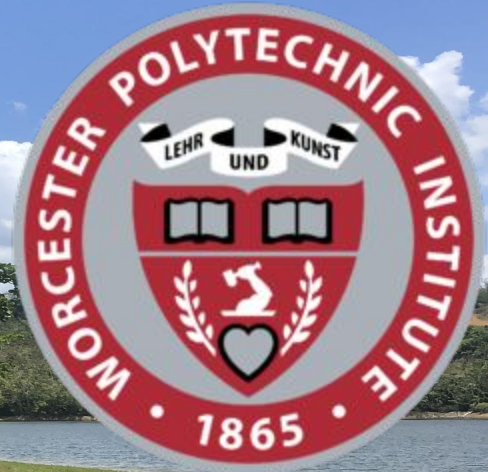


# Autosuficiencia Alimentaria en La Región de La Plata



Brian Liwo; Brandon Malarney;  
Jordan Pickunka; Greg Roe



# ¿Cuántas personas comieron algo que crecieron hoy?

De todos los alimentos en Puerto Rico, el 85% se importa, mientras que solo el 15% se cultiva localmente



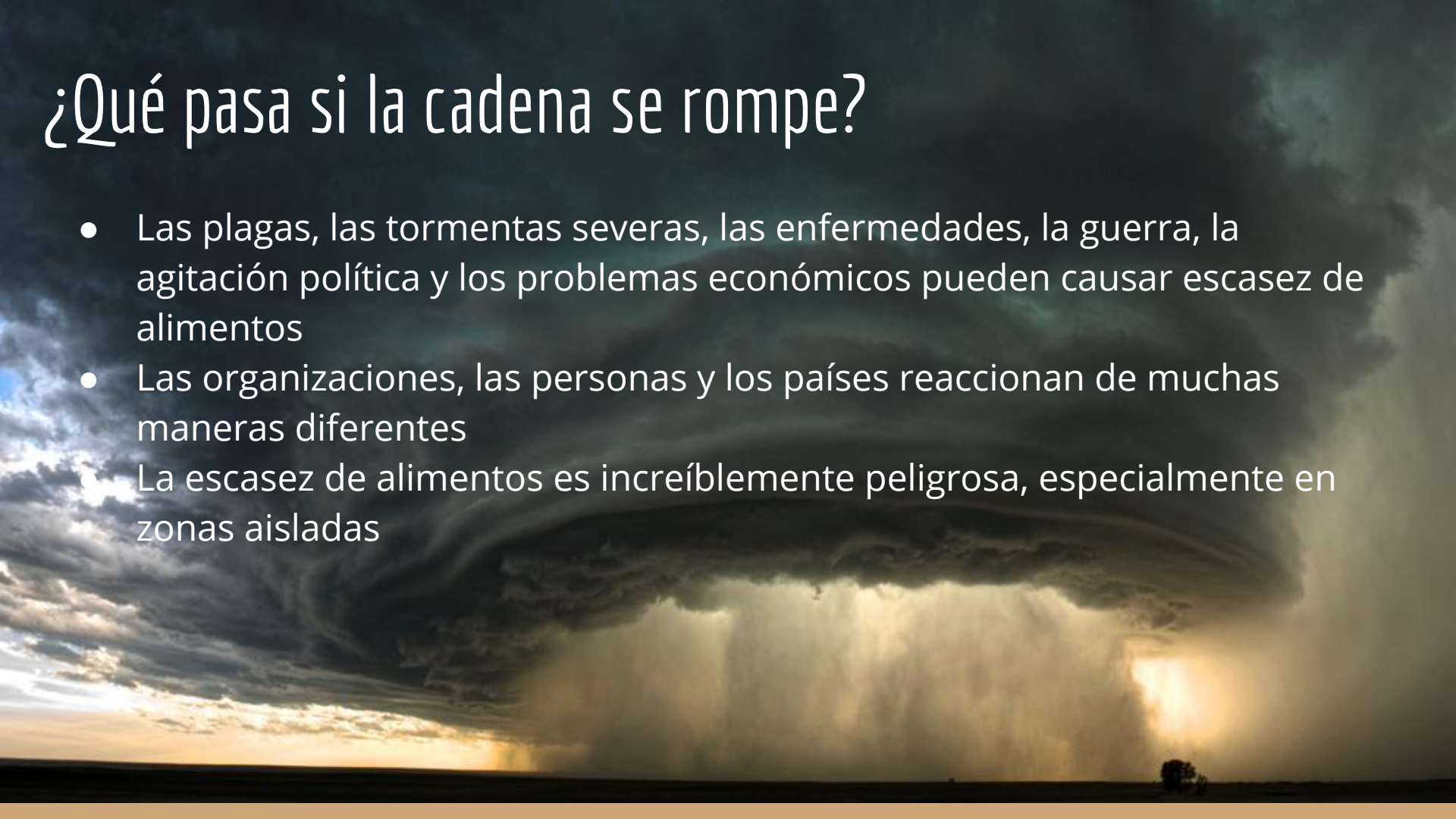
# Las cadenas de suministro agroalimentario

- **“El movimiento de los alimentos de la producción al consumo”**
- **Los cambios en el tamaño de la granja**
  - La superficie media aumentó 334%
  - El número de granjas disminuyó 300%
- **Aumento de la distancia de la granja a la mesa**
  - Promedio de 1500 miles
  - Más estrés en las rutas de envío



# ¿Qué pasa si la cadena se rompe?

- Las plagas, las tormentas severas, las enfermedades, la guerra, la agitación política y los problemas económicos pueden causar escasez de alimentos
- Las organizaciones, las personas y los países reaccionan de muchas maneras diferentes
- La escasez de alimentos es increíblemente peligrosa, especialmente en zonas aisladas





# Jardinería Casera

1 Autosuficiencia Alimentaria

2 Ganancia económica

3 Mejora de la salud

4 Mejoramiento ambiental



# Jardinería Casera Técnicas

- Hay técnicas especializadas que no todos conocen:
  - Fertilización
    - Compost
    - Fertilizantes inorgánicos o químicos
  - Mantenimiento
  - Control de plagas
- La jardinería se puede mejorar a través de programas educativos





# Refugio de Vida Silvestre La Plata



# Efectos de los huracanes en Puerto Rico

- **Acceso a alimentos y agua limitado.**
  - **80% de la producción de cultivos destruidos**
- **La Ley Jones exige que todas las importaciones provengan de un puerto de los Estados Unidos.**
  - **Este limitado esfuerzo de socorro**
  - **Peligroso si los puertos continentales están dañados**



