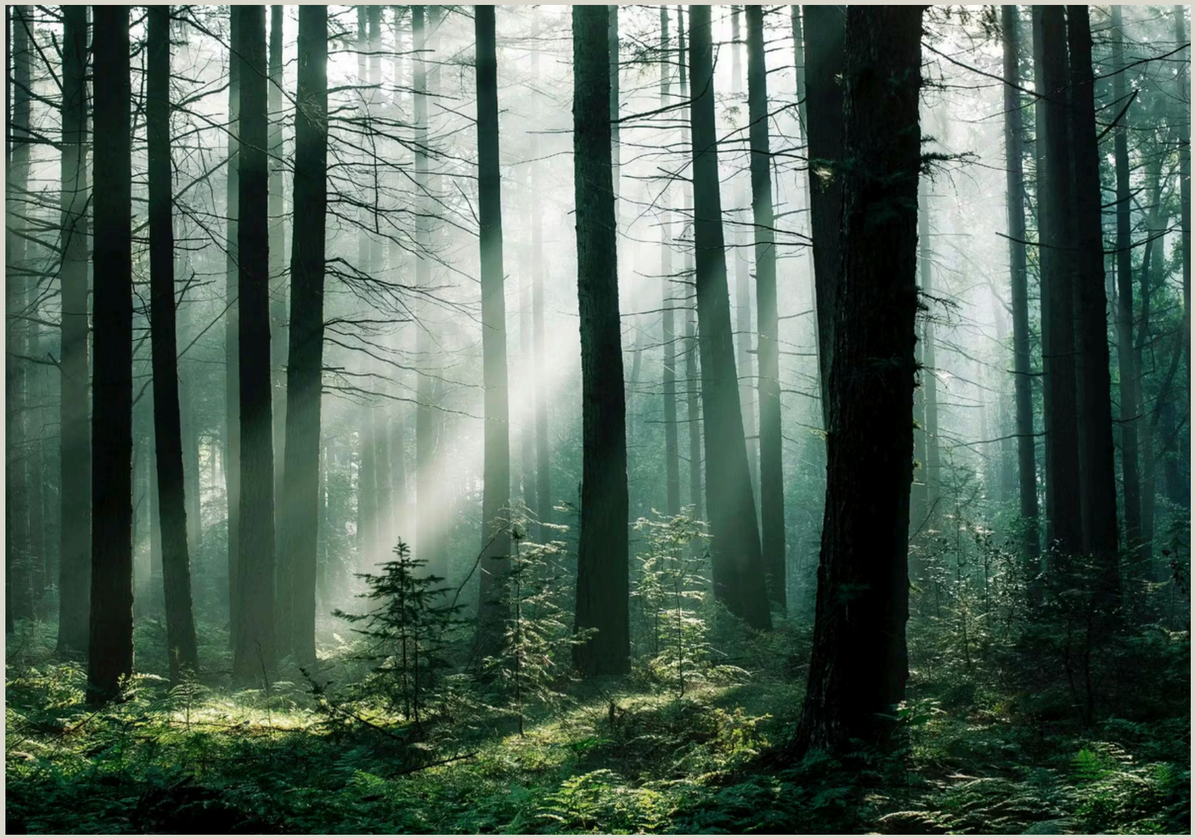
- Name of the NBS intervention
- City
- Country
- Source

Categorical data

- Status of the intervention
- Cost

Multiple selections per project

- NbS type
- Challenge(s) addressed



Multiple selections per project

1. Split each cell into individual rows
2. Remove descriptive lines and SDG references
3. Standardize and prefix remaining value
4. Convert to binary features

Sustainability challenge(s) addressed
Environmental quality
- Air quality improvement
Social justice, cohesion and equity (SDG 10)
- Environmental education
Health and well-being (SDG 3)
- Improving physical health

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Environmental quality

Social justice, cohesion and equity

Health and well-being

Sustainability challenge(s) addressed : Environmental quality

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1	1	1

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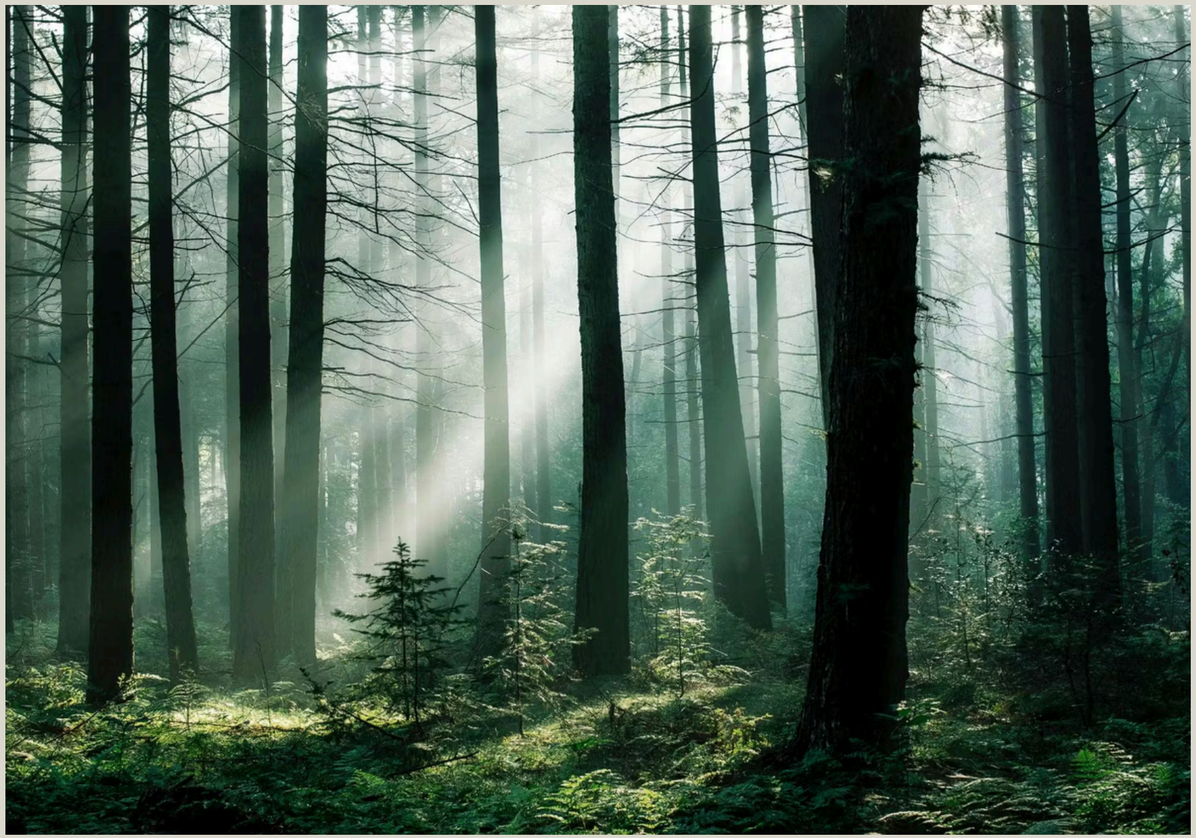


