Monsanto Company
Petition to Designate 1,550 acres at Kunia, O‘ahu as Important Agricultural Lands (IAL)

State of Hawai‘i Land Use Commission
October 11, 2017
Monsanto Serves Farmers Around the World
Working with Growers Large and Small

100% Agriculture
Row Crop Seeds

• High-quality seeds are at the center of our business.

• Monsanto helps farmers achieve better harvests while using natural resources more efficiently.

Eight Row Crops

- Sugarbeet
- Corn
- Soybean
- Cotton
- OSR/Canola
- Sorghum
- Wheat
- Alfalfa
Vegetable Seeds

• Over 2,000 seed varieties covering 22 vegetable crops.

• Develop and provide seeds in all major markets globally, including conventional and organic farmers.

• Deliver quality vegetable seeds under the Seminis brand to many Hawaii farmers, both conventional and organic.
Seed Industry in Hawaii

- Contributes to the State's economic base.
- 1964, University of Hawaii College of Tropical Agriculture and Human Resources, Seed Industry Council.
- 1969, $500,000 agricultural industry.
- One of the most valuable agriculture crops grown in the State today.
- Today, $323 million total economic impact including multiplier effects.
- 20% of ag workers in Hawaii are seed industry employees.
- 258 employees at Kunia Farm.

Source: Fifty Years of Seed in the Fiftieth State Economic Report of the Hawaii Crop Improvement Association
Agricultural Areas & Site Visit Viewing Points

Figure 2
Agricultural Areas (9/22/17 Site Visit Viewing Points)

Monsanto IAL
Monsanto Company
North Linear Scale (Feet) Island of Oahu

Source: Monsanto Company (2017), State of Hawaii, City & County of Honolulu
Disclaimer: This graphic is shown prepared for general planning purposes only.
IAL

- Monsanto owns 2151 acres in Kunia.
- Proposing 1550 acres to be designated as IAL.
- 72% of total landholdings on Oahu.

Standards and criteria ... *land that contributes to maintaining a critical land mass important to agricultural operating productivity. (HRS §205-44(c)(7))

Monsanto IAL

Source: State of Hawaii, City & County of Honolulu, ESRI basemaps.
Disclaimer: This graphic has been prepared for general planning purposes only.
Land Use

<table>
<thead>
<tr>
<th>Agricultural Use</th>
<th>Acres</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crop Production</td>
<td>1,158</td>
<td>75%</td>
</tr>
<tr>
<td>Cattle Ranching</td>
<td>276</td>
<td>18%</td>
</tr>
<tr>
<td>Other (agricultural infrastructure, soil conservation, gulch)</td>
<td>116</td>
<td>7%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1,550</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

Standards and criteria ... land currently used for agricultural production. (HRS §205-44(c)(1))
Topography and Streams

LEGEND
- Proposed IAL
- Owned by Others
- Reservoirs
- Waiahole Ditch
- Streams / Gulches

Figure 3
Topography and Streams

Monsanto IAL

Source: U.S. Geological Survey, State of Hawaii, City & County of Honolulu
Disclaimer: This graphic has been prepared for general planning purposes only.
LSB
(Land Study Bureau)
Detailed Land Classification System

<table>
<thead>
<tr>
<th>Productivity Rating</th>
<th>Total IAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acres</td>
<td>% of IAL</td>
</tr>
<tr>
<td>A</td>
<td>849</td>
</tr>
<tr>
<td>B</td>
<td>328</td>
</tr>
<tr>
<td>C</td>
<td>22</td>
</tr>
<tr>
<td>D</td>
<td>42</td>
</tr>
<tr>
<td>E</td>
<td>297</td>
</tr>
<tr>
<td>Unclassified</td>
<td>12</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>1,550</td>
</tr>
</tbody>
</table>

Standards and criteria . . . land with soil qualities and growing conditions that support agricultural production of food, fiber, or fuel- and energy-producing crops. (HRS §205-44(c)(2))

**Monsanto IAL**

Source: University of Hawaii Land Study Bureau (1972), State of Hawaii, City & County of Honolulu (2012). This graphic has been prepared for general planning purposes only.
Solar Radiation

Mean annual solar radiation: 187 to 190 watts per square meter per hour.