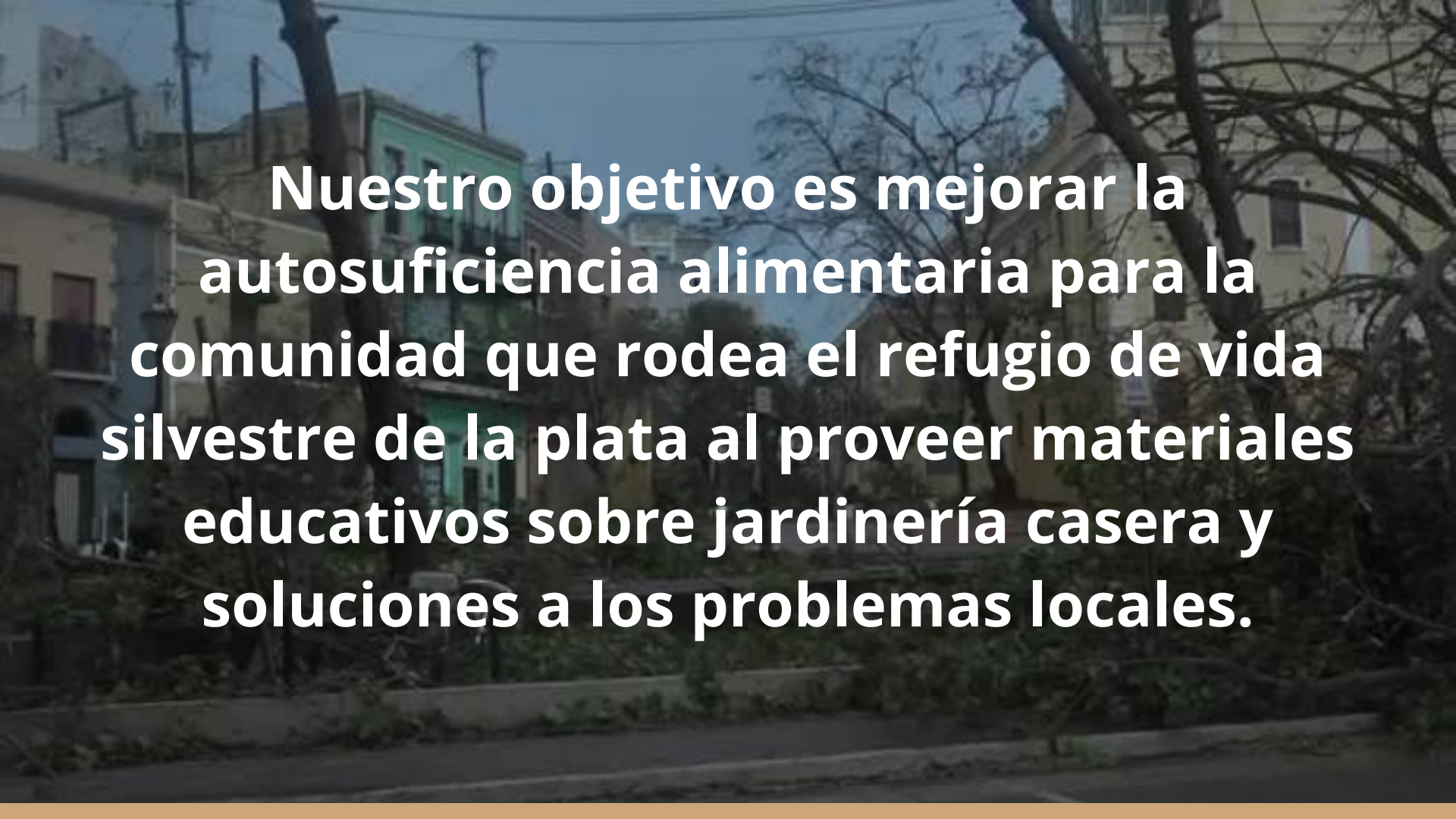
# El Refugio de Vida Silvestre del Embalse La Plata

- Lago de La Plata es un embalse creado en 1974
- El embalse también es el hogar de un centro comunitario/refugio de vida silvestre/área recreativa
  - Programas de divulgación

## El DRNA

- DRNA se creó en 1972
- Preservar, Proteger, gestionar y mantener
- Ahora promoviendo la agricultura



The background image shows a street scene with several buildings and trees. The buildings are multi-story, with some having balconies. The trees are mostly bare, suggesting a cooler season. The overall tone is somewhat muted, with a blueish-grey tint. The text is overlaid in the center, in a bold, white, sans-serif font.

**Nuestro objetivo es mejorar la  
autosuficiencia alimentaria para la  
comunidad que rodea el refugio de vida  
silvestre de la plata al proveer materiales  
educativos sobre jardinería casera y  
soluciones a los problemas locales.**



# Objetivos

## Objetivo 1

**Aprenda sobre jardinería doméstica en Puerto Rico a través de entrevistas**

## Objetivo 2

**Aprenda la disponibilidad de materiales utilizados para la jardinería doméstica y el compostaje**

## Objetivo 3

**Realiza un ejemplo creciente para descubrir los mejores métodos para mejorar el crecimiento de la planta**

# Entrevistas y Encuestas

- Entrevistamos a 21 Personas en La Plata
- Entrevistamos a 5 expertos
  - Carlos y Carmen Umpierre - Finca Noa
  - Jacqueline Seijo - Servicio de Agricola
  - Shirley Cruz - Puerto Rico Departamento de Agricultura
  - Ian Pagan - Josco Bravo
  - Manuel Nieves - Granjero local





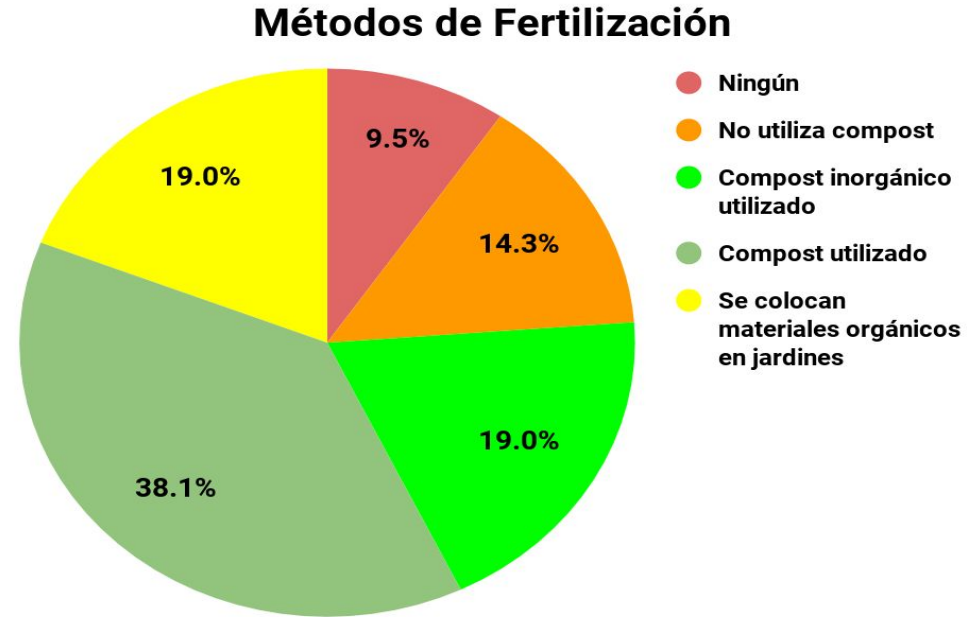
# Resultados de las Entrevistas-Jardinería Casera

- Jardinería Casera
  - 14 de los 21 entrevistados tenían jardines utilizados para producir alimentos
- Dificultades
  - Iguana-cazado, CDs/latas, las asustó con perros, alambre de pollo, y repelentes naturales
  - Insectos-locales: Neem & Malacion
    - Expertos: Neem, BT, Aramita, y repelentes naturales, como la hierba de limón, el orégano & mas