Evaluation and Feedback

Initial think-aloud study

- Layout confusing and hard to follow
- Purpose of some visualisations unclear
- Decision-making flow not evident

Major redesign

- Inspired by clearer structure from another group
- Rebuilt system with explicit overview → detail workflow

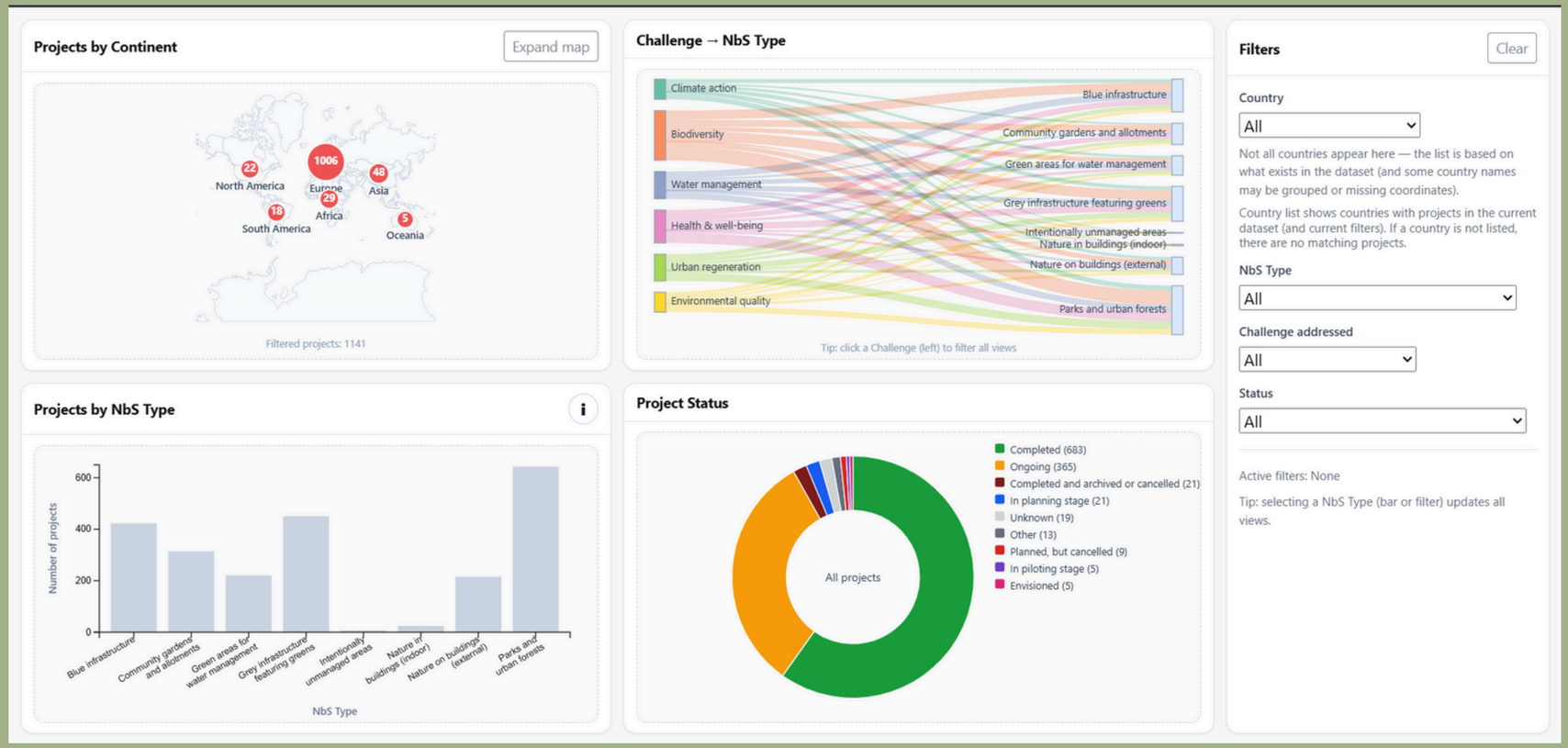
Second talk-through session

- Overall structure understood and accepted
- Identified minor usability issues:
  - missing labels
  - alignment issues in comparison tables
  - small clarity improvements

