



ZERO WASTE REVOLUTION

2015-2016 School Year

MONTHLY REPORT • DECEMBER

Cinematographer selected

Award-winning director, cinematographer, and editor **Gabe Cabagbag** has been selected to produce Lanikai School's Zero Waste Revolution video, funded by a \$15,000 Koaniani Grant from the Hawaii Community Foundation.

School Director Mr. Ed Noh viewed Gabe's past and current work posted on <https://vimeo.com/gabecabagbag> and was very impressed with his engaging storytelling, beautiful production values, and sensitivity toward his subjects. "My films strive to explore humanity in a very honest and truthful way," he says, "simply put, I love to create stories about passionate and inspiring people." *Hey, that's us at Lanikai*, as we pioneer a whole new way of understanding our place on the planet and the power of each person to effect positive, lasting change.



Gabe Cabagbag – searching for life's compelling stories conveyed through the moving image.

The plot is simple: We collect and process all the organic waste generated every day to create everything we need to turn our dry, dusty, depleted campus into an lush oasis of green, where healthy gardens, landscape and lawns flourish, kids live and learn a pono way to interact with their world, and noxious expensive waste becomes a faded memory. We will count on Gabe's creativity and capabilities to – as he says – "open viewers' eyes and motivate them to take action."

This collaboration will result in a lively and inspirational piece 10-12 minutes long suitable for screening at environmental conferences and festivals (Cannes! Sundance!) that will wow aspirants and attract financial supporters. Shooting begins in January; the video will be completed by June.

Hopefully, there will be sufficient footage and funds to also produce a few short technical training videos to be posted on YouTube. We are all looking forward to working with Gabe!

Bokashi trials underway

The two Bokashi Blasters that were filled in May at the very end of the 2014-2015 school year were decanted in August, just as classes were starting up again. Over two hundred pounds of the pickled “zombie food” was dug into trenches and buried into one of the AINA garden beds that had been planted with nitrogen-fixing cover crops over the summer. Raked on top was a box of our rich compost and a bucket of coffee grounds from Starbucks, all topped off with layer of mulch.

In September, tiny dry-land kalo seedlings were planted. Within weeks, the kalo bed practically exploded with robust vigor. Was it mostly the bokashi talking, or a combination of bokashi and other ingredients?

Kainoa wanted to test the value of bokashi used as a solo amendment for his science fair project. We had accumulated four Blasters full so there was plenty bokashi available for field trials

For the first trial, Mr. Sawyer rented a jack-hammer with a spade attachment to dig a foot-deep hole right into the hillside in the worst soil imaginable – bereft of any organic matter, sandy and depleted. Approximately 125 pounds of bokashi fermented material was thoroughly mixed in and then covered with another four inches of bad soil.

After two weeks, the pickled goop will be broken down to nutrients that plants can absorb. Following winter break, Kainoa will plant eggplants, carrots, beets, and radishes. The hypothesis is, “Bokashi is a rich and complete soil amendment able to sustain healthy plant growth even in poor soil.”

Additional bokashi trials are scheduled for January 2016.



Kalo responded magnificently to bokashi, cover crops, compost, and coffee amended soil



Can bokashi stand on its own in poor soil?



Kainoa will find out and submit original research for his science fair project.

State Robotics Championships

Teams Pizzabots and Triple L represented Lanikai School at the **FIRST LEGO® League** State Championship held December 5th at the Neal Blaisdell Center. Mr. Sawyer reports that they had an absolute blast! They boldly faced stiff competition from 59 other teams, proudly enjoyed cruising around with Sort-It-Out Sam, and came home with two awards: A First Place in Robot Design and Fourth Place in Robot Performance. *Congratulations* to our talented students for their best robotics season ever.



December visitors

We are always honored when the **Master Gardeners** come to visit. These folks are true practitioners: experienced and knowledgeable, forever challenging us with excellent questions. They are also loyal customers – we can count on them to support our compost, vermicast tea, and bokashi sales. Thanks to **Phyllis Fong** (far left) for setting up the tour. “Best project yet!” the MGs enthused.



Kainalu Elementary parent volunteer **Dyana ten Berge** (left) tagged along on a tour for **Juliet Matsumura**, Sustainability Coordinator for Kaimuki Middle School. They both encounter heavy resistance to implementing Zero Waste. At Kainalu, the custodians forbid mulch piles on campus! At KMS, the principal is convinced that students are unable to properly separate food and that hot compost piles will stink! We hold up Lanikai as a model to overturn such unfounded fears.