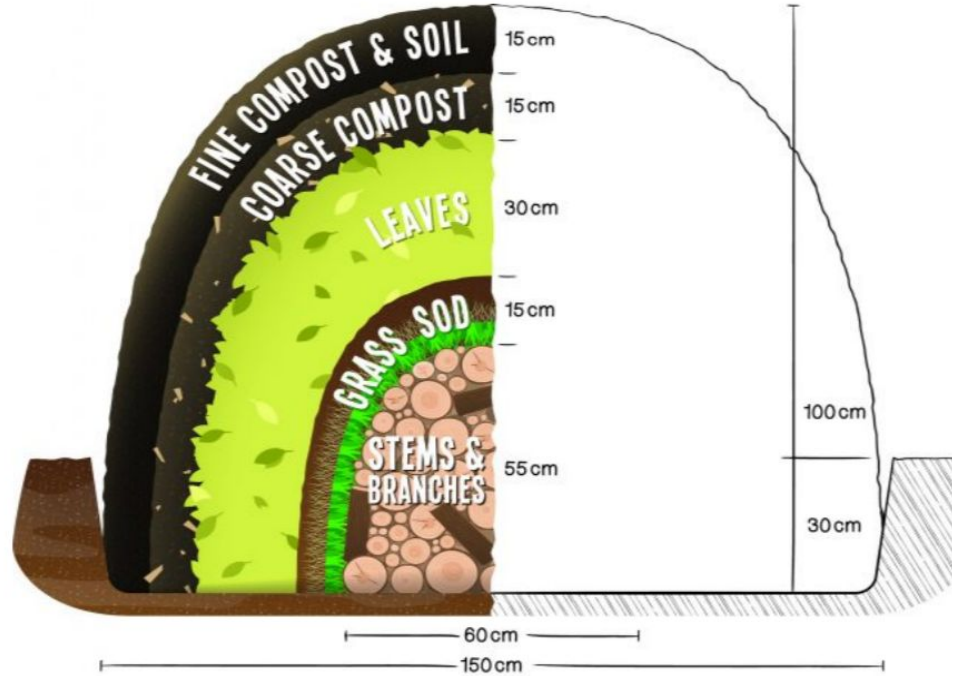
# Resultados de las Entrevistas - La Fertilización

- Los entrevistados informaron utilizando diferentes métodos de fertilización.
- Eliminación de escombros
  - 10/16 entrevistados apilan escombros en el poste María para su descomposición
  - 1 desechos usados como madera de fuego





# Hugelkultur



# Ejemplo de Crecimiento

- Árboles plantados (60), tomate (126) y lechuga (48) para investigar la eficacia del compost orgánico y Hugelkultur, así como la experiencia y el combate de problemas comunes con la agricultura local.
- Usamos soluciones locales y creamos nuestras propias soluciones.





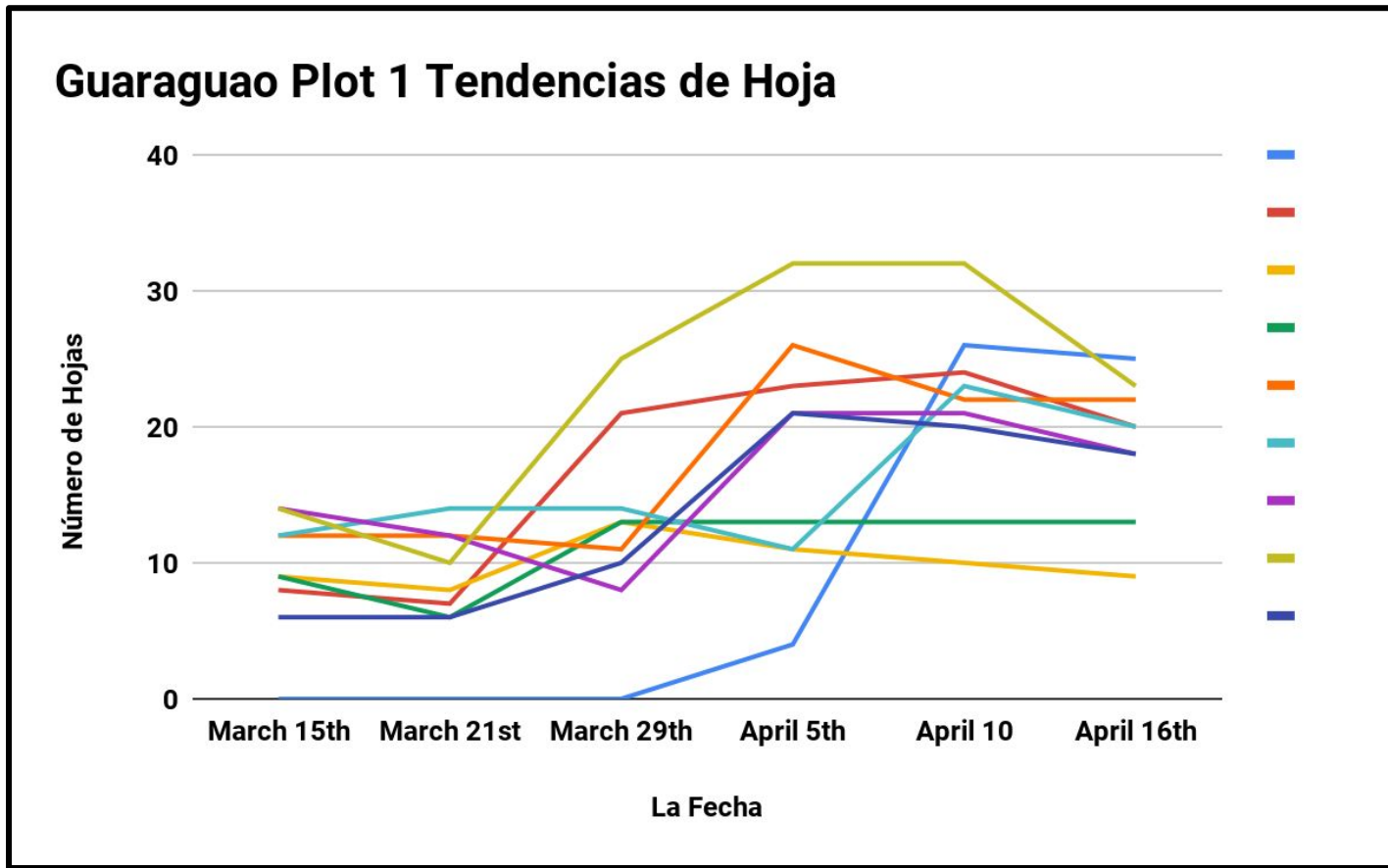
# Ejemplo creciente de prueba y error

- Se encontraron problemas agrícolas comunes en Puerto Rico.
- Plagas - Iguana Verde
  - Desarrollé dos sistemas anti-iguana e implementé repelentes naturales.
- Tomó datos sobre árboles, tomate y lechuga.
  - Altura
  - Numero de hojas
  - Observaciones cualitativas
- Probó la efectividad de la escorrentía de nutrientes de Hugelkultur.

