

# KEY-LOG ECONOMICS

*Research and strategy for the land community*

To: Jane Disney, Director, Mount Desert Island Biological Laboratory  
From: Spencer Phillips, Director/Economist  
Date: 04 January 2022  
Subject: Project Completion for “Creating Economic Tools to Address Debris Issues in Vietnam”

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As a result of our work together on this project, Anecdata has both the multilingual capabilities and the flexibility to grow and evolve with the need for solid information about ecological-economic issues in Vietnam. Local organizations, starting with our partner/client Keep Hanoi Clean and others (see below) are using Anecdata in an effort to develop a province-wide environmental assessment that will identify municipal solid-waste (MSW) management hotspots where additional resources and better strategy is most needed. We are also using the anecdata project to help educate users about the connections between MSW problems and economic, health, and other effects on human well-being. Finally, we are looking forward to a day when data collected on anecdata .org can support quantitative estimation of the ecological, public health, and economic risks presented by poorly managed MSW.

As that last sentence implies, however, we have had to adjust our expectations or target outcomes for this project. Initially, we had hoped to develop an algorithm by which an estimate of the economic impact of any particular quantum of poorly managed MSW, be it a pile of household waste awaiting pickup, a pile of construction debris, or old furniture burning by the roadside. In theory, each of these situations would contribute, marginally and for example, to an erosion of aesthetic value that can dampen tourism expenditures, to road hazards that cause damage and excess repair costs for vehicles, and exposure to airborne toxins that lead to excess morbidity and premature mortality. Each of these could have significant economic costs.

We were not able to achieve that vision within the scope of this small project, however. We encountered two barriers, the first of which is a paucity of primary studies necessary to provide a robust and therefore credible means of connecting the dots from litter piles in various locations, to human exposure, to lost wages or other economic indicators. The second has been the simple technical difficulty of translating observable data into even biophysical measures (weight and volume) of observed/collected MSW. We have completed an extensive review of the scientific literature on MSW issues, and we have found that while there is information that could inform parts of the envisioned algorithm (e.g. rates of “leakage” of trash from the MSW management system to the environment, such as from an overflowing dumpster to a waterway), there is very little beyond anecdotal evidence on the economic end of the envisioned algorithm.

Moreover the data requirements to use even existing leakage calculators *with a much narrower scope and ambition* are beyond the current capabilities of this project. For example, the International Solid Waste Association, working with a team of researchers at the University of Leeds, have developed a “[Plastic Pollution Calculator](#)” that estimates the quantity of plastic waste only at risk of reaching oceans or otherwise damaging the environment. Even so, that tool operates at a district level — the equivalent of a county in the U.S. and not at the fine-grained level at which Anecdata observations are collected. (We are reaching out to the Leeds research team, however, to determine how we might be able to use our data in a future version of that model that also covers other important components of the MSW stream.)

All of that said, we are still pursuing the ultimate goals of this project, and we have made important strides toward it in this project by focusing on four intermediate steps:

- Making anecdata.org accessible to persons who do not speak English

- Building, testing, and rebuilding an anecdotal project for the collection of detailed MSW information by volunteer citizen scientists.
- Working with Keep Hanoi Clean to pilot the data collection effort as part of its “Hanoi Province Environmental Conditions Assessment” and, more recently, working with other organizations to use our project for household, business, and other waste audits.
- Developing summary information about economic effects of MSW leakage and presenting that information through an interactive tool within the anecdotal project.

The following is a brief summary of what we have done and where we are on each of these elements.

Throughout, bear in mind that while COVID and other factors have affected our timeline and scope to date, our vision is the same, and we will continue to improve and use our anecdotal.org project in the cause of improving SWM, as well as lives and livelihoods, in Vietnam.

We will look forward to keeping you apprised of continued progress, as well as to deploying the information developed through the use of anecdotal in efforts to achieve real, on-the-ground improvements in Vietnam’s solid waste management situation.