Outcome

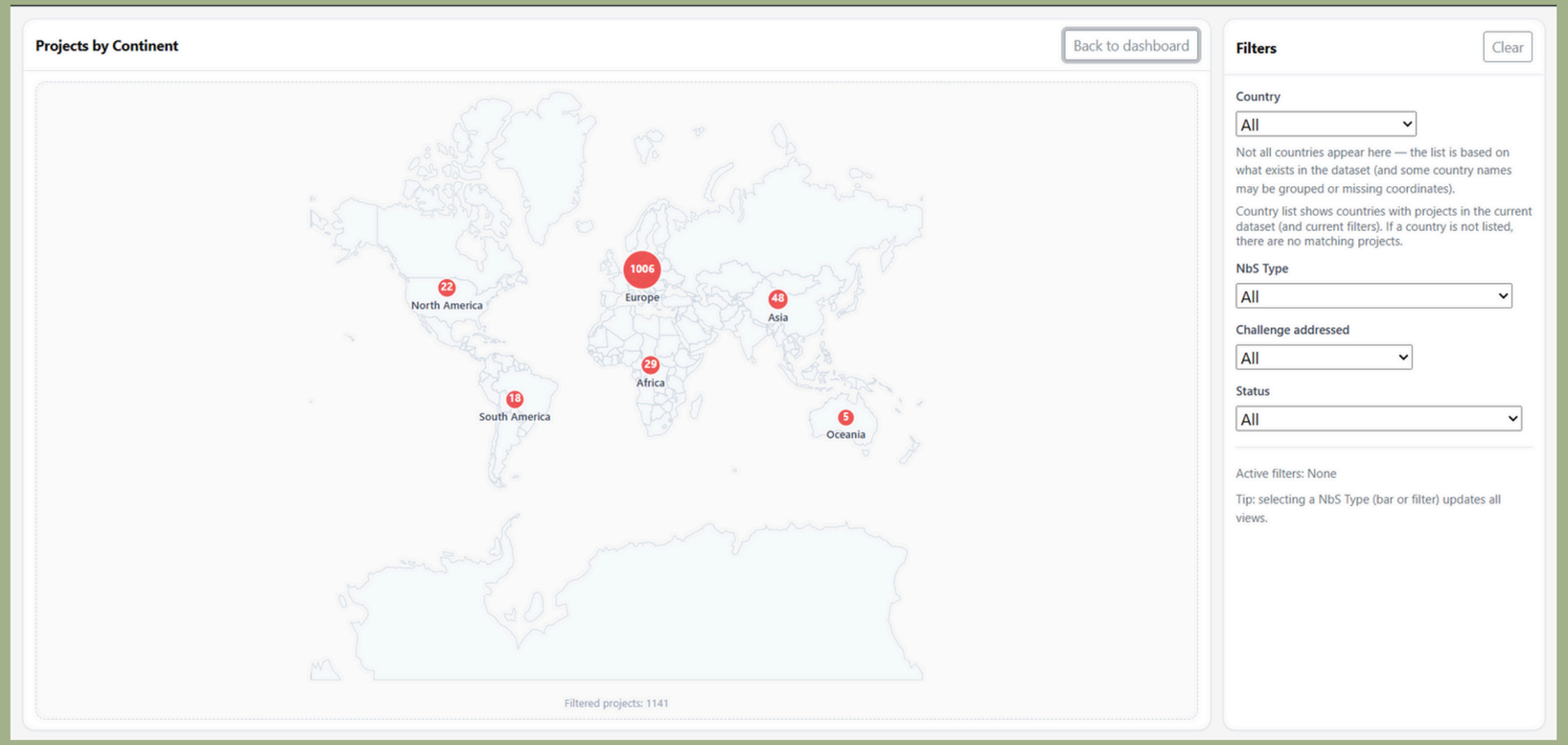
Iterative evaluation improved usability, clarity, and decision support