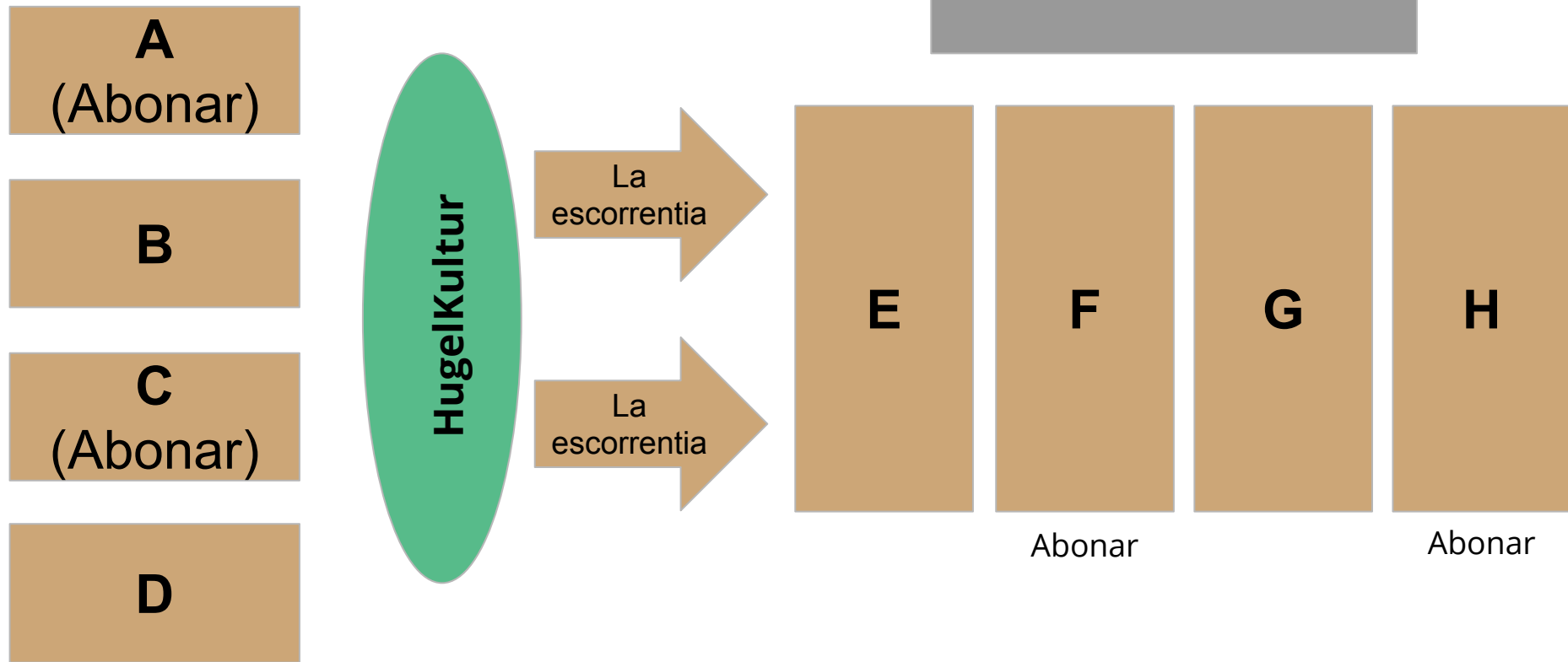




# Datos del Arboles



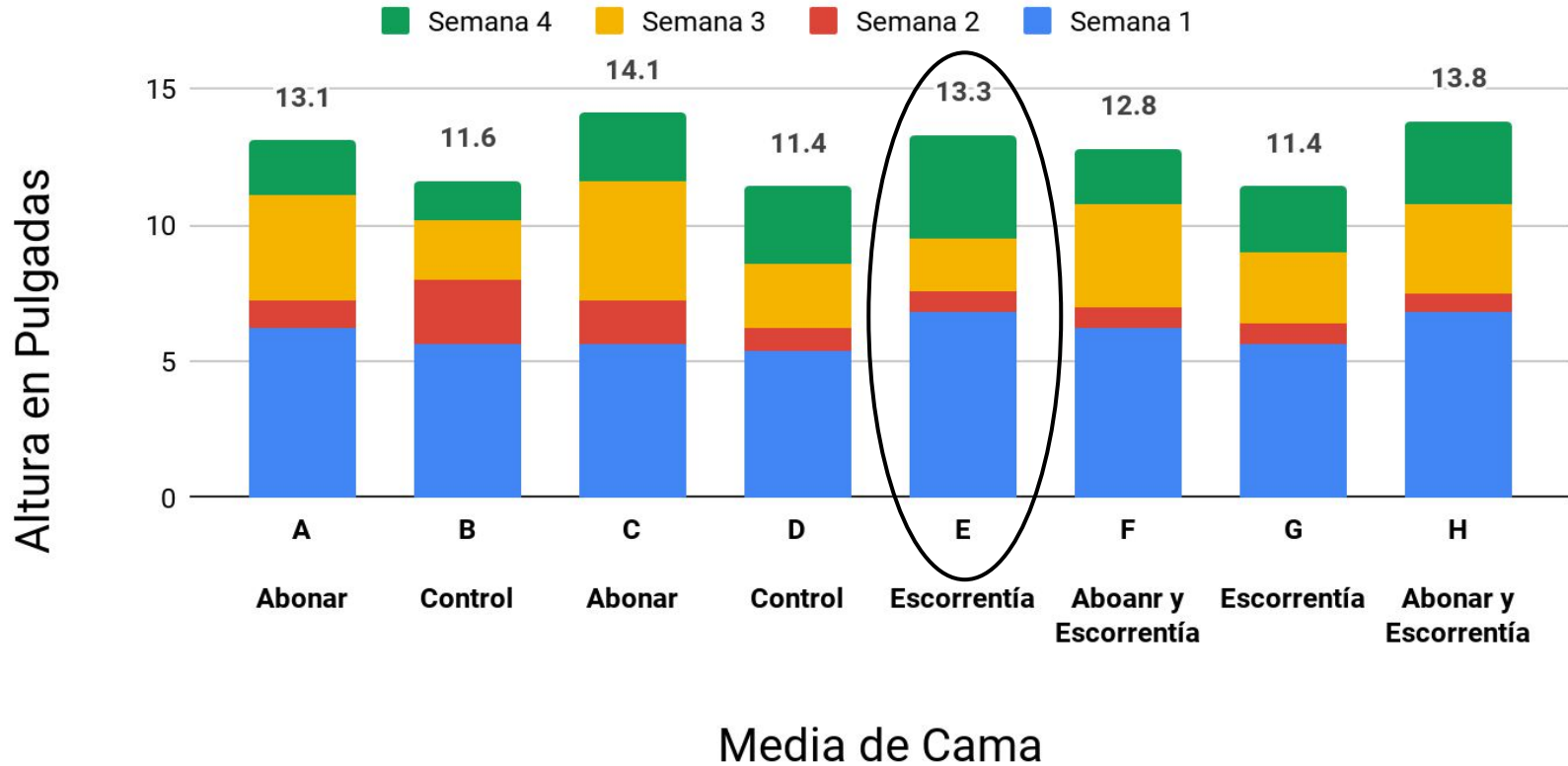
# Mapa de las camas del jardín





# Datos de Tomate

Camas de la A la H Tasas de Crecimiento



# Conclusiones

## Ejemplo Creciente:

- Los resultados finales indican que la escorrentía de Hugelkultur es beneficiosa