## Making Anecdotal Multilingual

This achievement is the result of MDIBL’s hard work and creativity. Cait Bailey has been wonderful to work with as she quickly understood what it was that we needed from the anecdotal app in Vietnam. She went above and beyond the call by not simply making a one-off Vietnamese language edition. Rather she developed a way for project administrators (like Key-Log Economics in this case) and other users to put their projects and the app into any language they choose. Our role in this achievement was in helping to think through some of the translation features and getting the necessary back-end and project-specific components translated into Vietnamese. For the latter we hired a native speaker from Hanoi (a recent University of Virginia Graduate who had worked with us previously on the literature review part of the project) to help with the translation and to test out the translation functionality. The result is that when users open the anecdotal app on their cellphones, they see everything from the anecdotal signup to solid waste observation fields in their phone’s default language.

**Future Possibilities** regarding translation could focus on making the project information (the landing page for any project) as well as all help text within data sheets to be as fully multilingual as are things like the “add observation” functionality, and our custom data types.

For now, and because our project is initially targeted at needs in Hanoi and Vietnam more broadly, our front-end material is in Vietnamese, but with a note to “Scroll for English” in each section. Were one to expand the use of the project in other places in SE Asia, for example — something we see as important and useful as a means of collecting standardized information on how solid waste affects lives and livelihoods in the region and beyond — we would quickly run out of space to explain the project, provide background information, and supply in-datasheet help text in additional languages. A better outcome would be one in which all of the project information and help served up in the phone’s default language.

## Building “Kinh Tế Sinh Thái Việt Nam”

After some experimentation and testing with different configurations of the data model (what to collect and how to collect it) and with good advice and input from Cait, I have created a well-functioning anecdotal project we are calling “Ecological Economics Vietnam”. While that title may beg revision as we promote use of the project in other countries, it captures the essence of our vision, which is to do more than count trash, but also to connect ecology and economics. Indeed, through the course of developing the project, we have

added a datasheet to cover beautification efforts as well as ways for people to record what they find beautiful in their neighborhoods and not just what they find ugly. And as noted above and detailed below, we are also providing information about how amenities and disamenities contribute to human and economic well-being.

Rather than describing the project in detail here, I would suggest viewing it [on the website](#) or through the mobile app. Some key features relative to our project goals, however include:

- Separate datasheets to record information about:
  - Community SWM surveys, such as the “Hanoi Province Environmental Conditions Assessment ( HANPECA) project, in which waste is categorized, photographed and documented, but not removed. This was the primary function we had in mind when we began using anecdotal data.

With this datasheet, users record the location of a SWM “issue” such as a pile of litter, a burning pile of trash, an overflowing dumpster, and then characterize the site according to what is nearby (school, café, hospital, etc., which gets at the idea that waste has different impacts depending on where it is), whether there are special hazards (vermin, toxins, hypodermic needles), and estimates of the total volume of waste at the site and the percentage of waste in different categories (plastic, organic, etc.).

We developed a visual volume guide to help users more accurately estimate the amount of waste observed. Images of familiar objects from a grocery bag (10 liters) to a shipping container (30,000 liters) — yes we do see piles of trash that big! — are paired with their volumes, and the user can enter the appropriate volume into the datasheet through simple multiplication (e.g. 5 bin bags of 50 l each = 250 l). Behind the scenes, these volume estimates are combined with estimates of the weight of the various materials per unit volume, and (soon) users will be able to see a chart of the weight of waste observed in each category. (Such estimates would be a precursor to quantitative estimates of the economic effects of these SWM issues.)