What was implemented



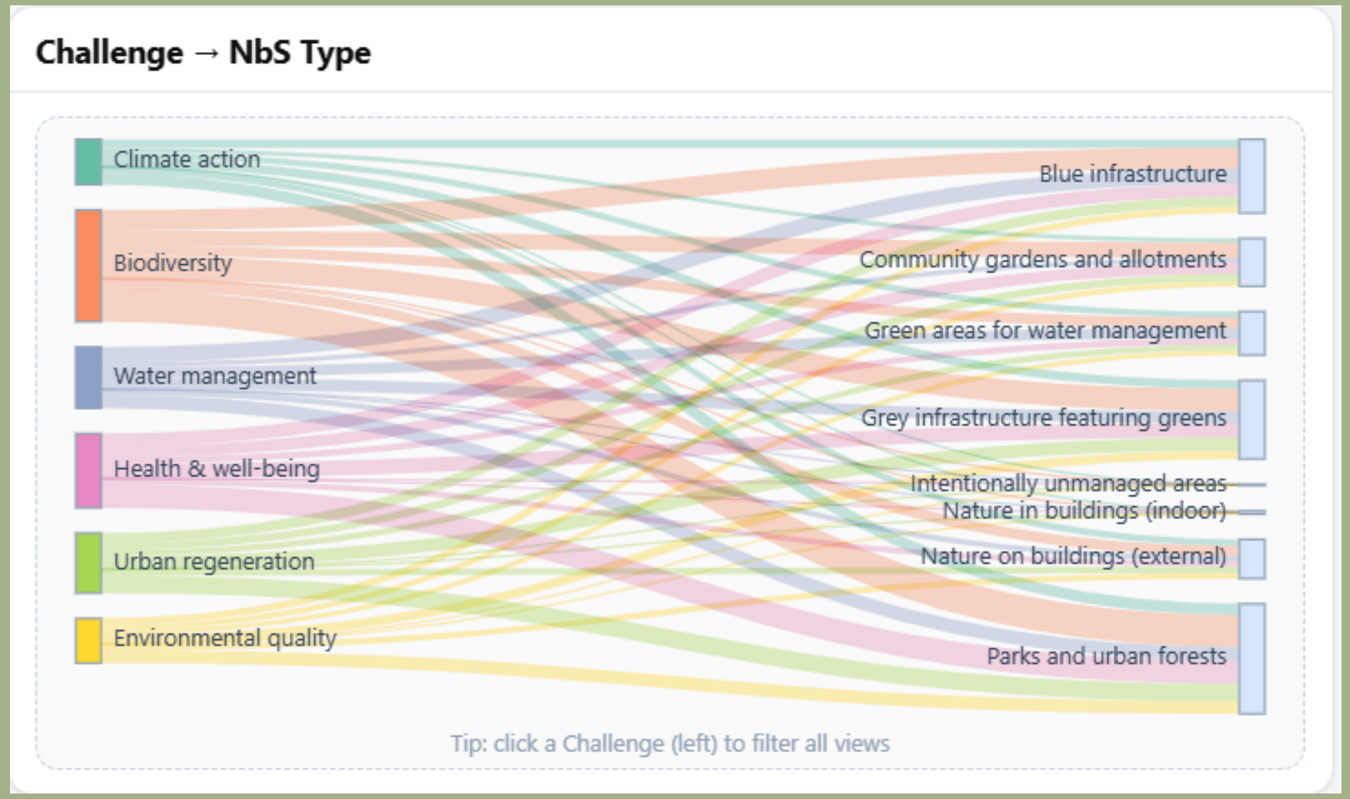
- Interactive decision-support dashboard
- Aggregated world map as entry point
- Linked charts for typology & status comparison
- Global filter panel
- Progressive disclosure from overview to detail

What was implemented - Map



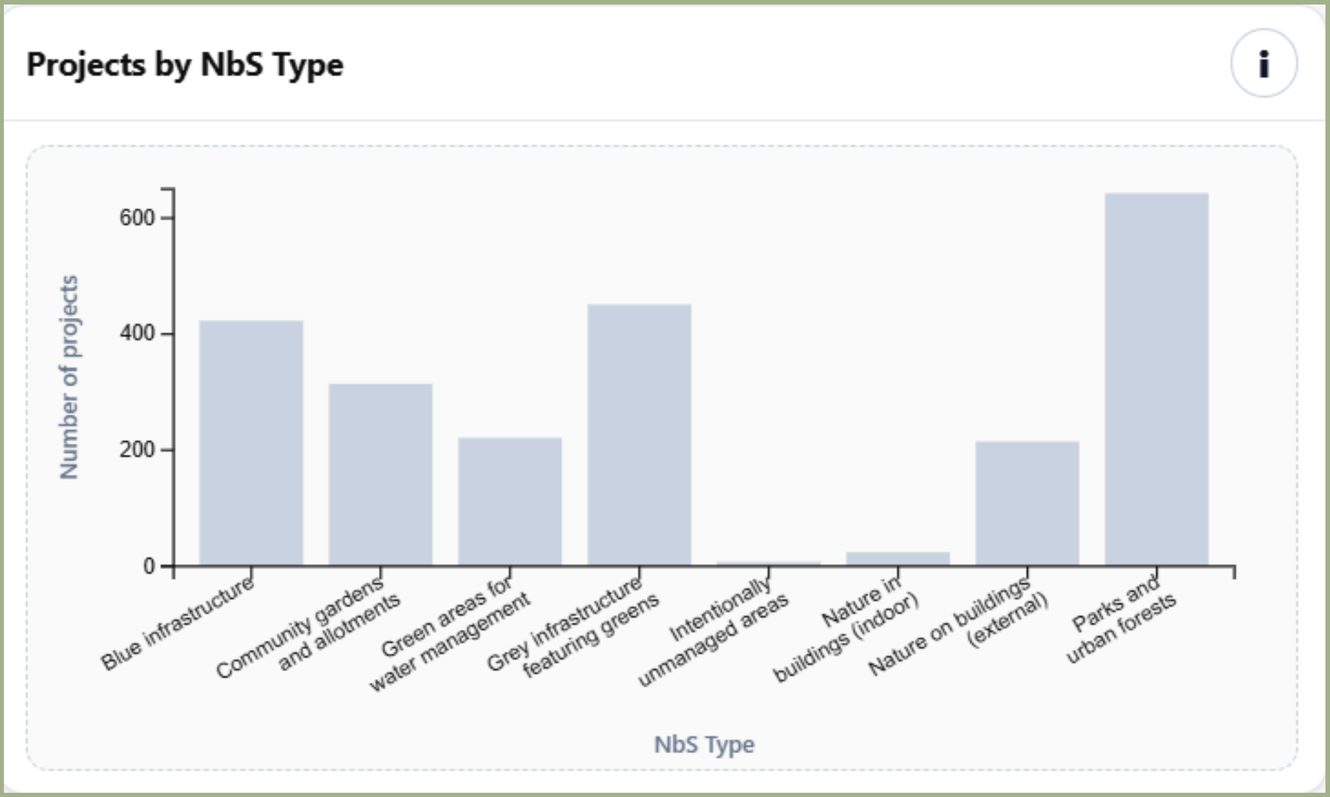
- World map aggregated by continent
- Supports spatial pattern detection
- Zoom reveals individual project locations
- Central component for spatial reasoning