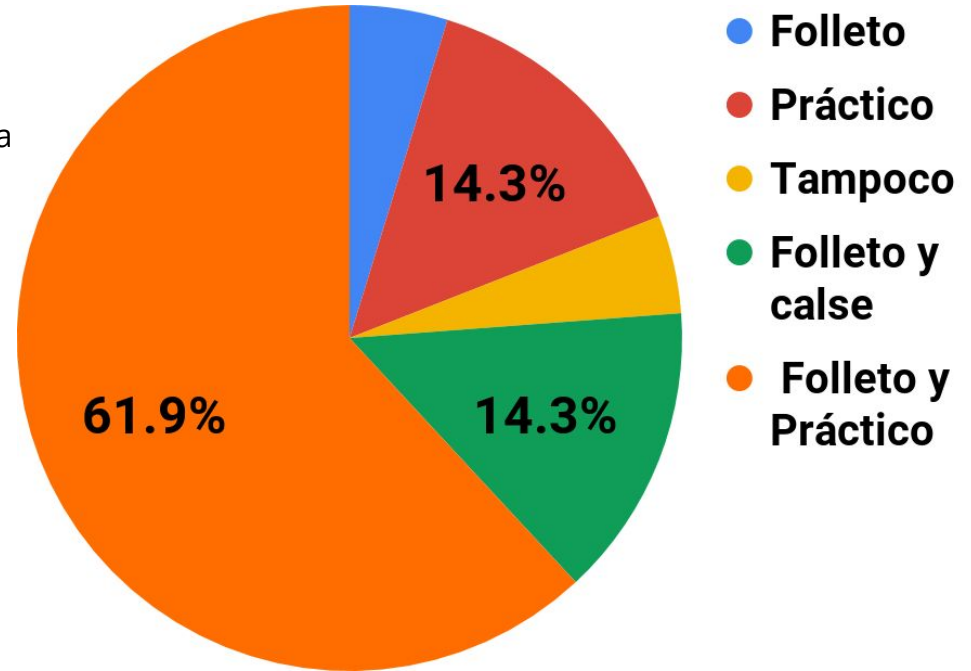
## Jardinería Casera Enfoca:

- Fertilización/compostaje
- Control de plagas
- Técnicas de jardinería diarias
- Eliminación de escombros

## Programa de Educación:

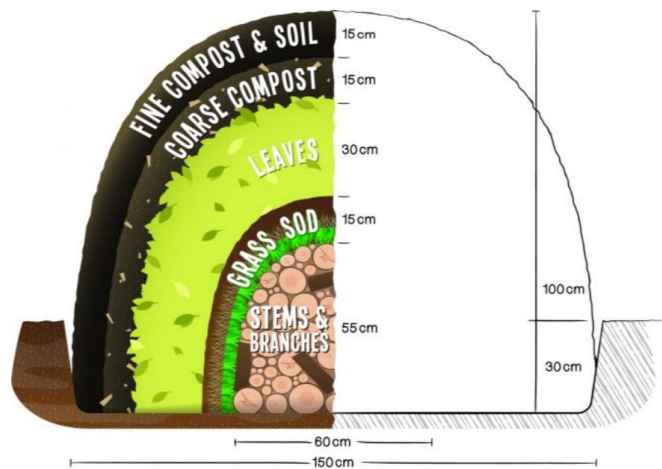
- Clase práctica con un folleto

Preferencia de Aprendizaje



# Las Recomendaciones

- Combatiendo los escombros
  - Grandes cantidades- creando de montículos centrales cuesta arriba desde el sitio de plantación planificado.
  - Pequeñas cantidades-utilice Hugelkultur tradicional
- Repeliendo las Plagas
  - Alambre de pollo actúa como una barrera
  - Las latas colgantes o los CDs repelen las iguanas
  - Cazar iguanas de forma legal ó teniendo perros como mascota
  - Los insecticidas y las plantas naturales disuaden a los insectos y insectos
    - Utilice aceite de Neem para repeler insectos y insectos
    - Cortar las hojas infectadas de hongos, tirar en bolsas de plástico





# Las Recomendaciones

- Cambiar la percepción de la iguana como no deseable para comer
  - Carne baja en grasas, magra y sana
  - Varias recetas incluyen Iguana guisada, Iguana con huevos, y Iguana frita
- Utilizar el programa educativo para promover la jardinería doméstica y mejorar la autosuficiencia alimentaria.



# Entregables

- Crear un esquema de clase para La Plata
  - Pequeño PowerPoint
  - Actividad práctica
    - Semilla en una taza
    - Frijol en una bolsa
    - Plantación dentro de una cama de jardín en La Plata
- Folleto que incluye datos sobre:
  - Creación de camas de jardín
  - Germinación de la semilla
  - Mantenimiento
  - Trasplante
  - Prevención de plagas
  - Fertilización

Refugio de Vida Silvestre del Embalse  
La Plata

Departamento de  
Recurso Naturales y  
Ambientales



**Jardinería  
Doméstica**

Mejora de la Sostenibilidad  
Alimentaria Local

**Brian Liwo; Brandon Malarney;  
Jordan Pickunka; Greg Roe**

# Solución Global

- Jardinería casera
  - Promueve la autosuficiencia alimentaria para protegerse de las roturas de la cadena de suministro agroalimentario
- Ejemplo Creciente
  - Se puede realizar en cualquier lugar con el fin de determinar nuevas soluciones a los problemas locales
- Programa de educación
  - Se puede utilizar para enseñar jardinería en el hogar en todo el mundo
  - Fundamentos son universales
  - Determine los problemas y las prácticas centralizadas en un área específica





# ¡Gracias!

Queremos extender un agradecimiento a Marinelly Valentin-Sivico, Emmanuell Pagan, Dr. Williams, WPI, y todos nuestros entrevistados que ayudaron a hacer nuestro tiempo en Puerto Rico maravilloso.



¿Preguntas?



# La Cita de Las Fotos

[http://doercoop.com/wp-content/uploads/2016/02/supercell\\_storm\\_sean-heavey.jpg](http://doercoop.com/wp-content/uploads/2016/02/supercell_storm_sean-heavey.jpg)

[https://media3.s-nbcnews.com/j/newscms/2017\\_38/2161266/170920-hurricane-maria-mn-0820\\_5e2b138539b8c8482234056a464a63ab.fit-760w.jpg](https://media3.s-nbcnews.com/j/newscms/2017_38/2161266/170920-hurricane-maria-mn-0820_5e2b138539b8c8482234056a464a63ab.fit-760w.jpg)

[https://www.researchgate.net/figure/The-effect-of-water-and-nutrients-on-plant-growth-Own-experiments-PS-Bindraban\\_fig4\\_235704235](https://www.researchgate.net/figure/The-effect-of-water-and-nutrients-on-plant-growth-Own-experiments-PS-Bindraban_fig4_235704235)

<https://www.permaculture.co.uk/articles/many-benefits-hugelkultur>

<https://www.indiamart.com/proddetail/organic-earthworm-vermicompost-16508833833.html>

<https://imgc.allpostersimages.com/img/print/u-g-Q1BEC920.jpg?w=550&h=550&p=0>

[https://static1.printplace.com/photo-gallery/42/Pamphlets-2%20\(1\)\\_450x450.jpg](https://static1.printplace.com/photo-gallery/42/Pamphlets-2%20(1)_450x450.jpg)

[https://www.google.com/search?q=puerto+rico+sunrise&rlz=1C1CHBF\\_enUS773US773&source=lnms&tbm=isch&sa=X&ved=0ahUKEwjUvb-gs7TgAhVGdt8KHfhJBDUQ\\_AUIDigB&biw=1280&bih=610&dpr=1.5#imgcr=7Pr3zpiJlLOiDM](https://www.google.com/search?q=puerto+rico+sunrise&rlz=1C1CHBF_enUS773US773&source=lnms&tbm=isch&sa=X&ved=0ahUKEwjUvb-gs7TgAhVGdt8KHfhJBDUQ_AUIDigB&biw=1280&bih=610&dpr=1.5#imgcr=7Pr3zpiJlLOiDM)

