SAVANNA

WHITE PAPER

Rebuilding Watersheds with Savanna

Thetus Corporation, 326 SW Broadway, Portland, Oregon 97209, USA.

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EXECUTIVE OVERVIEW

Watersheds are like the branching veins of a maple leaf, with the fine lines joining to become the largest stem at the base and small watersheds joining together to become flourishing watersheds. The smallest disturbance to one vein affects the entire system. So what happens when over 50% of a watershed is destroyed?

Integrated watershed management (with the participation of key people and organizations) has become widely accepted as the approach best suited for sustainable management of renewable and non-renewable natural resources in upland areas like Caatinga. Systemic, institutional and financial capacity barriers have limited holistic actions from all involved parties.

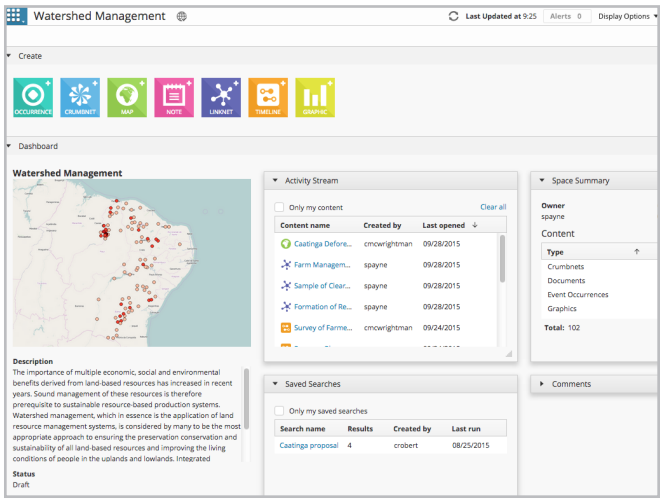
Because of the complex, multi-party involvement of this issue, a collaborative and cohesive analysis environment is necessary for effectively addressing the unique challenges that analysts face when looking for solutions to complex problems like natural resource management.

To address complex and constantly evolving problems like natural resource management, enterprises are turning to big data analytics to detect and analyze data and trends. However, the sheer volume of data reporting and false positive rates are daunting to analyze and require a solution to extend data results. Savanna's dynamic, all-source analysis environment gives participants the ability to delve into each point of interest, discovering connections and evidence to implement strategies for prevention methods.

ANTICIPATING OUTCOMES WITH SAVANNA

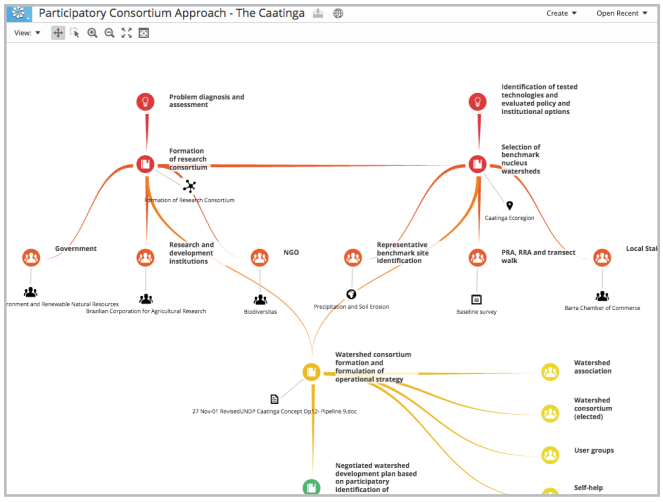
Complex, multi-party projects require a unique, multi-faceted approach to assessing and developing scalable community watershed development model. With the appropriate tools and expertise, Caatinga's community can anticipate potential outcomes and prepare accordingly.

Savanna, Thetus Corporation's flagship browser-based analysis platform, enables analysts to model complex problems. By identifying key information and visualizing relationships between structured and unstructured data, Savanna users construct holistic narratives that convey known risks as well as information gaps.