The Warden, Farm Manager, and Vocational Training staff from **Waiawa Correctional Facility Farm** were so impressed they requested a second tour in January for a group of higher-ups! They not only want to adopt our resource recovery practices at their farm, but also to develop a training program to provide green job opportunities.



Bottom line for December

Between December 1st through the 31st, there were only 14 school days during which students, staff, and faculty were deeply distracted with the Winter Concert, Student Council Canned Food Drive, Book Fair, various field trips, gingerbread house construction, Christmas parties, and antsy anticipation of winter break. 'Tis the season!

Although we did not move forward on any of our special projects, *waste happens* – relentlessly – and, of course, we continued to sort, separate, and process without fail. Total December food waste recovered and composted was **1,313 pounds**. Total to date is 7,091 pounds, or 3.55 tons. When we conducted the initial waste audit prior to starting the Zero Waste Revolution, our results predicted that Lanikai School would generate seven tons of food waste per year – right on the money. We are pleased that our audit proved to be well-designed and accurate.

Everyone was more attentive to event food waste in December, from classroom pizza parties to the Winter Concert attended by several hundred people. Mr. Noh e-mailed teachers to encourage them to re-commit to the school's health and wellness policy that discourages excessive sweets and party foods. They complied, mostly. In any case, December was a vast improvement over October, an embarrassing low point. Some food waste was lost in December, but not enough to be statistically significant, so we can claim a **100% landfill diversion rate**.

- 100% of all HI-5 cans and bottles were collected and redeemed.
- Approximately 90% of all paper and cardboard was collected and processed.
- Approximately 50% green waste was dumped out by the mulch area instead of loaded into the dumpster. We have made an arrangement with **Davey Tree**: If we pile our branches, cuttings, and other green waste in one spot, the Davey tree trimmers will periodically chip/shred the pile and add it to our mulch at no charge. We do them a favor by accepting mulch – it costs \$200 per truck-load in tipping fees at the landfill if they have to haul it out to Waianae. Davey guys delivered several loads of lovely, fragrant neighborhood-sourced mulch to us this month.

Recycling of green waste continues to be a challenge. The custodians worry about the spread of unwanted seeds, mold and pest infestations and items like coconut berries that presumably attract rats. These are legitimate concerns! More study is required and potential solutions investigated.



"G" from Davey Tree supplies local mulch and helps us to address our green waste issues.

First semester data

This is a good time to look at our accumulated data so far. We are exactly halfway through the school year – 5 months or 20 weeks or 91 days pau – aligned with the standard semester calendar in place at most schools. (Lanikai is organized by trimesters for grading purposes.)

<u>Week of</u>	<u>Vermicomposting</u>	<u>Hot Compost</u>	<u>Bokashi</u>	<u>Weekly Total</u>
7/27/2015	36 pounds	158 pounds	0 pounds	194 pounds
8/3/2015	128 pounds	182 pounds	0 pounds	310 pounds
8/10/2015	130 pounds	237 pounds	0 pounds	367 pounds
8/17/2015	157 pounds	112 pounds	0 pounds	269 pounds
8/24/2015	166 pounds	295 pounds	0 pounds	461 pounds
8/31/2015	157 pounds	0 pounds	177 pounds	334 pounds
TOTAL AUG.	774 pounds	984 pounds	177 pounds	1,935 pounds
9/7/2015	101 pounds	206 pounds	0 pounds	307 pounds
9/14/2015	129 pounds	250 pounds	0 pounds	379 pounds
9/21/2015	49 pounds	140 pounds	0 pounds	189 pounds
9/28/2015	0 pounds	0 pounds	123 pounds	123 pounds
TOTAL SEPT.	279 pounds	596 pounds	123 pounds	998 pounds
10/5/2015	48 pounds	268 pounds	0 pounds	316 pounds
10/12/2015	20 pounds	88 pounds	0 pounds	108 pounds
10/17/2015	110 pounds	476 pounds	33 pounds	619 pounds
10/26/2015	142 pounds	116 pounds	160 pounds	418 pounds
TOTAL OCT.	320 pounds	948 pounds	193 pounds	1,461 pounds
11/2/2015	108 pounds	337 pounds	0 pounds	445 pounds
11/9/2015	102 pounds	213 pounds	0 pounds	315 pounds
11/16/2015	136 pounds	244 pounds	0 pounds	380 pounds
11/23/2015	80 pounds	144 pounds	20 pounds	244 pounds
TOTAL NOV.	426 pounds	938 pounds	20 pounds	1,384 pounds

