Banni in a time of change:

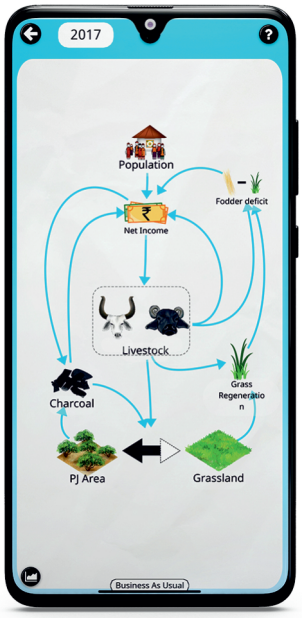
Interactive Simulations for Systemic Engagement

A Collaborative Project between DESTA, ATREE, BTN & Sahjeevan

OBJECTIVE

The objective of our project was to develop a multi-stakeholder insight-building tool for consensus building and initiating discussions on the sustainable management of the Banni grasslands, through participatory workshops

The design of the tool was envisaged to help stakeholders build insights beyond the obvious, and build consensus on best possible decisions that could lead to sustainable management of the Banni and explore potential future scenarios under 'What if' conditions.



Features of the App

1. The App comes in three languages 1) Hindi, 2) Gujarati and 3) English

2. Three preloaded scenarios, 1) Business as usual, i.e. keeping climate and decision making as it is today, 2) Climate Change, i.e. simulating 3 years of consecutive droughts (50 mm rainfall), 3) PJ removal policy i.e. removing the Prosopis Juliflora (PJ) trees in order to restore grasslands.

3. The end user can develop their own scenarios by combining all possibilities. This includes changing market prices and livestock breeding rates

4. The App can run simulations up to the year 2050 and has a time slider to manually re-run the simulation and observe changes more closely.



CONTEXT

The Banni grasslands in Kutch, Gujarat, India, is an area of approx. 2500 sq kms. There are 55 villages within Banni and it supports the livelihoods of a number of semi-nomadic pastoralist communities, collectively known as Maldharis. It also provides habitat to a multitude of unique flora and fauna, despite receiving on average just 340 mm of rainfall a year.

The pastoralist communities have used the grassland as a common resource for grazing of their livestock, predominantly the Banni buffalo and Kankrej cattle, for several centuries. Over the years however, due to a multitude of reasons, but predominantly due to the plantation of the non-native invasive mesquite, Prosopis juliflora (PJ), the grassland has degraded. Currently it is faced with problems of falling grassland productivity, increasing livestock populations, continuing spread of P. juliflora, conflicting views on land ownership and management practices (within and among local communities, and with social managers), changing aspirations of people, and the overarching threats of climate change, especially rainfall variability. The dominance of P. juliflora over grasses of Banni has resulted in a change in the livelihoods of the locals as well. The predominant livelihood of livestock breeding and trading, has been negatively impacted through the reduction of fodder availability. However, the emergence of a charcoal economy, based on the wood supply from P. juliflora, has also resulted in the emergence of an alternative livelihood. The income from the charcoal economy now also supports the livestock-based livelihoods. Further, an increased integration with the dairy industry since the mid 2000s, has resulted in a shift in the nature of the pastoral livelihoods from predominantly livestock breeding and trading to milk sale. This has also resulted in an increase of the livestock population (to produce more milk) and brought about a reduction in their mobility (as the milk value chain needs a steady supply head from a fixed location). The pressure on the grassland thus has increased. Another recent trend is the privatization of the erstwhile commons into privately owned 'wadas' (land parcels for agriculture) used by the owners for rainfed agriculture. This diversification is contested by many in the community.

Due to its simple, interactive, and engaging nature, the App has a greater outreach as compared to the system dynamics model.

ABOUT THE APP

Banni in a time of change : *forms the interface of a system dynamics model that was developed for the Banni grasslands. The system dynamics model captures the interactions between land, biomass, livestock, livelihood/economy and rainfall. The model was built through a participatory process, to which the local community, multidisciplinary researchers and representatives from a local NGO engaged in the landscape, all contributed. The engagement with these stakeholders was done through the tools of systems thinking (iceberg, causal loops, stock-flflow diagrams).*

The model was built in order to serve as a learning tool that could help people understand different possible future scenarios of Banni. It is meant to provide insights and not future forecasts. The model simulates the overall behaviour of the system, from 2018-2030 and up to 2050, by modeling the interactions between various ecological and economic variables. This is particularly helpful since the human mind is often unable to remember and simulate such interactions to understand how systems could behave over time. It is for this reason that we are often surprised by the outcomes of our own interventions, i.e., what we expect vs what actually happens. The outcomes are often distant over time and space, and the effects of our own actions may only be seen after a long delay. An example is the current dominance of the alien invasive species Prosopis juliflora (PJ) on the Banni grasslands as a result of interventions many decades earlier (it was introduced as far back as the 1960s). Hence, for sustaining commons such as the Banni grasslands, it is important that people are enabled to think through such interactions between ecological and economic systems, and what impacts their own decisions would have on their lives and livelihood.
Converted into a mobile App, the model becomes far more engaging in nature. The App uses pictures, interactive graphics, and simplified model structures to replicate the insights that the simulation model is capable of delivering.

APP USAGE FOR ENGAGEMENT

The app also has a systems story which explains the interconnections between the grassland, PJ trees, livestock, dairy, charcoal, income, fodder deficit, livestock sales and population. As the story unfolds the user is taken through the causal loop model. The user can tap and understand the description of each variable. The app is interactive as it has images which change over time replicating the changes in values of these variables as happening in the system dynamics model

Through a process of facilitated workshops the app has been used as an engagement tool with the community. The workshop format begins with group mental simulation exercises, where people envision their futures collectively, and present them to each other using graphs. Their scenarios are then compared against the runs in the App. This reveals key assumptions and allows them to be tested collectively.

The differences observed between scenarios from different groups are also compared and evaluated for their plausibility. The people experience how they think about the common system from different points of view and how their different points of view are often complementary and not competing in nature. This is a key shift in mindset for consensus building and collective action.

SCAN QR TO DOWNLOAD
"BANNI IN TIME OF CHANGE" APP

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