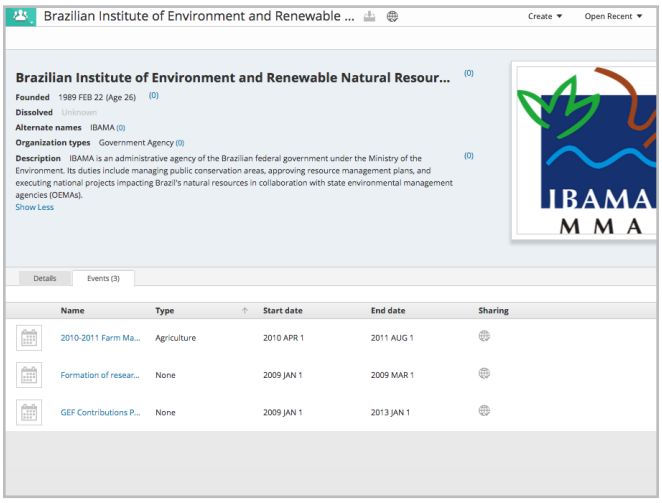
Access data via Savanna's web interface for easy file sharing

Savanna is browser-based, meaning that any authorized user with an Internet connection can access the Savanna platform and all public content created by other users on the network.



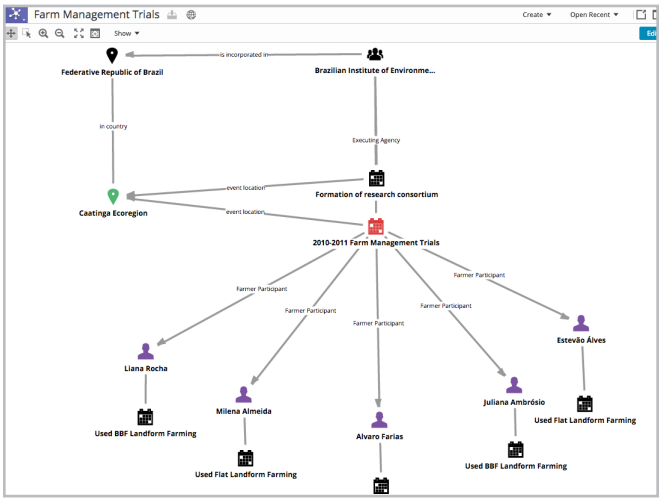
Contextualize and synthesize information with Crumbnet

Savanna Crumbnets serve as white boards for free-form analysis. Crumbnets allow analysts to capture questions, hypotheses, and assumptions to create an analysis narrative and place relevant data in context (e.g., Analyst's Notebook Charts, documents, images, other Crumbnets, videos, and much more). Analysts use Crumbnets to collaboratively ask and answer questions, pose hypotheses, note assumptions and state relevant facts to contextualize data. Crumbnets also serve as a navigation tool to guide audiences through the analysis.



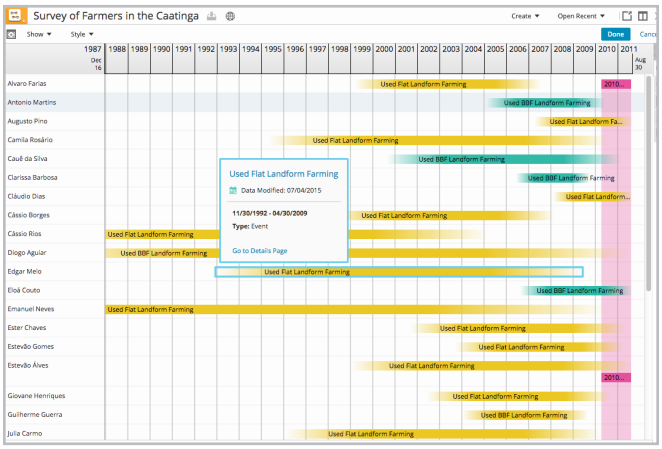
Build interconnected information networks with Occurrences

Occurrences are the problem-specific building blocks of an information network that any Savanna user can access and quickly add new discoveries and pull on existing data to connect information. With Occurrence templates, analysts can set requirements, define important fields and identify information gaps. These templates capture problem-specific information in a uniform way, eliminating redundancy and creating a common analytical framework that analysts can build on. Occurrences are fully sourced and linked between related profiles, allowing users to easily navigate between connected information.