Standards and criteria ... land with ... growing conditions that support agricultural production of food, fiber, or fuel- and energy-producing crops. (HRS §205-44(c)(2))

Figure 6
Solar Radiation
Monsanto IAL
Monsanto Company
North
Linear Scale (Feet)
Island of Oahu
0 600 1,200 2,400

LEGEND
- Proposed IAL
- Owned by Others
- TMK Parcels
- Reservoirs
- Waiahole Ditch
- Streams / Gulches
- Roads

Mean Annual Solar Radiation (Watts/sq.meter/hour)
200 - 202
198 - 200
196 - 198
194 - 196
192 - 194
190 - 192
188 - 190
186 - 188

Source: University of Hawaii Energy Analysis of Hawaii's (2014) State of Hawaii City & County of Honolulu. This document has been prepared for general planning purposes only.
ALISH
(Agricultural Lands of Importance to the State of Hawai‘i)

<table>
<thead>
<tr>
<th>ALISH Classifications</th>
<th>Total IAL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Acres</td>
</tr>
<tr>
<td>Prime</td>
<td>1,064</td>
</tr>
<tr>
<td>Unique</td>
<td>2</td>
</tr>
<tr>
<td>Other</td>
<td>318</td>
</tr>
<tr>
<td>Not ALISH</td>
<td>166</td>
</tr>
<tr>
<td>Total</td>
<td>1,550</td>
</tr>
</tbody>
</table>

Standards and criteria... land identified under agricultural productivity rating systems, such as the agricultural lands of importance to the State of Hawaii (ALISH) system... (HRS §205-44(c)(3))

Monsanto IAL

Source: State Department of Agriculture (1977) State of Hawaii City & County of Honolulu
Disclaimer: This graphic has been prepared for general planning purposes only.
Water Resources and Agricultural Infrastructure

- Water Use Permit (WUP No. 828).
- Mean annual rainfall: 26” to 34”.

Figure 7
Water Resources and Agricultural Infrastructure

Monsanto IAL

Standards and criteria . . . land with sufficient quantities of water to support viable agricultural production. (HRS §205-44(c)(5))

- Agriculture and Preservation Area.
- Draft 2016 Central Oahu SCP map—same designations.
- Outside of Urban Community Boundary.

Standards and criteria . . . land whose designation as IAL is consistent with general, development, and community plans of the county. (HRS §205-44(c)(6))
City and County Zoning

Agricultural – Restricted (AG-1)

Standards and criteria . . . land with or near support infrastructure conducive to agricultural productivity, such as transportation to markets, water, or power. (HRS §205-44(c)(8))
Standards and Criteria for IAL
HRS §205-44(c)

1. Land currently used for agricultural production;

2. Land with soil qualities and growing conditions that support agricultural production of food, fiber, or fuel-and energy-producing crops;

3. Land identified under agricultural productivity rating systems, such as the agricultural lands of importance to the State of Hawaii (ALISH) system adopted by the board of agriculture on January 28, 1977;

4. Land types associated with traditional native Hawaiian agricultural uses, such as taro cultivation, or unique agricultural crops and uses, such as coffee, vineyards, aquaculture, and energy production;

5. Land with sufficient quantities of water to support viable agricultural production;

6. Land whose designation as important agricultural lands is consistent with general, development and community plans of the county;

7. Land that contributes to maintaining a critical land mass important to agricultural operation productivity;

8. Land with or near support infrastructure conducive to agricultural productivity, such as transportation to markets, water or power.
Kunia Farm Crop Production Cycle

**Plant the Crop**
- Precise water and fertilizer use through drip irrigation
- Controlled pollination for quality results

**Growing**
- 15 weeks

**Cover Crop**
- 1-30 weeks
- A few kernels
- Bushels

**Prepare Land**
- 7-8 weeks
- Till under old crop

**Cover Crop**
- cover crop minimizes dust and enriches the soil
- Plant cover crop

**Harvest desired ears**
Land Stewardship

- Berms and grassed waterways.
- Reduced tillage methods such as Strip Till.
- Crop rotations and fallow periods.
- Cover crops.
- Micro-irrigation/water management.
Mahalo