Geospatial Image Collection to Improve the Specificity of Climate Interventions.

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Abstract

Climate communication involves deep community engagement and multiple parallel behavior interventions for a wide array of audiences. Images include large amounts of culturally nuanced details that can improve the social uptake of community climate interventions. Image specificity grounds information within subgroups improving the relatability and accuracy of emerging regional interventions. We experimented with using ArcGIS to collect and sort regionally and topically sorted climate mitigation and resilience behaviors. We'll review how our team set up a feedback loop in Survey123 and ArcGIS and how this might be useful in future climate messaging.

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Abstract:
Climate communication involves deep community engagement for a wide array of audiences. Images include large amounts of culturally nuanced details that can improve the social uptake of community climate interventions. The most effective climate communication involves engaging community members using tools that are tailored to the community itself. Using local images provides cultural context that can improve the relatability and accuracy of emerging regional interventions. We used ArcGIS Online to collect local images from Santa Cruz County, California using the Survey123 platform. We then sorted the images based on categories of climate mitigation and resilience behaviors. We'll review how our team set up a feedback loop in Survey123 and ArcGIS and how this might be useful in future climate messaging.

Methods:

We used the ESRI software, Survey123 to collect images from the Santa Cruz county region of current climate engagement work. By clicking on the provided QR code any community participant can enter data into the story feedback system. To seed the collection with the first set of images, we partnered with a local climate action non-profit that ran a photo contest. The images of that contest were displayed downtown, printed at a climate action festival with tables for community members to join local climate action programs. For digital display, we created a hosted feature layer from Survey123 input to display on ArcGIS Online webmap. We displayed images in the legend based on the main category input by the users.

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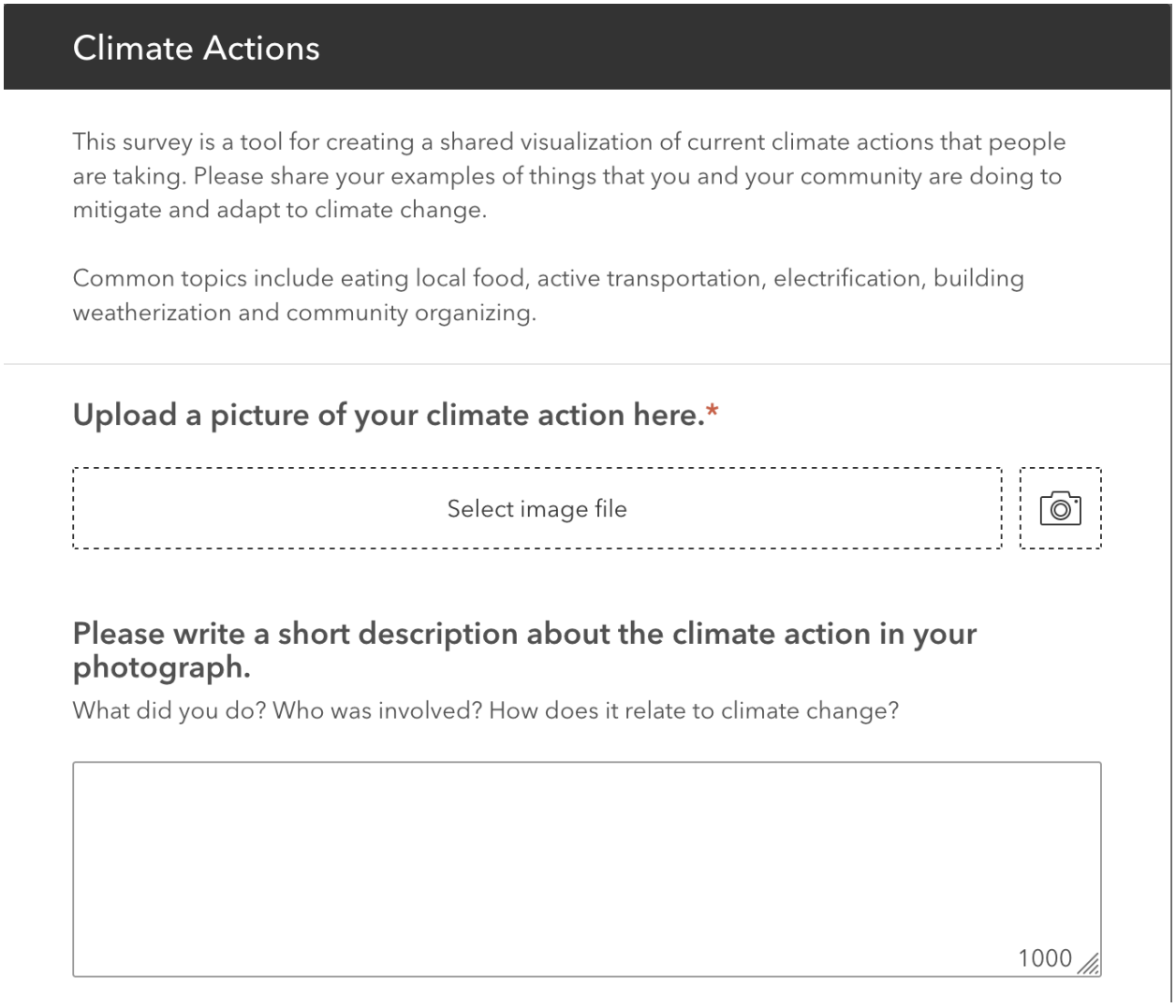
Survey:
Our input link is (https://arcg.is/1C4er51). We provided it as a QR code shared in public places for the community to enter examples of their own experiences. This is what the Survey123 input form looks like on the user's device. We then experimented with two different display methods, one is a StoryMap landing page (https://arcg.is/0WaP950) and another provides the same information grouped into tabs by topic area (https://climatemapsc.maps.arcgis.com/apps/Shortlist/index.html?appid=5cabaa68671c4b18b6fb8a6dd4a2d21c).