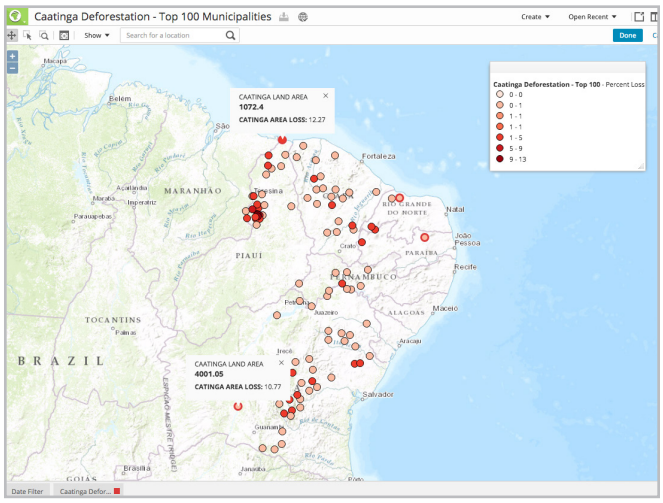
Visualize connections and relationships with Linknet

Analysts can add multiple Occurrences from the information network to a Linknet to view interconnected people, places, organizations, events and things by simply dragging and dropping. Occurrences in the Linknet are fully sourced, allowing analysts to easily access information about individual entities on the Linknet.



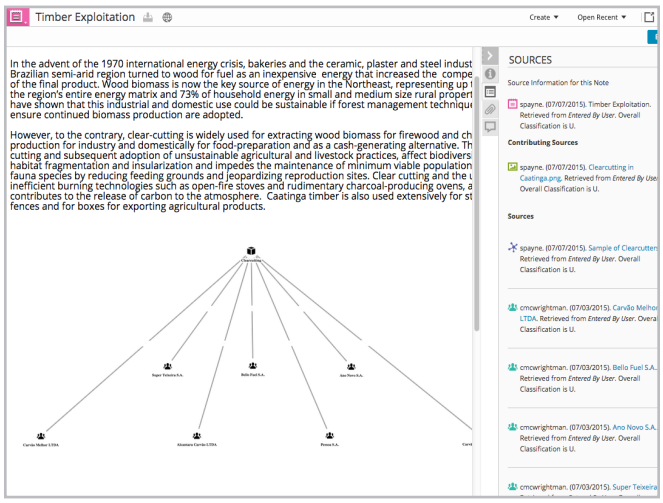
Temporally visualize information with Timeline

With Timeline, analysts can temporally visualize Occurrences (people, organizations, places, events and things) and their associated events by simply dragging Occurrences onto the Timeline. With Timeline, users can interact with Occurrence events by zooming, panning, drilling down for more specific information, and filtering with a temporal filter.



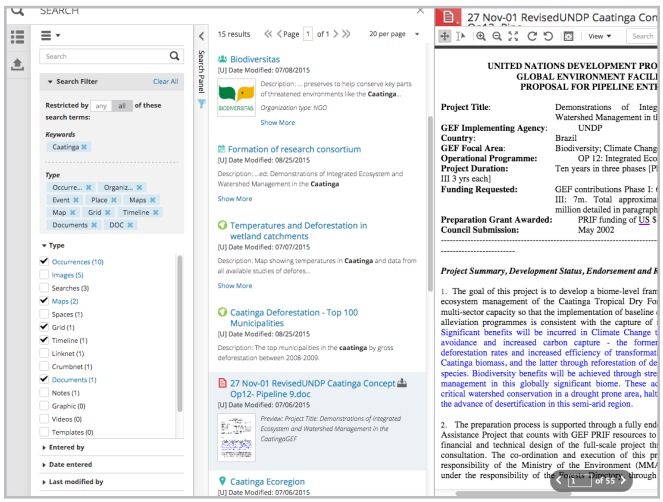
Visualize geographic data in Savanna's enterprise-level mapping tool

