

ADOPT-A-RIVER INITIATIVE,
Training of Trainers Workshop,
National Museums of Kenya,
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DATA COLLECTION AND MANAGEMENT

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Introduction to

miniSASS


This is a simplified version of the South African Scoring System (SASS), an aquatic bio-monitoring tool that has been used in South Africa for over 30 years.



- It uses the composition of macro-invertebrates (small animals) in the river and is based on the sensitivity of the various animals to water quality. These animals are organized into groups, with each group having a specific sensitivity score.
- The **low cost, low technology** environmental education tool was developed by reducing the 90+ traditional SASS aquatic macro-invertebrate classes that are used to derive river health classes into 13 simple groups. This promotes simpler understanding and identification to produce citizen science data.



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- The toolkit itself consists of, among other things a simple net and a site information sheet to record samples found in the river and to give ecological information about the site.
 - **High scores** indicate high sensitivity to pollution and **low scores** indicate high tolerance of pollution. A quantitative score of the system is translated into **health categories** ranging from Natural to Seriously Modified.
 - Support tools, such as field guides and the dichotomous key, assist identification and understanding of the bugs and worms found in the water and form part of the miniSASS tool kit.
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- miniSASS currently boasts a website, the most important feature of which is the **Interactive Google Earth Map** and **database**. The interactive map allows miniSASS users of all ages to explore their catchment, find their river and then upload their own miniSASS results.
- This way, a public-access, interactive map of river health across a region or country can be developed, with results continuously contributed by users as citizen science.
- Users can also explore all results, compare and contrast river health across catchments and in relation to land use activities, while connecting with others who are sampling rivers in their community.





miniSAS

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1. It is low cost, low technology
 2. Its simple and reliable
 3. Its user-friendly to non-experts
 4. It's very effective in promoting the level of understanding on the importance of river health and of the overall environment amongst learners.
 5. Its an effective way of ensuring that the next generation of consumers, river health monitors and potential polluters, and the next generation of leaders have a greater appreciation and understanding of aquatic ecosystems.
 6. The interactive nature of the Google Earth based miniSASS map promotes independent learning and information sharing among users/learners
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MiniSASS provides ***'eyes and ears on the ground'*** in terms of identifying water quality problems and raising red flags




Use of macro-

invertebrates in bio-monitoring

- These animals have no backbone and can be seen with the naked eye
- Aquatic macro-invertebrates have **different levels of sensitivity to change in the water conditions.**
- The more sensitive ones tend to either die or migrate when changes in the water conditions occur. Examples; Stone flies, Caddis flies and Mayflies.
- Others are more resilient and can withstand negative changes in the water conditions and thus will be found even in streams and rivers that have poor water quality. Examples; snails, flat worms and true flies.



Why macro-invertebrates?

1. Different macroinvertebrates have different sensitivities to pollution. The higher their score, the more sensitive they are.
 2. They are generally easy to collect and identify.
 3. They are relatively sedentary which allows the source of pollution to be detected.
 4. They integrate the water quality conditions at a site, providing an overall measure of the “health” of a river.
 5. They can provide a picture of the historical water quality at a site.
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Macro-Invertebrate groups used in miniSASS?

Flatworms, Leeches, Worms, Snails, Crabs
and Shrimps, Stoneflies, Caddisflies,
Damselflies, Dragonflies, Bugs and Beetles,
Minnow Mayflies, Other mayflies and True
flies.


Data/Sample

Collection

- Only 2 river types are recognized in miniSASS score interpretation i.e. **Rocky** and **Sandy** types.
- On the other hand, each river type may have **3 biological habitat types (biotopes)**, and when sampling, macro-invertebrates should be searched within all the 3 biotopes;
 1. Vegetation
 2. Rock
 3. Gravel/ Sand/Mud(GSM)
- The two rivers score differently under the **Ecological Category Table**, due to the different variety of habitats available.