- Community amenity surveys, so people can note the good things about their neighborhood, including parks, gardens, public art, and natural areas. The datasheet captures the location, and users characterize the amenity (playground, public art, water, etc.) and provide an estimate of its size. In cities like Hanoi, with exceptionally little greenspace per capita, documenting the places that people value and recognize as amenity resources will be useful to efforts to preserve and expand open space.
- Events held to remove waste from the environment and/or to support beautification projects like public art installations or community gardening (Keep Hanoi Clean’s programming frequently combines waste removal and longer term beautification). This data sheet includes information about the amount of waste removed by type (plastic, organic, metal, glass, etc.), as well as some demographic information about event volunteers. Like the waste observation datasheet, this datasheet provides the basis for summary information on the volume and weight of waste cleaned up.

Prior to this project, we had developed a Google Forms-based system by which Keep Hanoi

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Clean could track the amount of waste removed during cleanup events. We had created a bilingual form, but the system itself was English-based and, critically, there is no simple way to get location information into a Google Form. Easy/automatic geolocation is important for the “Observe Waste” function needed, and Anecdata proved to be the best platform.<sup>1</sup>

**Future Possibilities**, in the very near future, as it happens, for Kinh Tế Sinh Thái Việt Nam include the addition of datasheets for other organizations. For example, GreenHub is another Vietnamese NGO that is embarking on an effort to audit waste at the household level. We are now looking at their data collection protocol to determine what they would need in the form of a new datasheet and data types. GreenHub also does commercial waste audits (restaurants and hotels) and they incorporate brand information into their auditing. A third organization, Live and Learn, is gearing up to do community waste audits for one Hanoi District.

We are happy to be in a position to leverage the facility with anecdata we have developed in the course of this project into broader application by these other groups. We are striving to use common waste categories and metrics so that when it comes time to report on SWM issues and advocate for better targeting of resources, enforcement, etc. to the areas with the greatest need, these organizations will be able to combine their respective data for bigger impact.

## Hanoi Province Environmental Conditions Assessment

Keep Hanoi Clean’s flagship citizen science effort, HANPECA, has been in the works since before we had even heard of anecdata. It took some time for us (I am also an advisor to the organization) to find and secure funding for a pilot phase. Just as the funding was becoming available, the COVID-19 pandemic began to bite in Vietnam and the necessary volunteer training sessions and even small cleanup events where we could test the anecdata tools became difficult-to-impossible to carry out.

We did, however, manage to squeeze some training and outreach in between lockdowns and we developed a “pair-up-to-cleanup” campaign whereby groups of at most three people would do a cleanup wherever they wished and then record the results in anecdata. Not all groups did record the information, but we hope to improve on that score as the program becomes more widely known and practices.

As of this writing, KHC is working with district-level governments to gain support for piloting HANPECA, including completion of an anecdata-supported waste survey for two complete wards or communes.<sup>2</sup> Assuming continued progress on controlling the pandemic, training sessions followed by a full roll out in one ward and one commune are expected shortly after the lunar new year (1 February).

Under a separate project, our sister organization, Key-Log Economics Vietnam, is helping KHC by reviewing training materials, developing survey guidance/protocols, troubleshooting anecdata use issues, and, once the pilot ward and commune have been fully surveyed, we will develop reports with summary information, maps of observed MSW issue sites using from both anecdata’s built in mapping capabilities and our own more extensive geographic information system (GIS).

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<sup>1</sup> We evaluated several other options, including KoBo Toolbox (another user-customizable data collection platform), and various waste-measurement-focused mobile apps, but all came up short in one or more key characteristics. The options we considered either the could not function in multiple languages, lacked automatic geolocation, or had no flexibility for the type of waste or waste management activities that one can record.

<sup>2</sup> Communes are governmental units equivalent to wards, but for rural districts.