Using geographic data or a CSV file containing geographic coordinates, analysts can create and stylize maps to complement their analysis. Automated mapping of data sets facilitates visualization of large quantities of geographic information while customization tools allow the user to modify colors, base layers, and data visibility.



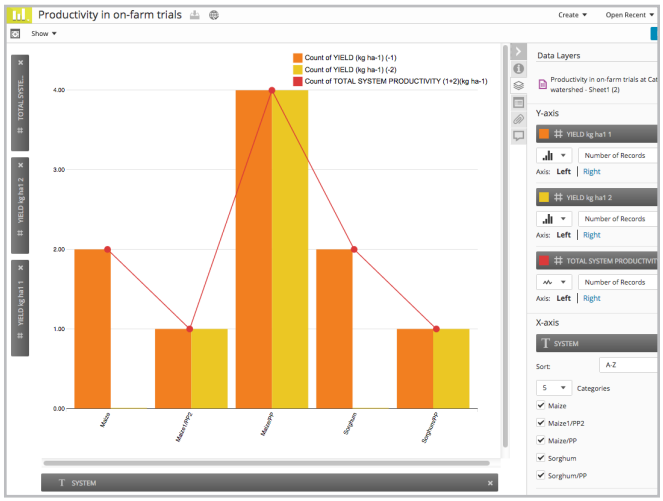
Support analysis conclusions with evidence created in Savanna and from other sources

Analysts collaborate on Crumbnets to support their conclusions with content created in Savanna, such as a screenshot image of a Map and relevant research. Viewers explore evidence in the form of documents, images, videos, maps, notes, quantitative data, and profiles of people, places and organizations.



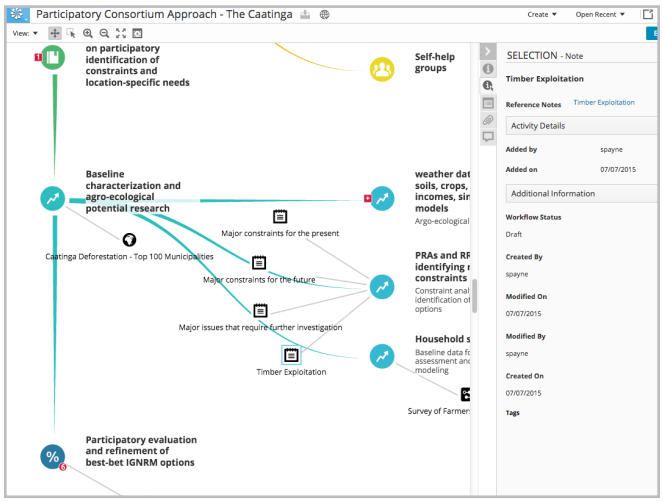
Discover external data and Savanna content through keyword search and filtering

Savanna's search capabilities enable analysts to find relevant data and model content among public material on the shared network through searching for keywords and other filters, such as file type and classification level. Search results can then be added to the user's Space and incorporated into their analysis. Searches can also be saved so that analysts can be alerted when new relevant content becomes available.



