



DRYING



STORING



TRANSPORT









# Quality Preservation of Coffee beans without using chemicals or cold storage

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# Ultimate Goals: Producers to Roasters






## Post - Harvest

-  Produce coffee according to the buyers needs under an efficient cost system.
-  Use an efficient logistics method to send the coffee beans to the roasters.
-  Maintain product quality during the period of harvest and sale.
-  Create a long-term relationship with the parties.
-  Create value for their operations and business.
-  Honor the efforts of producers and roasters.



# Understanding the Problem

## Post - Harvest

-  Producers do not know that they are losing quality with poor post-harvest practices.
-  Urgency to sell immediately because the fear of losing the quality.
-  Lack of long-term vision in some business that require investment for future success.
-  Buyers who are strict about quality but do not want to invest in the best solution to preserve the beans during the sea journey.
-  Not understand that quality is for all type of categories, from standard to specialty.

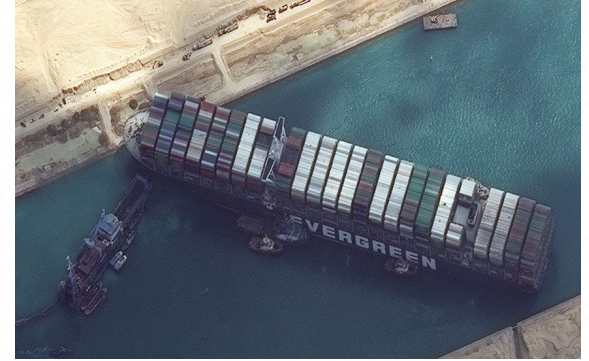


# 3-Challenges that affects Green Coffee Beans

Unpredictable Weather



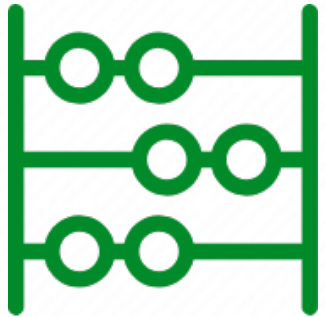
Transport and logistics issues



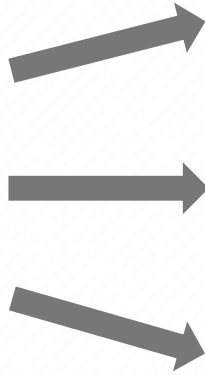
Poor storage conditions



# Storage: Elements to take into consideration



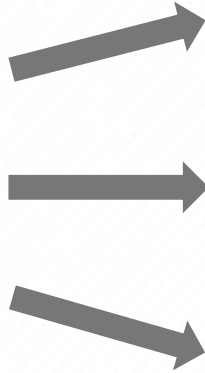
Permeability/  
Isolation



# Storage: Elements to take into consideration



Contamination

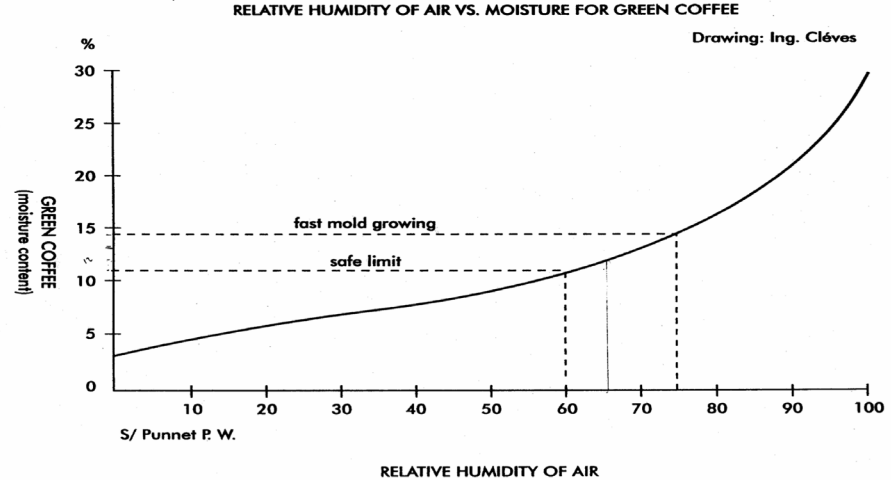
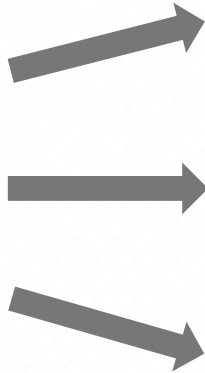


# Storage: Elements to take into consideration



- 1) Skin drying. Moisture 55-45%.
- 2) White Stage drying. Moisture 44-33%.
- 3) Soft Black stage. Moisture 32-22%.
- 4) Medium Black Stage. Moisture 21-16%
- 5) Hard Black Stage. Moisture 15-12%
- 6) Fully dry coffee and conditioning. 11-10%.