What was implemented - Sankey



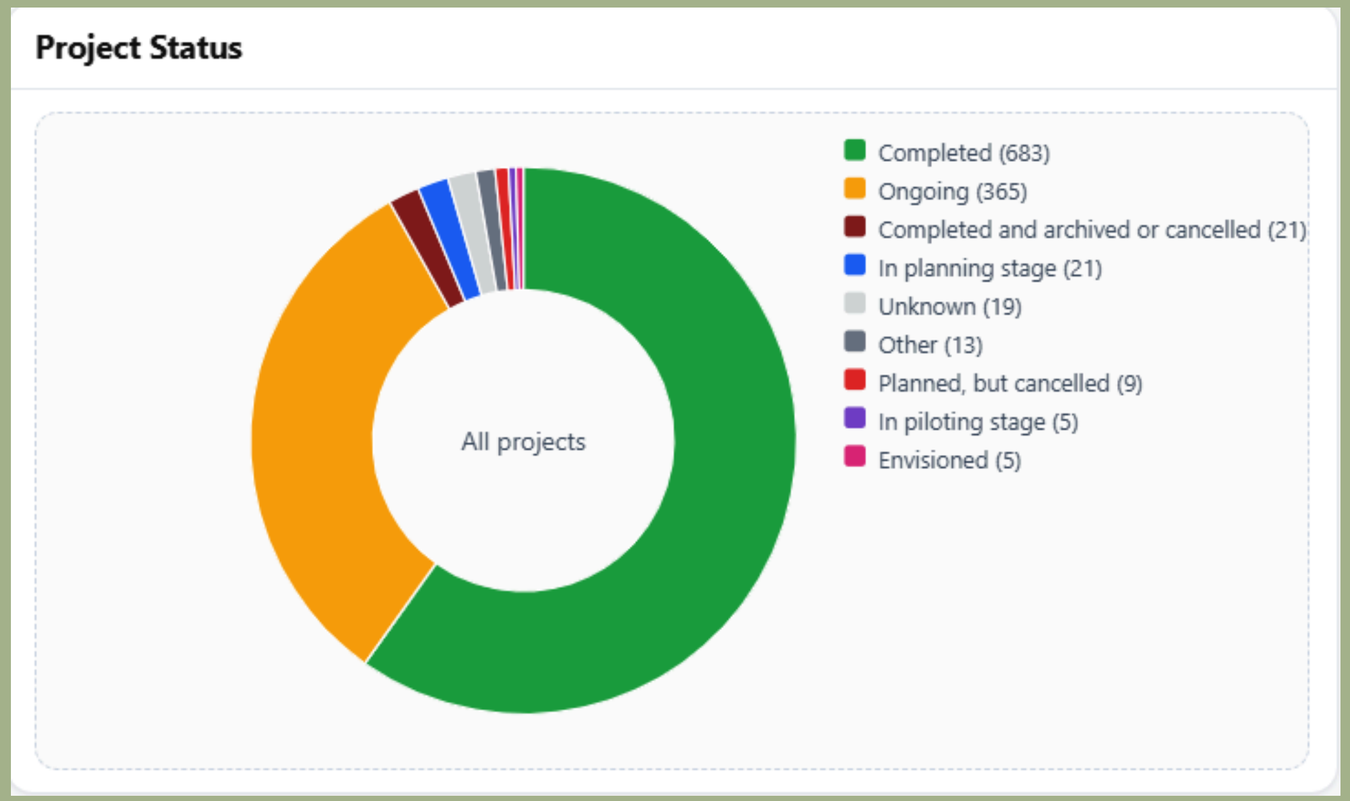
- Shows relationship between challenge → NbS type
- Supports conceptual understanding of solution strategies
- Linked with filters and other views
- Useful for hypothesis generation

What was implemented - Bar Chart



- Shows distribution of projects by NbS type
- Supports comparison across solution categories
- Linked to map and other charts
- Helps identify dominant and rare solution types