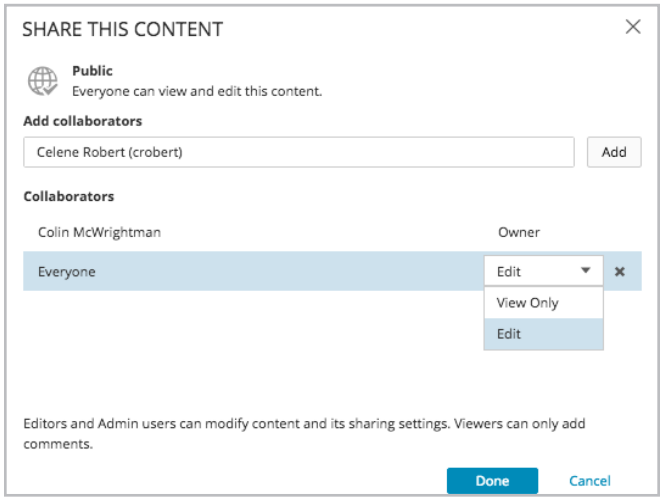
Visualize structured data as charts

With the Graphic tool, users can visualize structured data inside Savanna as charts (pie, bar, scatter, line) by simply dragging and dropping datasets onto the Graphic background. With Graphic, analysts can pick multiple columns of data to visualize on the chart, and choose custom style settings to visually differentiate the data.



Understand how information changes over time by tracking provenance and lineage

Savanna users have multiple options to describe information, including adding citation details, linking to contributing sources, attaching reference materials, and organizing related information in a Space. Savanna automatically captures details like citations and user activity for content created within Savanna.



Manage privacy settings to control access to classified information

Administrative controls enable careful management of user access to information. Users select private or public settings for material they create or upload. They can also mark information according to its classification level, thereby permitting public view of the information only for those users whose accounts are set to the same classification level.

SPOTLIGHT: CAATINGA WATERSHED MANAGEMENT

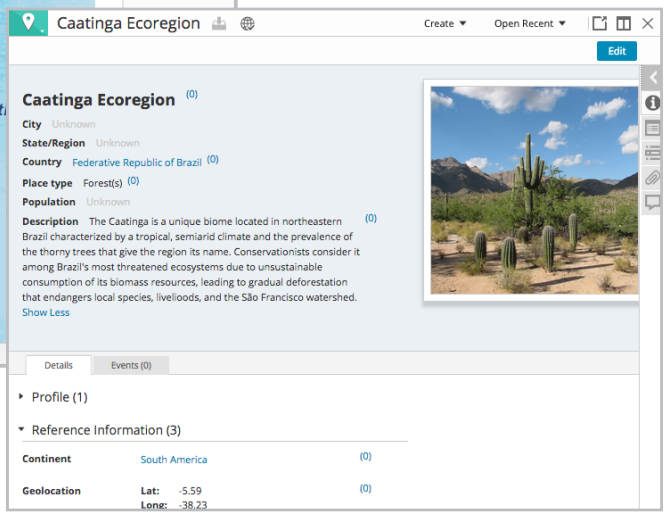


Figure on left: Map showing deforestation in Caatinga.

Figure below: Occurrence for Caatinga Ecoregion.

In the northern region of Brazil, the Caatinga has become one of the most threatened watersheds in the world. Deforestation and a lack of conservation efforts have driven this once richly forested region to the brink of ruin.

Integrated watershed management with participation of key people and organizations has become widely accepted as the approach best suited for sustainable management of renewable and non-renewable natural resources in upland areas like Caatinga. Many barriers, including systematic, institutional and financial capacity, have limited holistic actions from all involved parties. Because of the complex, multi-party involvement of this issue, a collaborative and holistic environment is necessary for effective analysis and dissemination.

Savanna's collaborative workspace and unique, model-based approach are ideal for analyzing complex problems like watershed management. Savanna's dynamic, all-source analysis environment gives analysts the ability to investigate an integrated watershed management project, gather research about the history and effects of deforestation, and compile evidence to implement strategies for rebuilding watershed methods.

A group of analysts decides to explore watershed management techniques, as well as projects that can be implemented to improve living conditions in Caatinga. First, they use Crumbnet to create a narrative mind map that outlines the steps needed to develop a scalable community watershed development model in Caatinga's devastated Ecoregion.