[https://www.google.com/url?sa=i&source=images&cd=&cad=rja&uact=8&ved=2ahUKEwi56eetjMTgAhVm7oMKHXVvCCUQjRx6B\\_AgBEAU&url=https%3A%2F%2Fwww.active.com%2Fnutrition%2Farticles%2Fhow-to-start-a-sustainable-home-garden-2348107&psig=AOvVaw3NRs7A09M3rAz9dYlfmzC0&ust=1550538547084268](https://www.google.com/url?sa=i&source=images&cd=&cad=rja&uact=8&ved=2ahUKEwi56eetjMTgAhVm7oMKHXVvCCUQjRx6B_AgBEAU&url=https%3A%2F%2Fwww.active.com%2Fnutrition%2Farticles%2Fhow-to-start-a-sustainable-home-garden-2348107&psig=AOvVaw3NRs7A09M3rAz9dYlfmzC0&ust=1550538547084268)

<https://ourworld.unu.edu/en/food-scarcity-the-timebomb-setting-nation-against-nation>

<https://www.google.com/maps/place/Embalse+La+Plata/@18.3395657,-66.2372113,15z/data=!4m2!1m6!3m5!1s0x8c033fdd39332f79:0x7bba12dfd78aaa8c!2sEmbalse+La+Plata!8m2!3d18.3395657!4d-66.2372113!3m4!1s0x8c033fdd39332f79:0x7bba12dfd78aaa8c!8m2!3d18.3395657!4d-66.2372113>

<https://www.businesstoday.in/current/corporate/amazon-goldman-sachs-to-acquire-indian-supermarket-chain-more/story/281462.html>

[https://diy.sndimg.com/content/dam/images/diy/fullset/2018/5/4/0/shutterstock\\_156179237\\_Evan-Lorne\\_compost-bin.jpg.rend.hgtvcom.616.411.suffix/1525464414199.jpeg](https://diy.sndimg.com/content/dam/images/diy/fullset/2018/5/4/0/shutterstock_156179237_Evan-Lorne_compost-bin.jpg.rend.hgtvcom.616.411.suffix/1525464414199.jpeg)

[https://www.google.com/search?rlz=1C1SQJL\\_enUS813US813&biw=1536&bih=722&tbm=isch&sa=1&ei=LnK2XliNGuqMtgWQ\\_K5w&q=puerto+rican+oregano+plant&oq=puerto+rican++oregano+&gs\\_l=img.1.0.35i39j0i30j0i24!2.249720.263641..266676...0.0..3.2059.10543.1j1j2j0j1j5j2j1j1j1.....1....1..gws-wiz-img.....0..0j0i10j0i7i30j0i8i30j0i8i7i30.8g9yKJB-r10#imgcr=pXgBDQPRX\\_D5VM:](https://www.google.com/search?rlz=1C1SQJL_enUS813US813&biw=1536&bih=722&tbm=isch&sa=1&ei=LnK2XliNGuqMtgWQ_K5w&q=puerto+rican+oregano+plant&oq=puerto+rican++oregano+&gs_l=img.1.0.35i39j0i30j0i24!2.249720.263641..266676...0.0..3.2059.10543.1j1j2j0j1j5j2j1j1j1.....1....1..gws-wiz-img.....0..0j0i10j0i7i30j0i8i30j0i8i7i30.8g9yKJB-r10#imgcr=pXgBDQPRX_D5VM:)

[https://www.google.com/search?rlz=1C1SQJL\\_enUS813US813&biw=1536&bih=722&tbm=isch&sa=1&ei=OnO2XNHODI-EtQWW5oeoBw&q=lemongrass+plant&oq=lemon&gs\\_l=img.1.0.35i39j0i67i3j0i67i4j0.30956.33498..35942...0.0..1.433.1715.0j2j1j2j1.....1....1..gws-wiz-img.....0..0j0i10j0i7i30j0i8i30j0i8i7i30.8g9yKJB-r10#imgcr=pXgBDQPRX\\_D5VM:](https://www.google.com/search?rlz=1C1SQJL_enUS813US813&biw=1536&bih=722&tbm=isch&sa=1&ei=OnO2XNHODI-EtQWW5oeoBw&q=lemongrass+plant&oq=lemon&gs_l=img.1.0.35i39j0i67i3j0i67i4j0.30956.33498..35942...0.0..1.433.1715.0j2j1j2j1.....1....1..gws-wiz-img.....0..0j0i10j0i7i30j0i8i30j0i8i7i30.8g9yKJB-r10#imgcr=pXgBDQPRX_D5VM:)



# Las Citas

Advantages and Disadvantages of Lectures. (n.d.). Retrieved February 15, 2019, from <http://archive.wceruw.org/CI1/cl/doingcl/advlec.htm> Agriculture and Natural Events and Disasters. (2018, October 31). Retrieved from <https://www.epa.gov/agriculture/agriculture-and-natural-events-and-disasters>

Alterman, T. (2016, January). Should you plant seeds or seedlings? Mother Earth Living. Retrieved from: <https://www.motherearthliving.com/gardening/vegetablegardening/seeds-or-seedlings-zmgz16jfzhou>

Anthem, P. (2016, October 13). Food for hurricane Matthew survivors. World Food Programme. Retrieved from: [https://panorama.wfp.org/moving-in-the-wake-of-hurricanematthew?\\_ga=2.264917519.1679203835.1550599914-471492812.1550599914](https://panorama.wfp.org/moving-in-the-wake-of-hurricanematthew?_ga=2.264917519.1679203835.1550599914-471492812.1550599914)

Atkin, E. (2018, July 17). The troubling failure of America's disaster response. The New Republic. Retrieved from: <https://newrepublic.com/article/149899/troubling-failureamericas-disaster-response>

Bigio, A. (2017, September 17). Seguirá cerrada el área recreativa de La Plata. Retrieved from <http://drna.pr.gov/noticias/seguira-cerrada-el-area-recreativa-de-la-plata/>

Bloch, S. (2018, February 05). 2017's natural disasters cost American agriculture over \$5 billion. Retrieved from <https://newfoodeconomy.org/2017-natural-disasters-agriculture-damage5-billion/>

Boeckmann, C. (2017, May 20). Soil pH levels for plants. The Old Farmer's Almanac. Retrieved from <https://www.almanac.com/plant-ph>

# Las Citas

British Broadcasting Corporation (BBC). (2018, December 18). Yemen crisis: why is there a war? Retrieved from: <https://www.bbc.com/news/world-middle-east-29319423>

Bester, N., Di Vito-Smith, M., McGarry, T., Riffkin, M., Kaehler, S., Pilot, R., & Bwire, R. (2016, January). The Effectiveness of an Educational Brochure as a Risk Minimization Activity to Communicate Important Rare Adverse Events to Health-Care Professionals. Retrieved from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4769727/>

Camp, C. R. (1998). Subsurface drip irrigation: A review. Transactions of the American Society of Agricultural and Biological Engineers. 41(5): 1353-1367. doi: 10.13031/2013.17309

Carter M. What's the difference between pamphlets and brochures?. (2014). <https://www.mgxcopy.com/blog/san-diego-printing/2014/10/09/difference-betweenpamphlets-andbrochures/>. 38