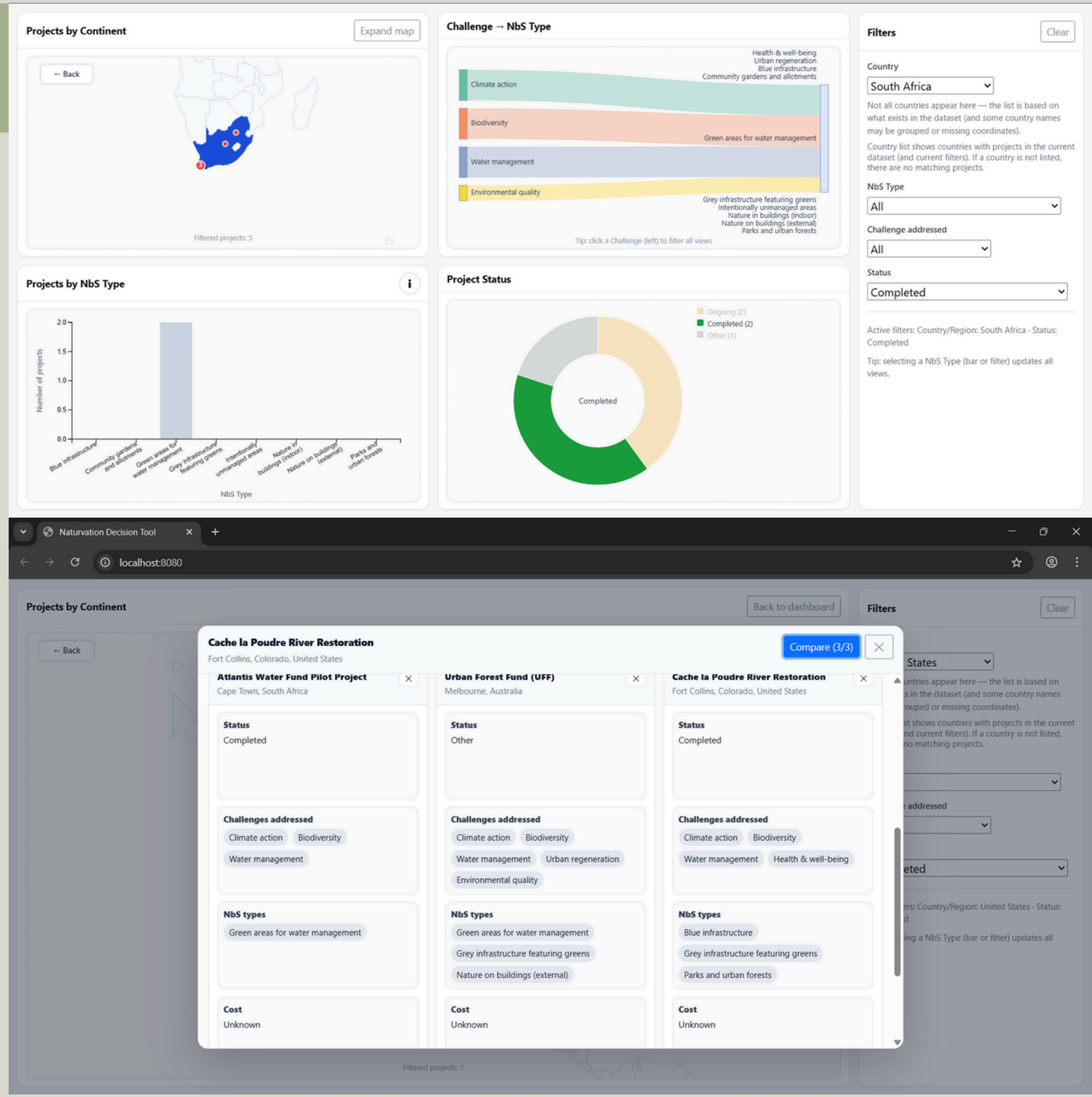
What was implemented - Donut Chart



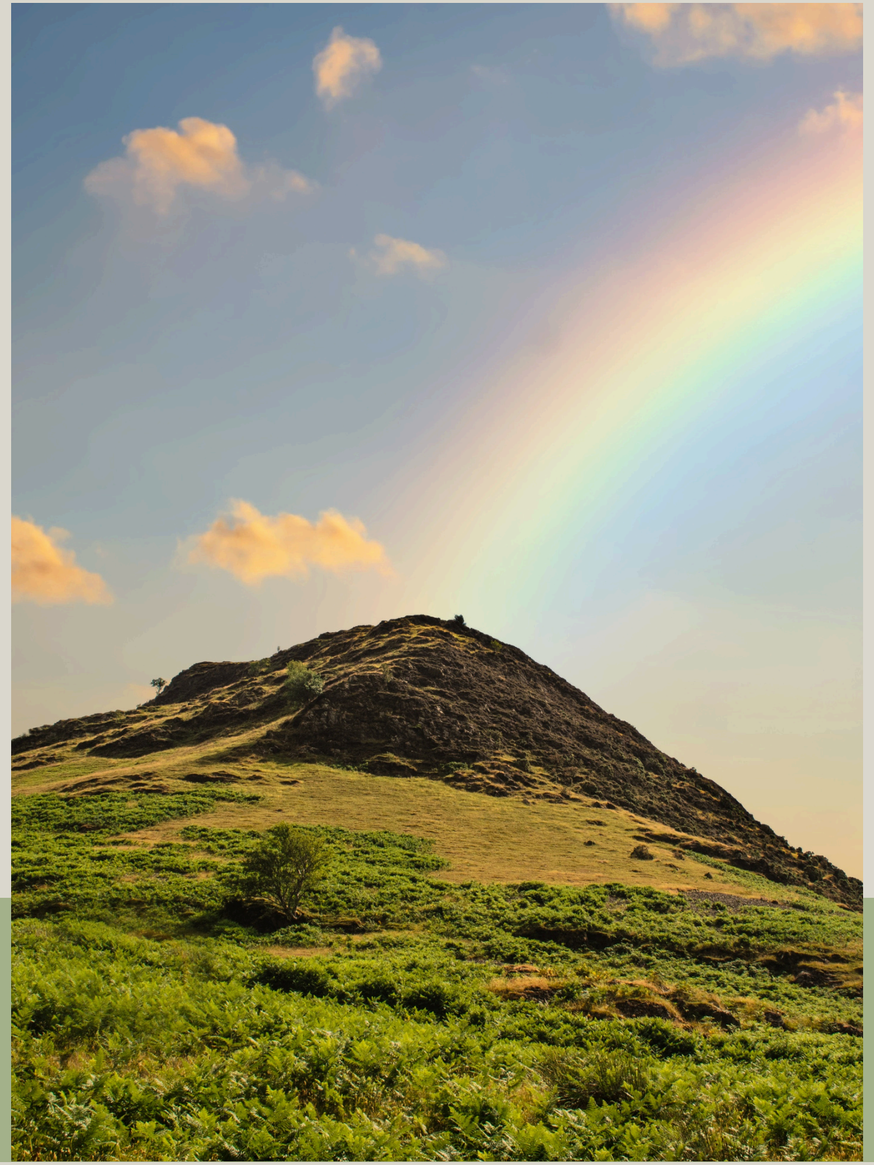
- Shows distribution of project status
- Indicates maturity of NbS implementations
- Helps distinguish planned vs completed projects
- Updates based on filters and selections