With Savanna's dynamic Occurrence dossiers, the analysts collaboratively populate an information network about key players working to establish Caatinga's watershed management model. Occurrences are building blocks that capture people, organizations, things, places and events related to a problem. In this case, the analysts make Organization Occurrences for members of a participatory consortium. Under its Event section, they connect the Caatinga Ecoregion Place Occurrence to an event representing regional farm trials.

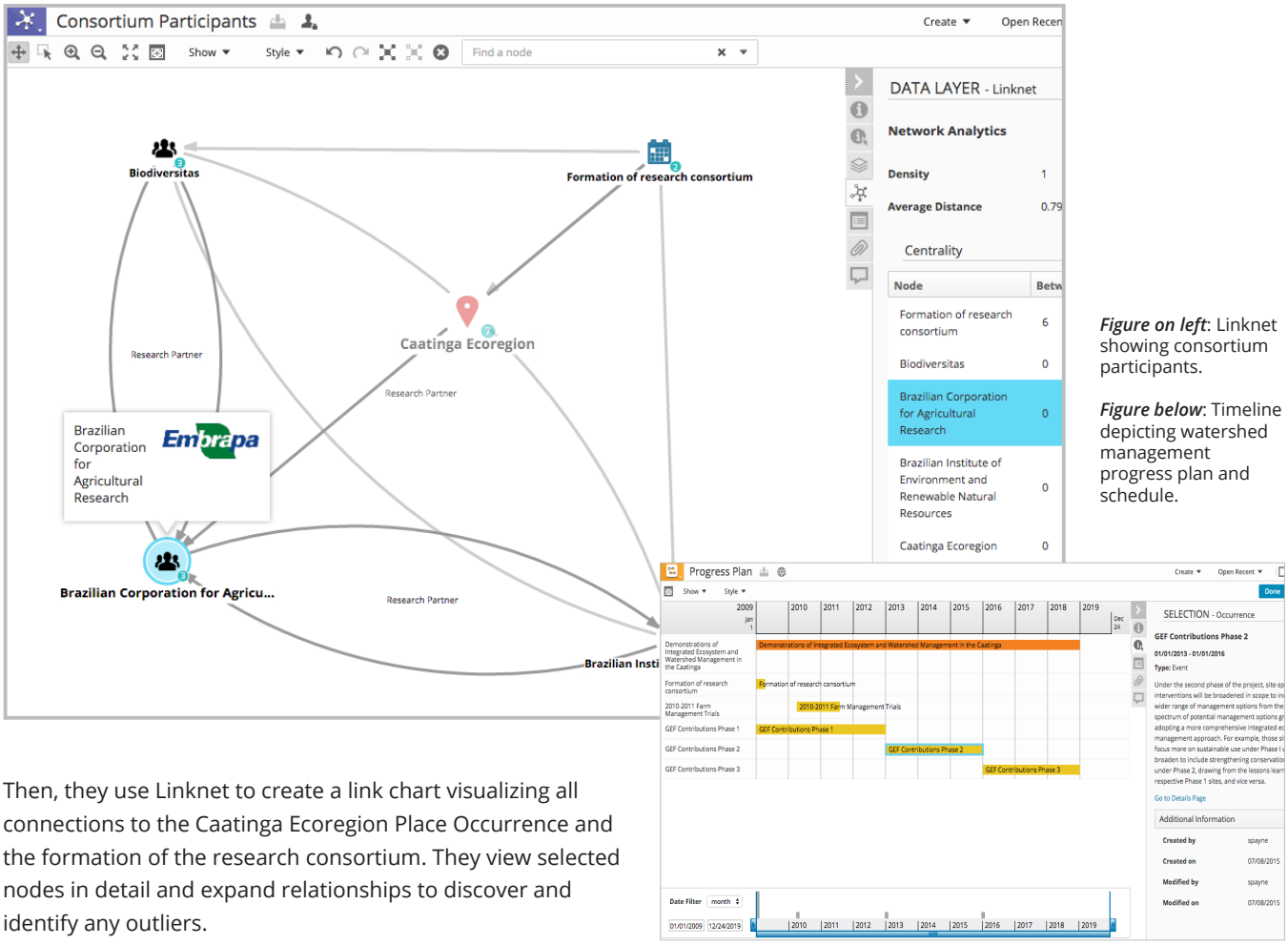


Figure on left: Linknet showing consortium participants.