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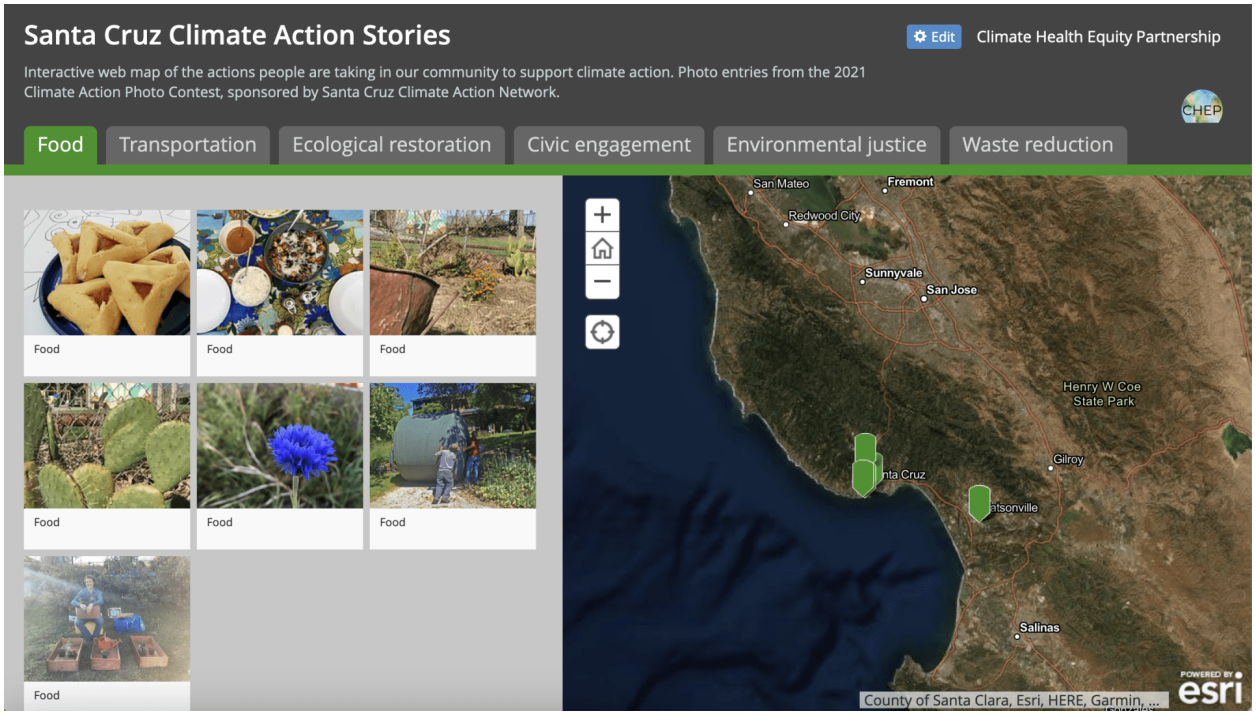
Images of Community Engagement:
We sorted the images that the community submitted into groups under the subheadings: food, transportation, ecological restoration, civic engagement, environmental justice, and waste reduction. The images are visually clustered geographically. Displaying the clustered groups as a place-based representation allows us to see community engagement patterns in detail. We anticipate that with more data over larger areas, we would be able to see trends in regional variation which would assist in community climate engagement.