Interactions and Coordination

- Coordinated views
  - Selections update all views
  - Filters apply globally
- Filtering
  - Narrow dataset by type, status, country
- Details-on-demand
  - Click projects for detailed attributes
- Progressive disclosure
  - Overview → zoom → detail



- Designed around Bob’s scientific workflow
- Aggregation supports cross-city comparison
- Linked views enable multi-criteria reasoning
- Progressive disclosure reduces cognitive load
- Structure refined through user feedback



Why were the choices made?

NbS are inherently spatial, and Bob’s questions involve where solutions are implemented.
A map supports spatial pattern detection, such as regional clusters, gaps, and geographic bias.

Why were the choices made?

Why A Map?

Why were the choices made?

Why a Sankey?

Shows relationships between challenges and NbS types, not just counts.
Supports conceptual reasoning about how different urban challenges are addressed by different solution strategies.

Why not a bar chart?

A bar chart would hide many-to-many relationships between challenges and solutions.

Why were the choices made?

Why a Bar Chart?

Bar charts are effective for comparing quantities across discrete categories.
Supports Bob in identifying dominant and underrepresented NbS types at a glance.

Why not a pie chart?
Bar charts allow more accurate category-to-category comparison than angular encodings.

Why were the choices made?

Why a Donut Chart?

Highlights proportional distribution of project status (e.g. completed vs planned).
Helps Bob assess maturity and implementation stage of NbS portfolios.

Why not another bar chart?

A donut emphasizes overall composition, complementing the bar chart’s categorical comparison.

Decisions require connecting multiple dimensions (space, type, status). Coordinated views reduce cognitive load by keeping context consistent across interactions.

Why were the choices made?

Why Coordination?

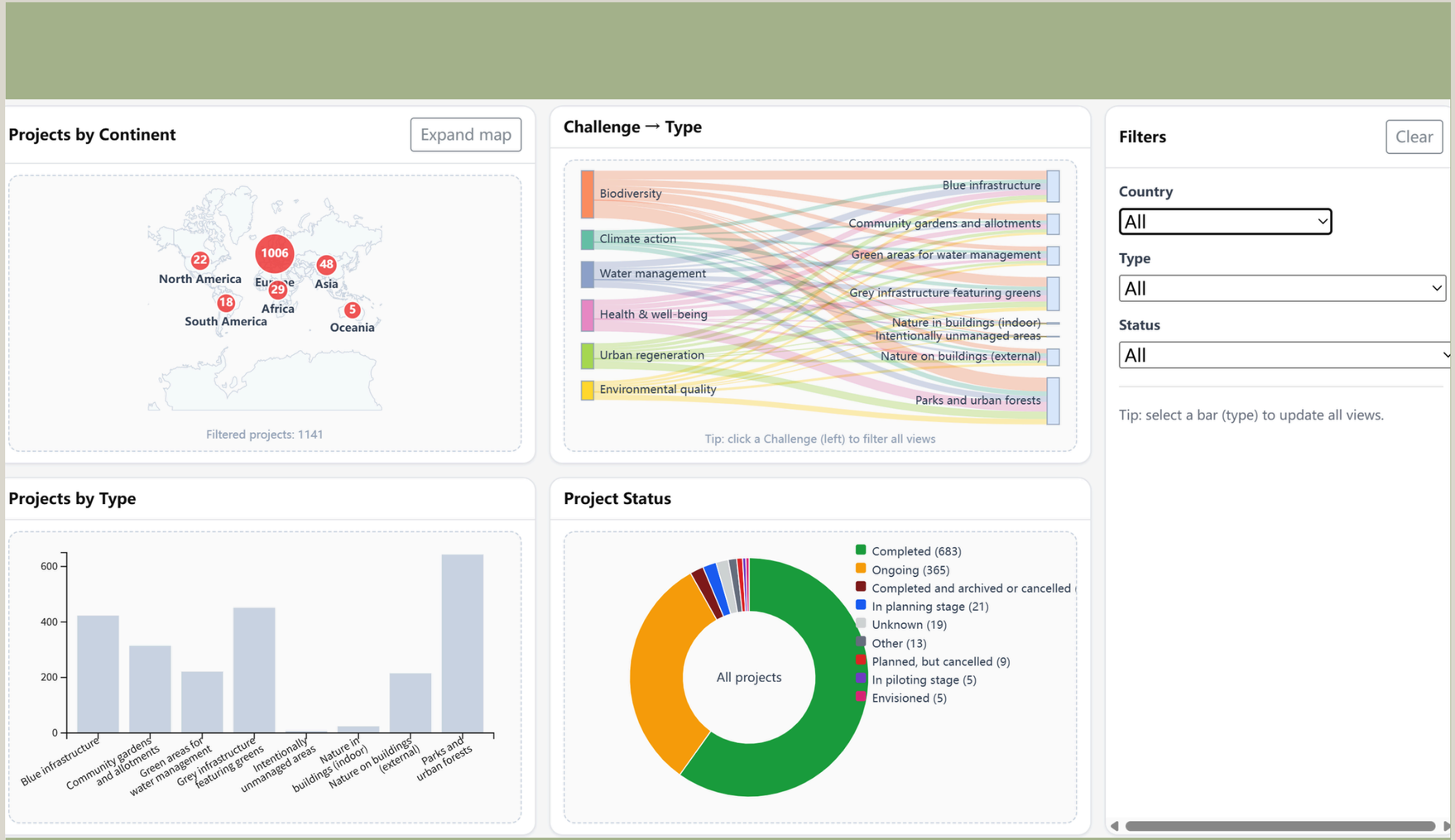
Prevents overwhelming users with detail upfront.
Mirrors Bob's scientific workflow:
overview → pattern detection → case-level inspection.