Figure below: Timeline depicting watershed management progress plan and schedule.

Then, they use Linknet to create a link chart visualizing all connections to the Caatinga Ecoregion Place Occurrence and the formation of the research consortium. They view selected nodes in detail and expand relationships to discover and identify any outliers.

In Timeline, the analysts drop multiple Occurrences, such as various notable Event Occurrences, onto a visual span of time to draw connections between events within each Occurrence. Visualizing event times from multiple Event and Place Occurrences side-by-side gives analysts the opportunity to see the progress of the watershed management plan. They can also use the Selection panel in the Details sidebar to read more about the events on a Timeline, with links to view the events in more detail in the Occurrence view.

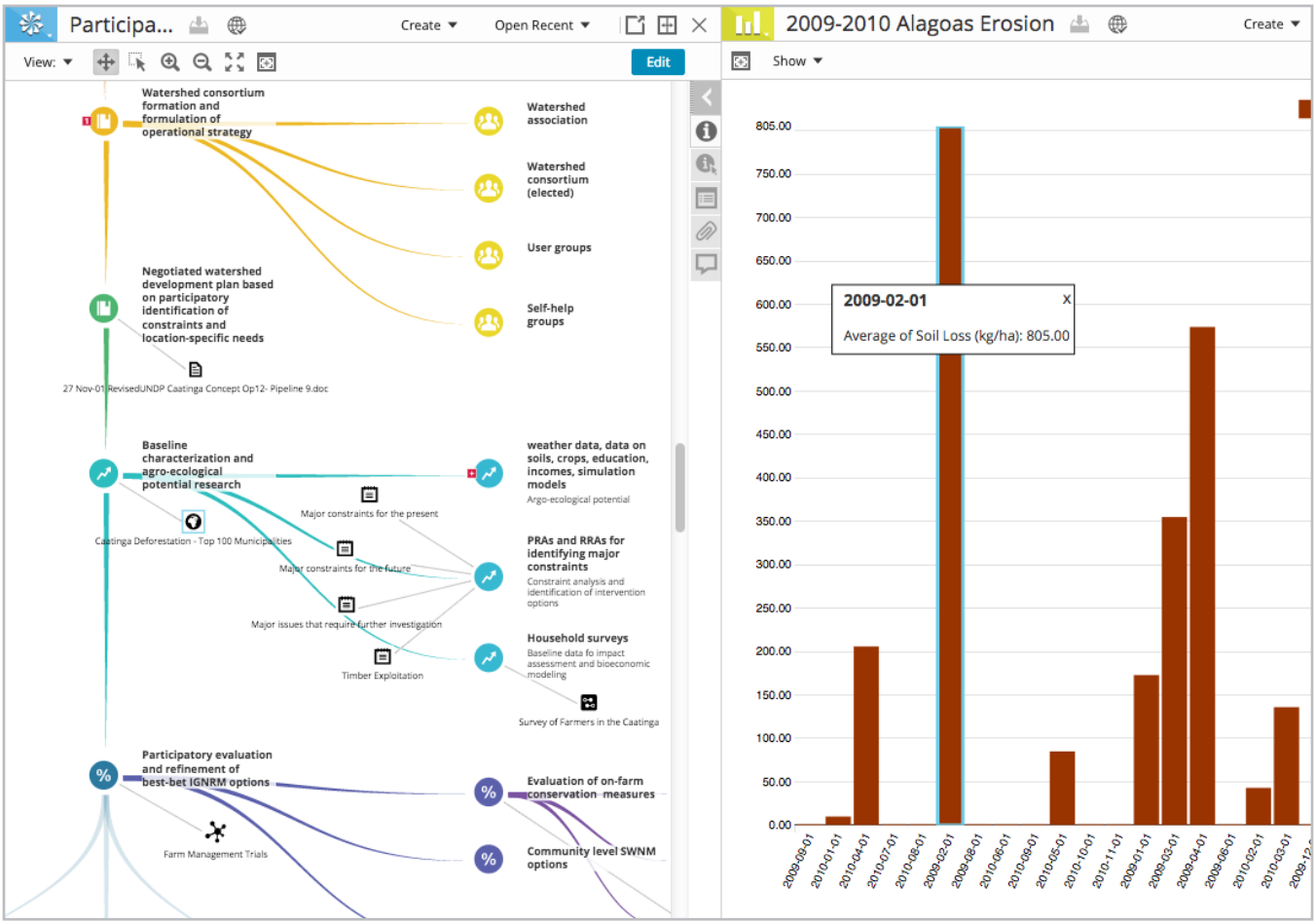
To provide more supporting evidence, the analysts can use Savanna's Search tool to find relevant content. Because Savanna's Search feature can pull indexed mentions of key terms from within PDFs, they're able to find the summited Caatinga proposal uploaded by another Savanna user. They can easily add the PDF to our Space to be used as supporting evidence in the Participatory Consortium Approach Crumbnet.