First semester data, continued

<u>Week of</u>	<u>Vermicomposting</u>	<u>Hot Compost</u>	<u>Bokashi</u>	<u>Weekly Total</u>
11/30/2015	141 pounds	273 pounds	0 pounds	414 pounds
12/7/2015	168 pounds	139 pounds	137 pounds	444 pounds
12/14/2015	156 pounds	299 pounds	0 pounds	455 pounds
TOTAL DEC.	465 pounds	711 pounds	137 pounds	1,313 pounds
AUG. thru DEC. TOTALS	2,264 pounds	4,177 pounds	650 pounds	7,091 pounds

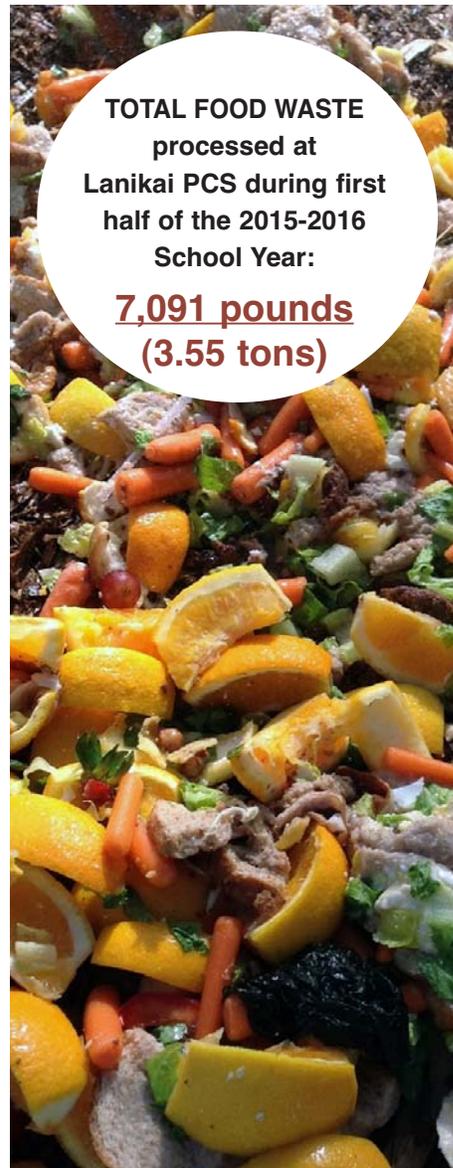
Analysis

- Food waste includes all lunch and snacks, plus occasional events (Teachers' Potluck, Winter Concert, etc.) Total food waste collected and processed: 7,091 pounds. **Food waste diversion rate: 100%**
- Average pounds of food waste processed weekly: 354.6 pounds.
- Average pounds of food waste generated daily: 77.9 pounds.

What? More waste than last year? Last year's daily food waste collection was measured at 68.2 pounds, but food waste *did not* in fact go up. The discrepancy in numbers indicates instead our increased efficiency in collecting snack waste since Sort-It-Out went on duty full-time. Sam's average daily catch is just under ten pounds.

- Percentage of total waste composted by worms: 32%
- Percentage of total waste hot composted: 59%
- Percentage of total waste bokashi composted: 9%

Great mix! This excellent balance of flexible composting technologies appropriately reflects content of food waste and provides a variety of valuable products.