Chalker-Scott, L. (2017). Hügelkultur: What is it, and should it be used in home gardens? Retrieved January 13, 2019, from Chalker-Scott, L. (2017). Hügelkultur: What is it, and should it be used in home gardens? Retrieved January 13, 2019, from <https://research.wsulibs.wsu.edu:8443/xmlui/bitstream/handle/2376/12233/FS283E.pdf?sequence=1&isAllowed=y>

Chiep, P. (2013). Hands-on learning approach effective for agriculture training. Retrieved from <http://www.accent.ac.nz/elto/articles/hands-learning-approach-effective-agriculturetraining>

Cock, M. (2011, November 09). Plant pests: The biggest threats to food security? Retrieved from <https://www.bbc.com/news/science-environment-15623490> Consequences of low genetic diversity. (n.d.). Retrieved February 17, 2019, from <http://maize.teacherfriendlyguide.org/index.php/genetic-diversity-andevolution/consequences-of-low-diversity>

# Las Citas

Demeyer, A., Nkana, J.C. & Verloo M.G. (2001) Characteristics of wood ash and influence on soil properties and nutrient uptake: an overview. *Bioresource Technology*, 77(3). 287- 295.

DRNA reabre el Refugio de Vida Silvestre del Embalse La Plata. [DNER Reopens the La Plata Reservoir Wildlife Refuge] (n.d.). Retrieved from <https://www.paralanaturaleza.org/drnareabre-el-refugio-de-vida-silvestre-del-embalse-la-plata/>

Einbinder, N. (2018, May 1). How to respond to hurricane Maria compared to Harvey and Irma. *Frontline*. Retrieved from: <https://www.pbs.org/wgbh/frontline/article/how-the-responseto-hurricane-maria-compared-to-harvey-and-irma/>

FAO, IFAD, UNICEF, WFP and WHO. (2018). The State of Food Security and Nutrition in the World 2018. Building climate resilience for food security and nutrition. Rome, FAO. Retrieved from <http://fao.org/state-of-food-security-nutrition/en/>

Falcon, W., Ackerman, J.D., Recart, W., & Dehler, C.C. (2013). Biology and Impacts of Pacific Island Invasive Species. 10. Iguana iguana, the Green Iguana (Squamata: Iguanidae), *Pacific Science* 67(2), (1 April 2013). <https://doi.org/10.2984/67.2.2>

Food Aid. (2003). Action Aid. Retrieved from: [https://www.actionaid.org.uk/sites/default/files/doc\\_lib/food\\_aid\\_briefing\\_note.pdf](https://www.actionaid.org.uk/sites/default/files/doc_lib/food_aid_briefing_note.pdf)  
Food and Agriculture Organization (FAO). (2004). What is happening to agrobiodiversity? Retrieved from <http://www.fao.org/docrep/007/y5609e/y5609e02.htm>



# Las Citas

Fresh Food for All: The Southern Baja Food Security Alliance. (2018, April 19). Retrieved from <https://icfdn.org/fresh-food-southern-baja-food-security-alliance/>

Galhena, D. H., Freed, R., & Maredia, K. M. (2013). Home gardens: A promising approach to enhance household food security and wellbeing. *Agriculture & Food Security*, 2(8). doi:10.1186/2048-7010-2-8 39

Gillham, B. (2005). *Research Interviewing: The Range of Techniques: A practical Guide*. New York, N.Y.: Open University Press.

Grist, D. (2018, November 8). How to start seeds. Gardener's Supply Company. Retrieved from: <https://www.gardeners.com/how-to/how-to-start-seeds/5062.html>

Growing Gardens. (n.d.) Guide to hardening-off. Retrieved from: <https://gg.memberclicks.net/hardening-off-plant-starts>

Guzy, C. (2018, March 20). Months After Hurricane Maria, Puerto Rico Still Struggling. Retrieved from <https://www.nationalgeographic.com/magazine/2018/03/puerto-ricoafter-hurricane-maria-dispatches/>

# Las Citas

Hammond, C. (2016, October 11). Do we have a 'preferred style' of learning? Retrieved from <http://www.bbc.com/future/story/20161010-do-we-have-a-preferred-style-of-learning>

Hands-on Learning Benefits. (2018, July 18). Retrieved February 16, 2019, from <https://demmelearning.com/learning-blog/hands-on-learning-benefits/>

Heslop-Harrison, J. (2018, December 21). Germination. Encyclopaedia Britannica. Retrieved from: <https://www.britannica.com/science/germination> How Recovering from a Natural Disaster Impacts Food Security. (2018, April 17). Retrieved from <https://icfdn.org/recovering-natural-disaster-impacts-food-security/>

Huber, C., Klinger, H., & O'Hara, K. J. (2018, December 08). 2017 Hurricane Maria: Facts, FAQs, and how to help. Retrieved from <https://www.worldvision.org/disaster-reliefnews-stories/hurricane-maria-facts>

Hunting and Eating Invasive Iguanas. (2015, September 02). Retrieved from <https://www.youtube.com/watch?v=h0886du3XmM>  
National Geographic

International Committee of the Red Cross (ICRC). (2015, September 28). Red Cross and Red Crescent relief aid in Yemen. Retrieved from <https://www.icrc.org/en/document/redcrossred-crescent-relief-efforts-yemen>

# Las Citas

Jun, L. (2010, August 09). Experts: Gansu mudslides had 4 causes. Retrieved from <http://en.people.cn/90001/90776/90882/7098449.html>

Kenton, W. (2019, Mar 15). The Jones Act. Investopedia. Retrieved from <https://www.investopedia.com/terms/j/jonesact.asp>

Kinver, M. (2014, March 03). Crop diversity decline 'threatens food security'. Retrieved February 17, 2019, from <https://www.bbc.com/news/science-environment-26382067> 40

Krow, S. (2019, February 11). Advantages & Disadvantages of a Brochure. Retrieved February 15, 2019, from <https://bizfluent.com/info-8261585-advantages-disadvantagesbrochure.html>

Landsea, C. (2015, June 1). How many tropical cyclones have there been each year in the. Retrieved from <http://www.aoml.noaa.gov/hrd/tcfaq/E11.html>

Larum, D. (2018, April 4). Retaining soil moisture: What to do when soil dries out too fast in the garden. Gardening. Retrieved from: <https://www.gardeningknowhow.com/garden-howto/soil-fertilizers/soil-dries-too-fast.htm>

L. (2013, March 22). [Bag with paper towels stapled]. Retrieved from <https://lori4christ.wordpress.com/2013/03/22/growing-bean-plants-as-a-science-lesson/>

# Las Citas

Marroquin-Guzman, M. (2012). Prevalent citrus diseases in Puerto Rico. Retrieved from:  
[https://www.researchgate.net/publication/264543608\\_Prevalent\\_citrus\\_diseases\\_in\\_Puerto\\_Rico](https://www.researchgate.net/publication/264543608_Prevalent_citrus_diseases_in_Puerto_Rico)

Marsh, R. (1998) Building on traditional gardening to improve household food security. Food and Agriculture Organization of the United States. Retrieved from <http://www.fao.org/tempref/docrep/fao/X0051t/X0051t02.pdf>

Maxmen, A. (2013). Crop pests: Under attack. *Nature*, 501(7468). doi:10.1038/501s15a

Miller, J. H. & Jones, N. (1995). Organic and compost-based growing media for tree seedling nurseries. Washington, D.C.: The World Bank. Retrieved from <https://books.google.com/books?id=tsTW9qpEgU0C&lpg=PR7&ots=3yN6N57vD3&dq=Organic%20and%20compostbased%20growing%20media%20for%20tree%20seedling%20nurseries&lr&pg=PR11#v=onepage&q&f=false>

Misra, R. V., Roy, R.N. & Hiraoka H. (2003). On-farm composting methods. *Land and Water Discussion*, 2(1). 1-26.

