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VOYAGE FROM PRINT TO DIGITAL

A walk down memory lane

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Kitty Currier demonstrates kite aerial photography to a group of students near Pejarakan, Bali



TOURISM & TRASH: MAPPING CONNECTIONS IN WEST BALI

Maps are going viral in a good way by uniting local communities to proactively save the environment.

By **Kitty Currier**, research associate for Biosphere Foundation

In the village of Pejarakan, West Bali, Indonesia, tourism is slowly replacing agriculture as the predominant local industry. As land once used to grow corn, peanuts, and chili is developed to support homestays, villas and resorts, the community is changing in other ways too.

Hole-in-the-wall shops sprout along the main road during the high season; cement has replaced dirt on back roads; and enrollment at the local tourism vocational high school has skyrocketed. Yet, the potential for other, less palatable changes remains: more trash to manage, competition for resources like

fresh water and space, and loss of traditions tied to an agrarian way of life.

I moved to Pejarakan about a year ago to conduct research for my doctoral dissertation in geography at the University of California, Santa Barbara. As a geographer, I believe that maps can help reveal connections between people's activities and the condition of their environment. A map helps to visualise, for example, the path of a plastic bag tossed into a mountain stream, winding its way down a watershed until it lands in the sea, perhaps settling on a coral or continuing its journey via oceanic currents.



Biosphere Foundation partner Ketut Sarka helps students take a survey on trash management in Pejarakan



Students collaborate to align kite aerial photographs into a mosaic during mapping class in Pejarakan



Students use Google Earth to align kite aerial photographs during mapping class at Biosphere Foundation's field station in Pejarakan



Aerial photograph taken from a kite near Pejarakan

Here in Pejarakan we are using map-based surveys to collect opinions regarding two topics: trash – particularly plastic – as an environmental problem; and tourism in West Bali – its future development including opportunities and challenges. Residents and visitors, alike, have been invited to participate to gather a variety of perspectives. The surveys are hosted on SeaSketch, an Internet-based mapping tool for collaborative (usually marine) spatial planning.

Map-reading and map-making, however, are not universally shared abilities. In a place where few people use computers, and Google Maps on smartphones only rarely, administering a digital, map-based survey may seem an impossible task. One activity we have used to teach map-reading skills is kite aerial photography (KAP).

In KAP, a camera is suspended from the line of a flying kite and lofted to an appropriate height, usually 60-120 meters above ground. The camera snaps pictures automatically on an interval, usually 5-10 seconds, as the kite operator walks along a path to be photographed. Afterwards, the pictures are aligned to create a continuous aerial photomosaic that can be used like a map. By conducting a KAP survey, then aligning the photos by hand in hard copy or digitally in Google Earth, participants learn to connect their ground-based perspective with the aerial perspective of a typical map.

Thanks to the connections of our friend and collaborator Pak Nasa, a local English teacher, several groups of high school students have participated in a class we have offered that focuses on computer mapping skills. Using five donated laptops set up at our field station in Pejarakan, they've created maps in Google Earth, submitted corrections to places in Google Maps, and edited OpenStreetMap (an open source, world-wide map of places from which Google pulls much of its

data). By correcting these geographic datasets, the students gain practice reading and using Internet-based maps while helping to make the places in their village discoverable by visitors.

With their newfound skills in computer mapping, these students have helped administer the surveys on trash management and tourism to other residents of Pejarakan and surrounding villages. At a recent meeting at the village head office, three students and Pak Nasa assisted local leaders with the surveys. Their help, combined with the attention, curiosity and patience of the participants, led first-time computer users to successfully complete, and perhaps even enjoy the surveys. The experience demonstrated that people with no prior computer experience could participate in a digital effort to crowdsource geographic information for environmental planning – something that is now common in more affluent countries but is rarely practised in the developing world.

As in many places, residents of West Bali face choices about how best to use and develop their resources such as land and sea, coastlines, infrastructure and community, among others. Many have expressed a desire to proceed in a way that improves their standard of living without sacrificing the integrity of their environment or culture.

In pursuit of this goal, grassroots initiatives like Alam Lestari and Nature Conservation Forum Putri Menjangan have arisen. These community projects were established to preserve local mangrove forests and coral reefs through eco-tourism, recognising that healthy ecosystems have monetary as well as environmental value. As West Bali's tourism industry evolves, maintaining the character that makes the region unique will require careful planning and perhaps a few more maps.📍

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