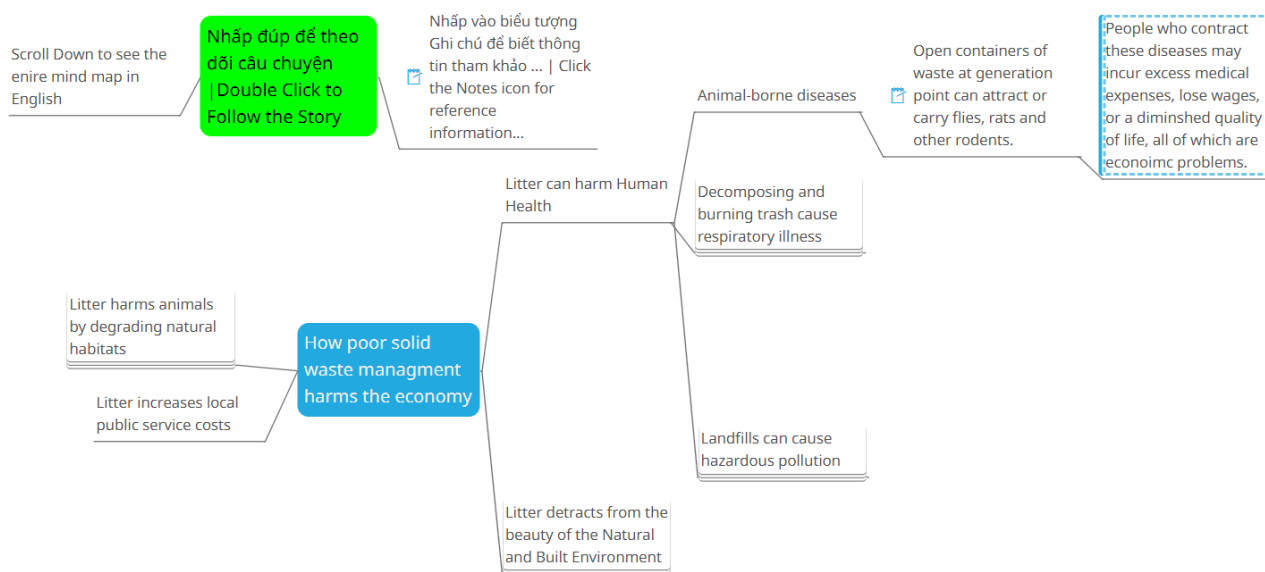
As part of that process, we will ask users to tell us about how they learned from and used information in the anecdota project about the economic effects of MSW issues (see below) and report back to MDIBL with all of the findings.

## Economic effects of MSW leakage

We are presenting evidence from existing literature on the effects of poorly managed solid waste on human welfare in the form of an online “mind map” served directly in the Kinh Tế Sinh Thái Việt Nam anecdota project<sup>3</sup>. Part infographic showing causal pathways and telling a story about how waste in the environment translates to costs in the economy, and part annotated bibliography (because notes on “nodes” in the mindmap can include further details germane to this project as well as full reference information), the mindmap encourages users to dive as deeply as they like into any particular type of impact.

In the screenshot below an English-speaking user is following the Human Health pathway to learn how litter provides habitat for animals who can pass diseases on to humans, causing excess medical expenses, lost wages, and diminished quality of life.

**Future Possibilities** related to economic effects include our continual review of the literature on MSW impacts and the addition of details and new pathways to the initial mindmap. Eventually, we do hope to use the data collected through the anecdota.org project to feed into quantitative estimates of the economic, human health, and other effects, but as explained above, that proved to be beyond the capacity of this small project.



**Figure 1: Economic Effects Mindmap Served as part of the “Kinh Tế Sinh Thái Việt Nam” project on anecdota.org.**

## Conclusion and Next Steps

We are very happy with the results thus far, and look forward to staying in touch with MDIBL as our use of the anecdota.org platform evolves to serve the needs of the various projects mentioned here proceed. We

<sup>3</sup> As we have only recently (in the last several days) discovered the means by which to share a live, interactive mind map and embed it in anecdota, we are still adding content to the map. We expect to have multiple ecological-economic “pathways” shown and translated into Vietnamese within the coming weeks.

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will share our analyses related to the HANPECA effort, especially, because those will include evaluation of the efficacy of the overall program (training, citizen science data collection, policy recommendations, etc.) and may provide useful insights for other anecdotal.org project teams.