Sampling Procedure

- i. Disturb the stones, vegetation, sand e.t.c. with your feet or hands while holding the net in the current
 - ii. You can also lift stones out of the current and pick insects off gently with your fingers or forceps
 - iii. Do this for about 5 minutes while ranging across the river to different habitats (biotopes)
 - iv. Rinse the net and turn the contents into a plastic tray
 - v. Identify each group using the identification guide (chart showing different organisms inhabiting water bodies) given prior to the exercise. This can be used in combination with the dichotomous key.
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- vi. Mark the identified insects off on the identification guide
- vii. Fill in the site information (Table 1) and add up the sensitivity scores to determine the average score on the scoring sheet (Table 2). To get the average sensitivity score from a sampling point, the sensitivity scores of the identified groups are summed up. The total sensitivity score is then divided by the number of groups identified.
- viii. Wash hands when done



Information

Table

Site Information Table

Date (dd/mm/yr)		
Collectors Name		
Rivers Name		
Site description		
GPS co-ordinate*	S	E
Comments/notes		

* Coordinates as Longitudes/Latitudes OR as decimal degrees

Table 2:

Scoring Sheet

Groups	Sensitivity score
Flat worms	3
Worms	2
Leeches	2
Crabs or shrimps	6
Stoneflies	17
Minnow mayflies	5
Other mayflies	11
Damselflies	4
Dragonflies	6
Bugs or beetles	5
Caddisflies (cased & uncased)	9
True flies	2
Snails	4