Patterson, S. (2016, Jan. 15). 14 reasons why raised beds are the best way to garden. *Natural Living Ideas*. Retrieved from:  
<https://www.naturallivingideas.com/14-reasons-why-raised-beds-are-the-best-way-to-garden/>

Patterson, S. (2015, Oct 2). 15 common gardening mistakes everyone makes. *Natural Living Ideas*. Retrieved from:  
<https://www.naturallivingideas.com/15-common-gardening-mistakes-everyone-makes/>



# Las Citas

Perez, J., Bond, C., Buhl, K., & Stone, D. (2015). *Bacillus thuringiensis* (Bt) General Fact Sheet. National Pesticide Information Center. Retrieved from <http://npic.orst.edu/factsheets/btgen.html> 41

Pinola, M. (2013, June 24). Turn a Soda Bottle into a Worry-Free Self-Watering Planter. Retrieved from <https://lifehacker.com/turn-a-soda-bottle-into-a-worry-free-self-wateringplan-5913914>

Reardon, J.A. & Perez, R.A. (2010). Agroecology and the development of indicator of food sovereignty in Cuban food systems. *Journal of Sustainable Agriculture*, 34(8). (07-922.)

Resilience Building. (n.d.) World Food Program. Retrieved from: <https://www1.wfp.org/resilience-building>

Reuters. (2018, January 12). Hungry Mobs Riot Over Venezuela Food Shortages. Retrieved from <http://fortune.com/2018/01/11/venezuela-food-riots/>

Reuters. (2018, February 22). Venezuelans are starving amid economic crisis, food shortages. Retrieved from: <https://nypost.com/2018/02/22/venezuelans-are-starving-amideconomic-crisis-food-shortages/>

# Las Citas

Ramaswamy, S. (2016, June 24) Reversing Pollinator Decline is Key to Feeding the Future. U.S. Department of Agriculture. Retrieved from <https://www.usda.gov/media/blog/2016/06/24/reversing-pollinator-decline-key-feedingfuture>

Rush, K. R. (2012). Introducing the Topic 'Supermarketization in Developing Economies' in International Business Classrooms: The Case of Wal-Mart and Bharti. Journal of International Business Education. Retrieved from <https://www.thecasecentre.org/educators/products/view?id=107523>.

Shah, A. (2007, December 03). Food aid. Global Issues. Retrieved from: <http://www.globalissues.org/article/748/food-aid>

Snyder, M. (2017, May 19). Can We Really Eat Invasive Species into Submission? Retrieved from <https://www.scientificamerican.com/article/can-we-really-eat-invasive-species-intosubmission/>

Stone, J. & Rahimifard, S. (2018). Resilience in agri-food supply chains: a critical analysis of the literature and synthesis of a novel framework. Supply Chain Management: An International Journal, 23(3), pp.207-238, <https://doi.org/10.1108/SCM-06-2017-0201>

Tank, F. (2018, October 01). A Local Food Revolution in Puerto Rico. Retrieved February 22, 2019, from <https://www.ecowatch.com/puerto-rico-local-food-revolution2609255811.html>

# Las Citas

Tanner, K. (2018, Dec 18). Cambrians were concerned about 400 piles of forest debris to be burned. Then it rained. Retrieved February 1, 2019, from <https://www.sanluisobispo.com/news/local/community/cambrian/article222978945.html> 42

10 Ways to Keep Your Garden Healthy. (2014, April 25). Retrieved February 14, 2109, from <https://www.finegardening.com/article/10-ways-to-keep-your-garden-healthy>

Thornberry, E. (2018, November 22). The famine facing Yemen is a war crime – it must be investigated | Emily Thornberry. Retrieved from: <https://www.theguardian.com/commentisfree/2018/nov/22/famine-yemen-war-crimecivilians-saudi-coalition>

Trautmann, N., & Krasny, M. (1997). Composting in the Classroom: Scientific Inquiry for High School Students. Dubuque, Iowa: Kendall/Hunt Pub.

Trivedi, P.P. (2014). Home Gardening. Pusa, New Delhi: Indian Council of Agricultural Research. United States of America, United States Department of Agriculture. (2018, May 4). Trends in U.S. Agriculture. Retrieved from [https://www.nass.usda.gov/Publications/Trends\\_in\\_U.S.\\_Agriculture/Farm\\_Numbers/index.php](https://www.nass.usda.gov/Publications/Trends_in_U.S._Agriculture/Farm_Numbers/index.php)

# Las Citas

Trivedi, P.P. (2014). Home Gardening. Pusa, New Delhi: Indian Council of Agricultural Research. Retrieved from: <https://www.biodiversitylibrary.org/item/258278#page/57/mode/1up>

United States of America, United States Department of Agriculture. (2018, May 4). Trends in U.S. Agriculture. Retrieved from [https://www.nass.usda.gov/Publications/Trends\\_in\\_U.S.\\_Agriculture/Farm\\_Numbers/index.php](https://www.nass.usda.gov/Publications/Trends_in_U.S._Agriculture/Farm_Numbers/index.php)

University of Florida. (2018). Elements of Composting. Retrieved from: <https://sfyl.ifas.ufl.edu/sarasota/natural-resources/waste-reduction/composting/what-iscomposting/elements-of-composting/>

University of New Hampshire Extension. (2018, January 29). Planting and care of tree seedlings. Retrieved from: <https://extension.unh.edu/resource/planting-and-care-tree-seedlings-factsheet>

USGS; Lago La Plata at Damsite. (2008). Retrieved from [https://pr.water.usgs.gov/public/rt/pr\\_lakes/lake\\_50045000.html](https://pr.water.usgs.gov/public/rt/pr_lakes/lake_50045000.html) United States Geological Survey

Venezuela's worst economic crisis: What went wrong? (2017, May 03). Retrieved from <https://www.aljazeera.com/indepth/features/2017/05/venezuela-worst-economic-crisiswrong-170501063130120.html>



# Las Citas

Wairegi, L.W. & Asten, P.J. (2010) The agronomic and economic benefits of fertilizer and mulch use in highland banana systems in Uganda. *Agricultural Systems*, 103(8). 543-550.)

Wajszczuk, K. (2016). The Role and Importance of Logistics in Agri-Food Supply Chains: An Overview of Empirical Findings. *Logistics and Transport*. 30. 47-55. 43

Wang, J. (2014). *Encyclopedia of business analytics and optimization*. Hershey, PA: Business Science Reference.  
DOI:10.4018/978-1-4666-5202-6

Webb, J. (2017, June 30). The World's Food Supply Depends On 14 Critical Chokepoints, Says New Report. Retrieved from <https://www.forbes.com/sites/jwebb/2017/06/30/the-worldsfood-supply-depends-on-14-critical-chokepoints-says-new-report/#2a82e06c18c0>

Windbiel-Rojas, K. (2014, July 16). Traps and barriers for keeping pests out. Retrieved from <https://ucanr.edu/blogs/blogcore/postdetail.cfm?postnum=14606>