Results:
The results display an assortment of existing community engagement on climate-related interventions. Common misperceptions include that nothing can be done, that no one is doing anything and there's no way for community members to participate. This image set challenges those misperceptions by visualizing concrete existing, present-day community participation. We noted that the community did not submit images of energy transformations in this first prototype. In future work, we'd recommend that this be a targeted point to help start including images of renewable energy transformations in the visualizations. The represented projects show a lot of home-based intervention. There are larger interventions in our community including Central Coast Community Energy, a community choice energy agency established by local communities to source renewable electricity for Monterey, San Benito, and Santa Cruz counties. There were no images of electric car charging, despite an increase in electric cars in our district. Active transportation is also popular here, however, we only have a few submissions for active transit. There are also a lot of food interventions in the area, this is a major agricultural region but the regional food production and distribution are underrepresented visually.

Climate and health connections are also conspicuously absent. We have climate health impacts in the region from heat and wildfires. The local coverage of the fires does not connect reliably to health impacts or actions that community members can participate in. The public health impacts from climate change regionally are more difficult to visualize. Images are not captured by the treating physicians and there are too many labor and privacy barriers to crowdsource image collection in the same way that we're collecting mitigation and adaptation images. At this point, we'd recommend that the health impacts visuals be captured as partnerships with public and private health facilities in the same way that the covid dashboards have recently become normalized. We learned through this process that tying image and story collection to community programs would be more efficient than individual contributions. Although it would be good to include both as coexisting content streams. Through partnerships with the Santa Cruz Natural History Museum and the Museum of Art and history, we are continuing to prototype how to connect image and story collection into existing public exhibits for individual contributions.

While this project prototyped the GIS tool in Santa Cruz, California. The methods used for collecting and sharing regional climate engagement examples can be used globally for any region. This method would be most effective if paired with already existing regional media production and community program engagement. It would improve the regional visualization of existing community participation in climate mitigation work and help normalize and expand participation.



Broader Impacts:

As we expand community-based engagement programs under the Action for Climate Empowerment work (T. E. Bowman et al., 2021; T. Bowman & Morrison, 2021), we strongly suggest that a visual community feedback model using a GIS tool be used as a component of the overall participatory strategy. We'd recommend that in future directions for this work that this methodology be expanded as a program under an existing climate communication resource program. It would be easier to produce the GIS links and provide the StoryMaps as a resource for each region than for each community trying to recreate this as a process due to a lack of coordination. The subsequent images could then be fed into dashboard systems, repurposed for print, news, and other media coverage of real-time climate solutions and health impacts.

Refernces:

Bowman, T. E., Cintron-Rodriguez, I., Crim, H., Damon, T., Dandridge, C., Kretser, J., Morrison, D., Niepold, F., Poppleton, K., Spitzer, W., & Weiland, L. (2021). Building capacity, momentum and a culture of climate action in the United States. *Environmental Research Letters*, *16*(4), 041003. https://doi.org/10.1088/1748-9326/abe961

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