Total score	
Number of groups	
Average score	



Interpretation of the

miniSASS score

- An ideal sampling site has rocky, sandy and vegetation habitats. However, not all habitats are present at any one given site. If a river lacks rocky habitats, the sandy type category is used to interpret the scores instead.
- Based on the average score obtained for the sampled site, its health can be determined. As indicated in Table 3 above, the higher the score, the healthier the site.
- Lastly, the groups will identify or suggest probable threats (physical, social or economic) to the river health and propose intervention measures.




Table 3: miniSASS Score Interpretation

Ecological category (condition)	River category	
	Sandy Type	Rocky Type
Unmodified (NATURAL condition)	> 6.9	> 7.9
Largely natural/few modifications (GOOD condition)	5.8 to 6.9	6.8 to 7.9
Moderately modified (FAIR condition)	4.9 to 5.8	6.1 to 6.8
Largely modified (POOR condition)	4.3 to 4.9	5.1 to 6.1
Seriously/critically modified (VERY POOR condition)	< 4.3	< 5.1



Data Management

- The summarised data will be verified by the teacher or supervisor at school or community group leader and once deemed satisfactory send a copy to NEMA.
 - The results will be uploaded on miniSASS. The platform can tell the health of a river by indicating a clean river (good condition) as a 'green frog' and a polluted one (bad condition) as a 'red frog'. This map will be available to everyone.
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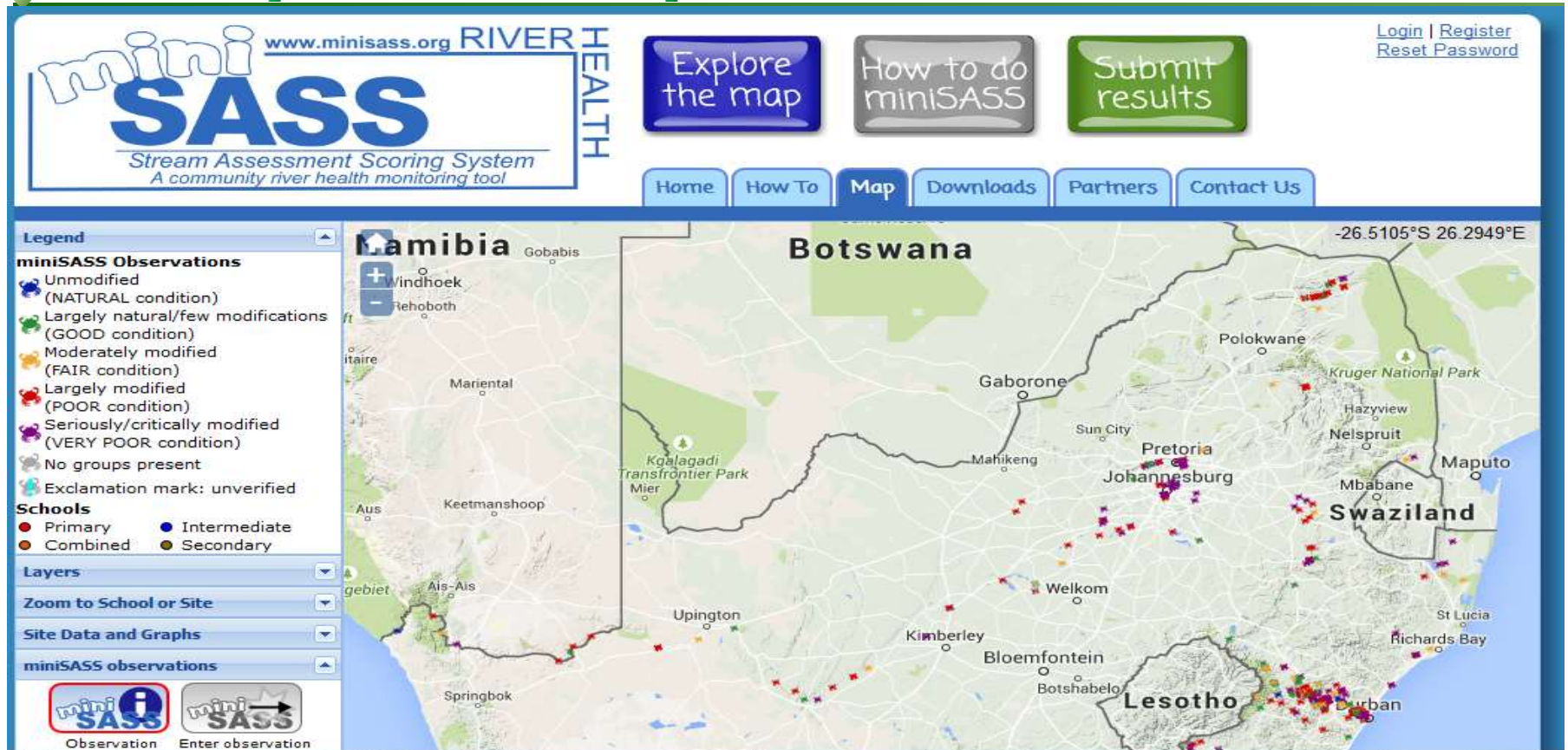
Useful Links