HISTORY of our HOT COMPOST PILES



START DATE: **7/31/15**

Date Pounds Food Temp

7/31 158 80°
8/5 +109 150°

8/7 267 +73 162°
8/12 340 +88 160°

8/28 428 +61 156°
9/9 489 +89 160°

9/16 578 +25 160°
603

HARVEST DATE: 3/16/16

START DATE: **8/14/15**

Date Pounds Food Temp

8/14 149 80°
8/19 +112 146°

8/25 261 +141 156°
8/28 402 +93 164°

9/11 495 +117 160°
612

HARVEST DATE: 3/11/16

START DATE: **9/16/15**

Date Pounds Food Temp

9/16 107 90°
9/20 +118 142°

9/23 225 +140 164°
10/6 365 +73 164°

10/16 438 +88 154°
10/22 526 +98 160°

624

HARVEST DATE: 4/22/16

START DATE: **10/6/15**

Date Pounds Food Temp

10/6 195 90°
10/17 +87 150°

10/17 282 +95 160°
10/23 377 +196 160°

10/30 573 +116 166°
11/6 689 +17 164°

706

HARVEST DATE: 5/6/16

START DATE: **11/4/15**

Date Pounds Food Temp

11/4 175 85°
11/6 +145 148°

11/10 320 +84 164°
11/25 404 +144 158°

12/4 548 +148 156°
12/16 696 +134 156°

830

HARVEST DATE: 6/16/16

START DATE: **11/13/15**

Date Pounds Food Temp

11/13 129 80°
11/18 +124 158°

11/20 253 +120 158°
12/2 373 +125 160°

12/9 498 +139 162°
12/21 637 +165 160°

802

HARVEST DATE: 6/21/16

Hot compost analysis

Beauty is in the eye of the beholder

Although we were sadly *not* chosen for the Cooke Foundation’s 2015 School Beautification Award, few would dispute the attractiveness of the completed Compost Crescent, hugging our garden beds. Since August we’ve added Vermilion, Blue, Gold, Chartreuse and Red, then swung back to where we began last year with an all-new Pink. We harvested truly gorgeous finished compost from Pink, Yellow, and Turquoise, nearly all of which was used in our gardens and other projects. We will submit an application again next year for the Beautification Award. It may just take the Cooke Foundation Committee a little more time to come around....



Hot compost handles 59% of total food waste

Food waste hot composted during this half of the year totalled **4,177 pounds**, mostly post-consumer waste from lunch and Sort-It-Out Sam snacks, 59% of the total 7,091 pounds generated. Visitors invariably express concern and surprise that we include meat and dairy in our piles. With the style of *static aerated* hot composting we use, animal proteins pose no problem. We do not turn the piles, but layer them lasagna-like with tree mulch with plenty of moisture, then “poke and soak” them weekly during processing so that air and moisture penetrate evenly throughout. Next, we patiently provide enough time for Nature to do her work. The harvest date is calculated six months from the last addition of food waste.

Teacher and staff concerns about stink, flies, rats, and centipedes influenced our somewhat conservative start last year: five piles with only 500 pounds of food waste per pile. This is the standard demonstration model that has been used to teach hot composting at the The Green House or the Oahu Urban Garden Center – for example – for many years. This year, with more confidence and experience, we decided to make our piles a bit bigger and a bit richer with more food-waste content. We will aim for 800 pounds per pile from now on.

Look at the “History of Our Hot Compost Piles” chart and you will see that each of our piles is absolutely *consistent* and *predictable*. Once the initial couple of layers are set down, the temperature soars to 150-160 degrees and stays steady for several weeks. This heat kills any pathogens, phytotoxins, and weed seeds. We would introduce this chart as Exhibit A for anyone afraid to set up a hot compost operation. Our piles have operated like clockwork – without incident – since we started last year. This is a safe, natural process, not experimental and definitely not rocket science.

Summary of our accomplishments

The following list summarizes our major accomplishments from July 29, 2015 – the first day of the 2015-2016 School Year – through December 31, 2015.

Student participation & Sort-It-Out Sam

- Organized and implemented Zero Hero Service activities for each grade level.
- Organized daily collection of all snack waste, school paper, cans and bottles through twelve Sort-It-Out Sam satellite recycling units. Set up Sam's after school Collection Station.
- Retired a total of ten classroom 32-gallon rubbish cans with Sort-It-Out Sams, eliminating 2,000 plastic trash liners/year. Replaced with biodegradable liners replaced monthly = 100/year.

Cafeteria waste reduction

- Organized daily collection of all kitchen and cafeteria waste at three Separation Stations, run by teams of 6th graders.
- Worked with Shannon Walker of One Love Cafe to replace single-use food service items with reusable trays, bowls, cups, and forks.
- Retired five out of six 32-gallon rubbish cans in the cafeteria, eliminating an additional 900 plastic liners/year. Replaced with two 13-gallon biodegradable liners/day = 360/year.

Food waste, paper/cardboard processing

- Processed 7,091 pounds of recovered food waste via vermicomposting, hot composting, and bokashi fermentation. Built six new hot compost piles, filled four Bokashi Blasters. Achieved 100% landfill diversion rate.
- Harvested 480 pounds of finished vermicast, approx. 5 cubic yards of compost, and 350 lbs. of bokashi pre-compost. Used most, sold some.
- Acquired industrial shredder to shred 100% collected paper for worm bed covering.
- Collected 90% of all cardboard. Began sheet mulching front schoolyard for turf restoration.