Why were the choices made?

Progressive Disclosure: Why This Structure?

Decision-Making Flow

- World map aggregated by continent
- Sankey: Challenge → Project type
- Bar chart: projects by type
- Donut chart: project status



Decision-Making Flow

Exploring Patterns with Linked Views

- All views are linked
- Click Sankey or bar → update all views
- Patterns become visible across dimensions

Narrowing Down with Filters

- Persistent filter panel
- Filter by country, type, status
- Filters apply globally
- Clear button to reset exploration

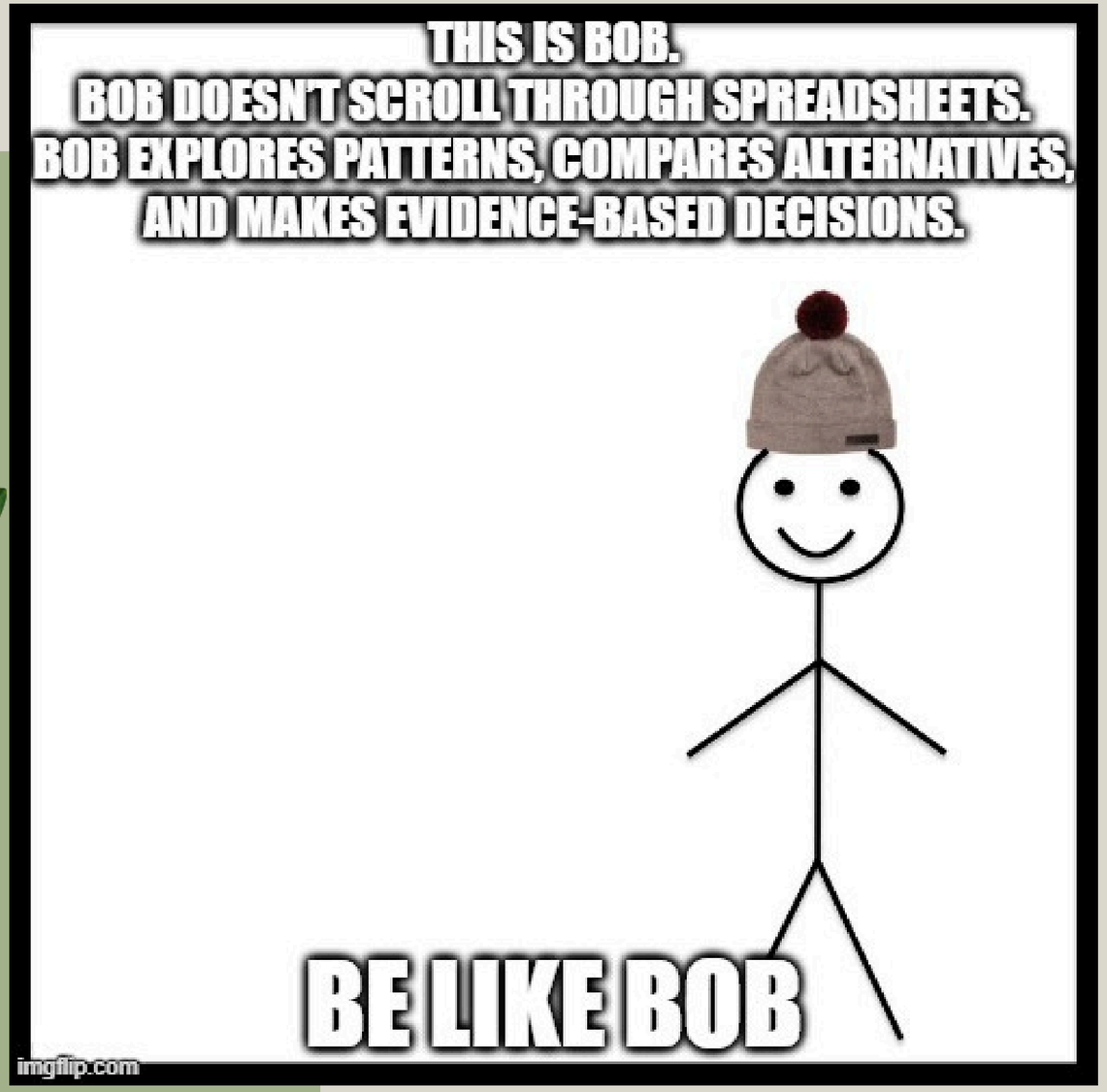
Spatial Focus & Project Details

- Expand map for spatial exploration
- Zoom from continent → project dots
- Click project → detail overlay
- Compare projects

In conclusion...

- Designed a persona-centred decision-support tool for NbS analysis
- Supports scientific decision-making stages:
- exploration, comparison, and evidence synthesis
- Combines spatial, categorical, and relational views
- Uses linked interactions to support multi-criteria reasoning
- Improved through iterative user evaluation

Thank You.


THIS IS BOB.
BOB DOESN'T SCROLL THROUGH SPREADSHEETS.
BOB EXPLORES PATTERNS, COMPARES ALTERNATIVES,
AND MAKES EVIDENCE-BASED DECISIONS.
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