With the Map tool, they can geospatially visualize a CSV of gross deforestation in Caatinga. The category lens gives them a detailed view of the percentage of loss in each region, while the temporal filter gives the analysts a view of the incidents within a certain date range, making it easy to see when and where deforestation began to increase.

The Result

The analysts revisit the Crumbnet outlining the consortium process and add discoveries and evidence collected throughout their analysis. From the Space Content panel, they add the deforestation Map and Productivity Trials Graphic as supporting evidence to a node. The Crumbnet now acts as a final summary of the analysis and is shared with team members and exported to PDF to send to fellow analysts and decision-makers for further action.

BENEFITS



Decision-making insight

Whether reviewing content from a bird's-eye view or focusing on a detailed event profile, decision-makers gain the critical insight they need to determine when to adjust organizational strategy in response to growing risk indicators.

Agility

Using Savanna's dynamic information management capabilities in coordination with Analyst's Notebook's data analysis tools, organizations can maintain current intelligence needed to respond to rapidly evolving situations and perspectives.

Productivity

Savanna eliminates the time required for integrating analytical output and sharing and formatting files, resulting in more time to devote to analysis and review.

Expanded source material

The ease of uploading and manipulating diverse forms of data frees analysts from technological limits to incorporating all relevant information. Should a growing conflict present incomplete or fuzzy data, analysts can utilize such information in Savanna and update it as clarifying details emerge.

Reduced exposure

Savanna minimizes exposure to error resulting from bad information by offering users the ability to annotate all source material and analysis products. Automatic updates documenting user activity further assign ownership while privacy settings maintain protected data.

CONCLUSION

Complex problems require multi-part solutions. With the rise of tools to mine large data sets, businesses have reaped greater knowledge from structured data[1]. However, challenges involving human variables like drug trafficking require a more nuanced understanding of context. Particularly when information is scarce, analysts must give special attention to informal knowledge, which they can use to construct formal models of how their problem space works.

Only by viewing problem spaces through multiple lenses and exposing inconsistencies can companies identify—and begin to quantify—risks. In doing so, alternatives become clear, imperatives become known, and negative consequences are avoided.

ENDNOTES

1. Furrier, J, "Big Data Is Big Market & Big Business - $50 Billion Market by 2017," *Forbes*, last modified February 17, 2012, accessed September 25, 2014, from http://www.forbes.com/sites/siliconangle/2012/02/17/big-data-is-big-market-big-business/.