Workshops and tours

- Conducted comprehensive Compost College event for 56 teachers and VIP attendees.
- Hosted private tours/workshops for Hanahau'oli School, Kailua Intermediate School, Hawaii Baptist Academy, educators from Australia, UH Manoa Horticulture Practices class, LeJardin Academy, Hawaii Master Gardeners, UH CTAHR GoFarm graduates, Kaimalu Elementary School, Kaimuki Middle School, and Waiawa Correctional Facility Farm.

Funding

- Awarded \$20,000 private gift from Steve and Marilyn Katzman for staffing.
- Awarded \$15,000 Koanai Grant from Hawaii Community Foundation to fund video project.
- Awarded \$1,000 from California Foundation for Agriculture in the Classroom for Biochar Project.
- Recycled \$1,000 Koaniani grant by selling Pearl City High utility cart and purchasing compost tea brewer and backpack sprayer.

Other

- Contributed to record-setting AINA garden productivity with 100% in-house inputs.
- Acquired and installed three 5-foot diameter HDPE planters to serve as science beds.
- Assisted with Carbon Neutrality Project and Trash Trek Lego League competition.
- Inspired and assisted with several original Science Fair projects and experiments.

Goals for 2016 and plans for the future

The single biggest accomplishment of 2015 was creating a project of such value that it warranted continued financial support for 2016...

Mahalo nui loa to the Katzmans!!!

We are honored and deeply grateful for the commitment, vision, and generosity of **Steve and Marilyn Katzman** who will once more be the wind beneath our wings, the rock upon which we stand. Lanikai Schools's Zero Waste Revolution will continue under the umbrella of Oahu Resource Conservation and Development Council, with Mindy Jaffe of Waikiki Worm Company serving as project manager.

Continuing the journey to ZERO

We will continue to work to perfect all of our procedures and protocols with the goals of simplicity, efficiency, and standardization. Each of our programs should be clearly replicable and measurable.

There's considerable interest and momentum for eliminating single-use items. With time and money, One Love Cafe will eventually get their dishwasher and stainless steel serving boats, the milk cartons will be replaced with a milk dispenser and washable cups, the paper towels in the restrooms will be replaced with hot air blowers, etc. We will continue to channel available school funds and apply for grants for equipment and project support.

There's talk about forming a committee to explore bigger "green" options for the school such as installing a water catchment system. Although the LSO has been supportive, there has not been much parental involvement and we would like to explore ways to interest parents more. Students are interested in trying the Healthy Snacks program and recycling mylar packaging. All these various worthy ideas will be pursued.

Now that all of our recovered products are rolling off the assembly line, we will be organizing sales opportunities so that we can share our bounty with families and the larger community. Sales of 2016 yields of compost, vermicast, bokashi starter and worm bin bedding will net \$5,000.

This year we will begin the process of producing comprehensive cost/benefit analyses of our programs. People assume that disposal/landfill is cheaper than Zero Waste but we think that when you factor in external costs such as carbon footprint and government subsidies, this is *not* true. No one has had sufficient data to crunch the numbers until now. We will ask KUPU, the local office of the Environmental Protection Agency, for assistance with this undertaking.

Critical mass achieved – let’s make that quantum leap

Lanikai School has demonstrated that the Zero Waste school campus is not a hippy-dippy novelty – it is real, achievable, and clearly the way of the future. We have attracted high-level local and national attention and we believe we are approaching the tipping point, the moment of the Big Bang.

Our single overarching goal for 2016 will be to secure long-term, full funding from major community backers such as the Castle Foundation and the Ulupono Initiative – we will *not* ask the Katzmans to shoulder the burden alone again. This program clearly meets all standards and prerequisites and deserves deeper, broader community commitment.

The video that will be produced the first months of 2016 will be an invaluable tool to help us to tell our story and spread our message far beyond our shores. Zero Waste is an *international* movement. We have something to say and something to contribute to the world and we will not be shy about shouting from the rooftops – and asking for help to manifest our vision.

This will also be the year we hope that Zero Waste will expand from a single site to multiple sites. The public schools are excited and primed but progress and funding is slow – it will likely be private schools such as Hanahau’oli and LeJardin Academy. These schools have accepted the idea that they will have to fund a staff position to assure reliability and success. We are willing and eager to accept apprentices. We are on board for assisting with any viable vocational training programs.

The future is bright. *Imua!*