miniSASS: <http://www.minisass.org/en/>

GroundTruth: <http://www.groundtruth.co.za/>



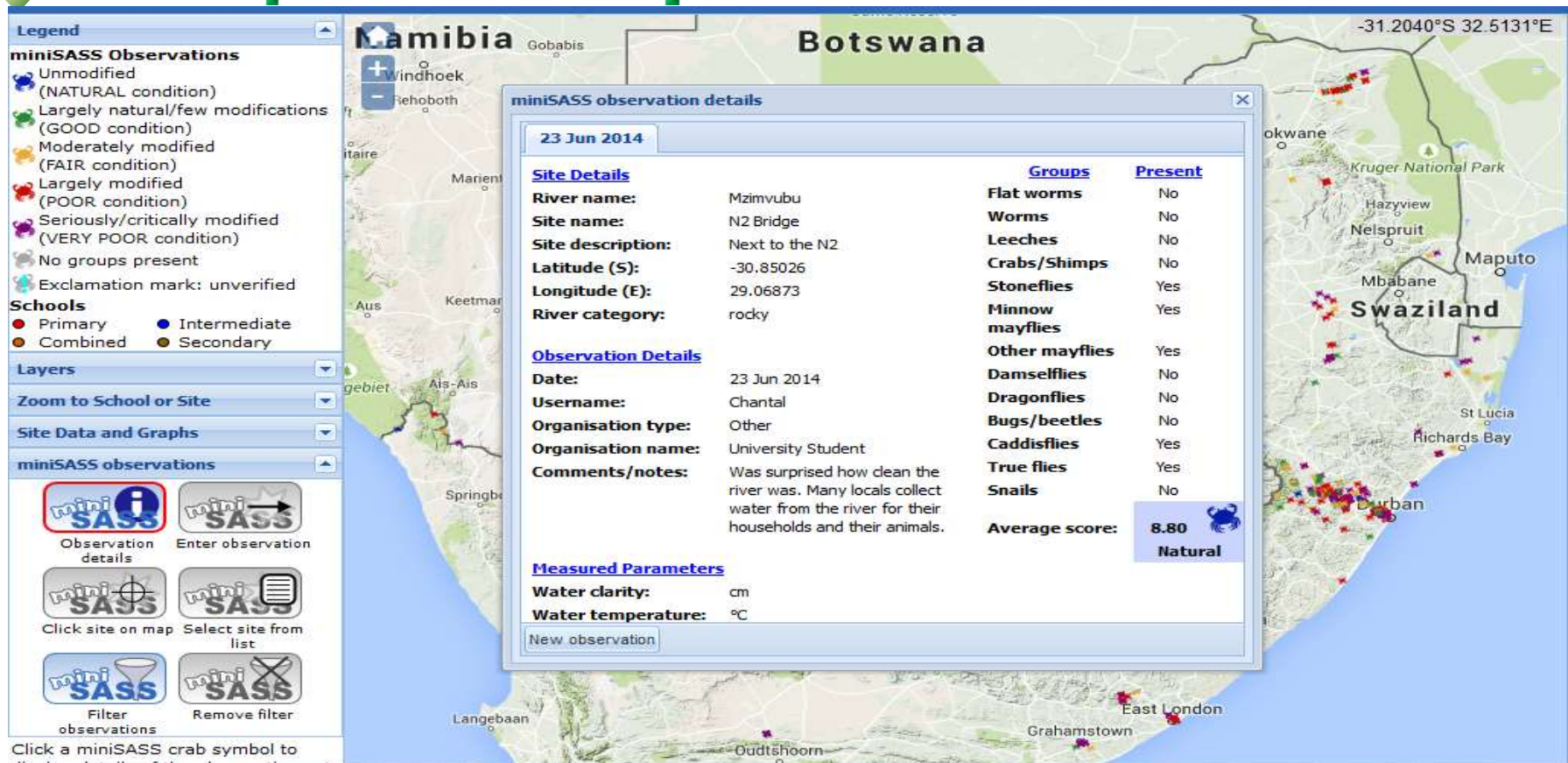
Output: Sample 1



Output: Sample 2



Output: Sample 3



Output: Sample 4

The screenshot displays the miniSASS web application interface. On the left is a sidebar with a legend for observation conditions (Unmodified, Largely natural, Moderately modified, Largely modified, Seriously/critically modified, No groups present, and Exclamation mark: unverified) and school types (Primary, Combined, Intermediate, Secondary). Below the legend are buttons for 'Observation details', 'Enter observation', 'Click site on map', 'Select site from list', 'Filter observations', and 'Remove filter'. The main area shows a map of southern Africa with a pop-up window titled 'miniSASS observation details' for a site on 04 Mar 2015. The site is named 'Orange' and is described as 'Old man's diff' with a 'rocky' river category. The observation details include the date, username 'trivaters', and organization 'Triwaters Tour'. A table lists the presence of various macroinvertebrates, and the average score is 7.00, categorized as 'Good'.

Legend

miniSASS Observations

- Unmodified (NATURAL condition)
- Largely natural/few modifications (GOOD condition)
- Moderately modified (FAIR condition)
- Largely modified (POOR condition)
- Seriously/critically modified (VERY POOR condition)
- No groups present
- Exclamation mark: unverified

Schools

- Primary
- Intermediate
- Combined
- Secondary

Layers

Zoom to School or Site

Site Data and Graphs

miniSASS observations

miniSASS Observation details

miniSASS Enter observation

miniSASS Click site on map

miniSASS Select site from list

miniSASS Filter observations

miniSASS Remove filter

Click a miniSASS crab symbol to

Namibia

Botswana

Swaziland

miniSASS observation details

04 Mar 2015

Site Details

River name: Orange

Site name: Old man's diff

Site description: 10km downstream of prieska, at base of cliff, next to dry flashflood tributary

Latitude (S): -29.58089

Longitude (E): 22.70019

River category: rocky

Observation Details

Date: 04 Mar 2015

Username: trivaters

Organisation type: NGO

Organisation name: Triwaters Tour

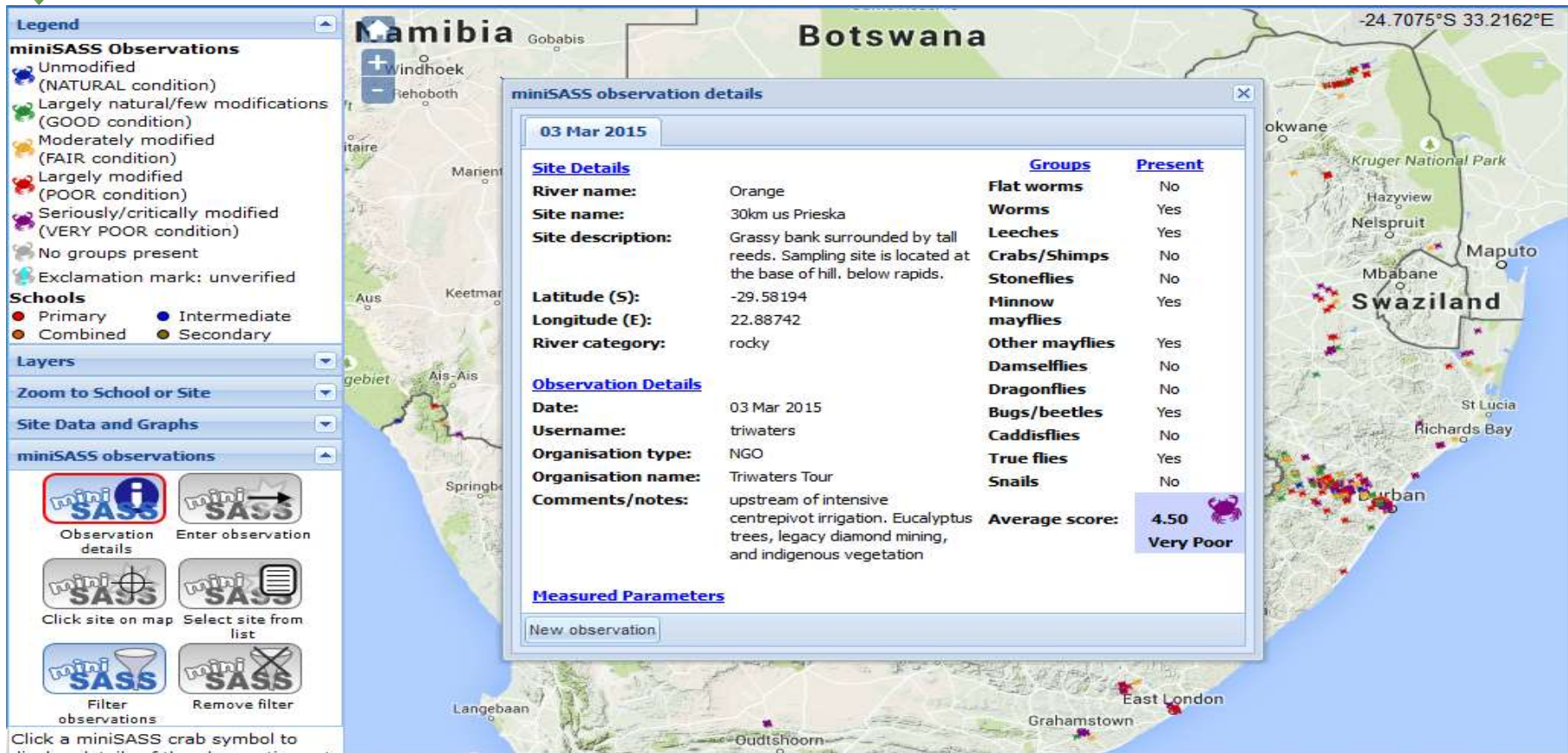
Comments/notes: 1 centre pivot (irrigation) just upstream, grassy bank, wide shallow river, moderate flow, tried very hard to find more macro invertebrates.

Groups

Groups	Present
Flat worms	No
Worms	No
Leeches	No
Crabs/Shimps	No
Stoneflies	No
Minnow mayflies	Yes
Other mayflies	Yes
Damselflies	No
Dragonflies	No
Bugs/beetles	Yes
Caddisflies	No
True flies	No
Snails	No

Average score: 7.00 **Good**

Output: Sample 5



The image features a large, dark green diamond shape centered on a white background. A horizontal light green bar passes behind the diamond. In the top-left and bottom-right corners, there are clusters of smaller, semi-transparent green diamonds of varying sizes, creating a sense of depth and movement. The text "THANK YOU" is written in white, bold, sans-serif capital letters, centered within the large diamond.

THANK
YOU