Relative  
Humidity/  
Moisture  
Content



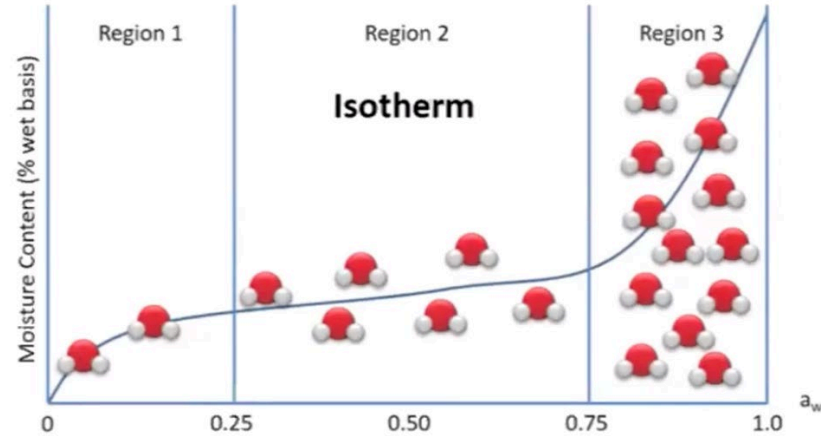
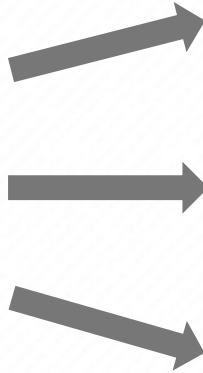
Control of microflora and equilibrium moisture content caused the “set standard” of coffee to be set at 11% moisture content on wet basis. However, the reality is that the relative humidity in the tropics is far higher than 65%, especially during the rainy season, when the RH levels may reach 85%-95%.

Coffee is considered to be a “hygroscopic” commodity, meaning that it absorbs moisture easily. Other commodities, for instance, paddy, absorb moisture much slower. Thus, coffee stored under conditions of a high ambient RH, will absorb moisture rapidly.

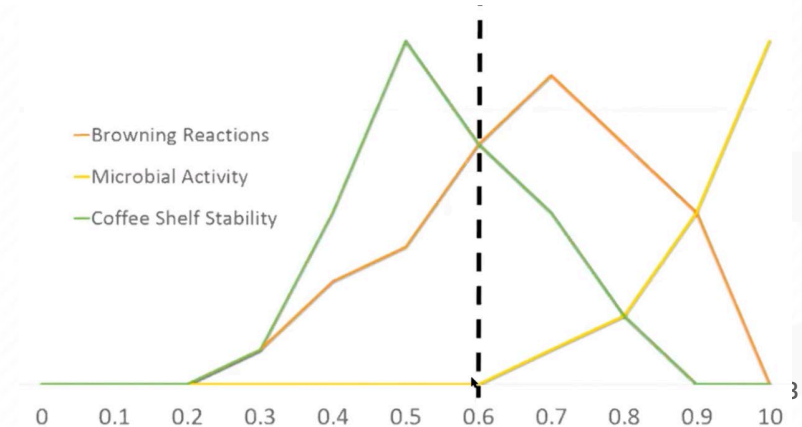
# Storage: Elements to take into consideration



Water Activity



Graphics property of:  
Jesús Salazar  
Cafeólogo  
México  
IG: @cafeologo

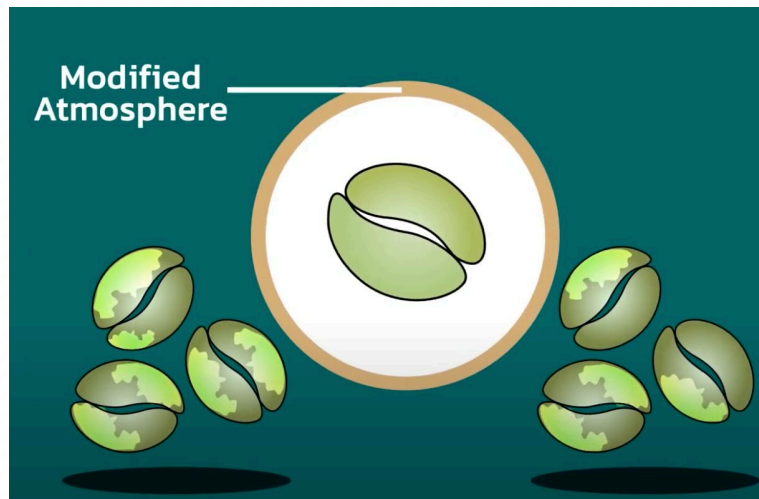
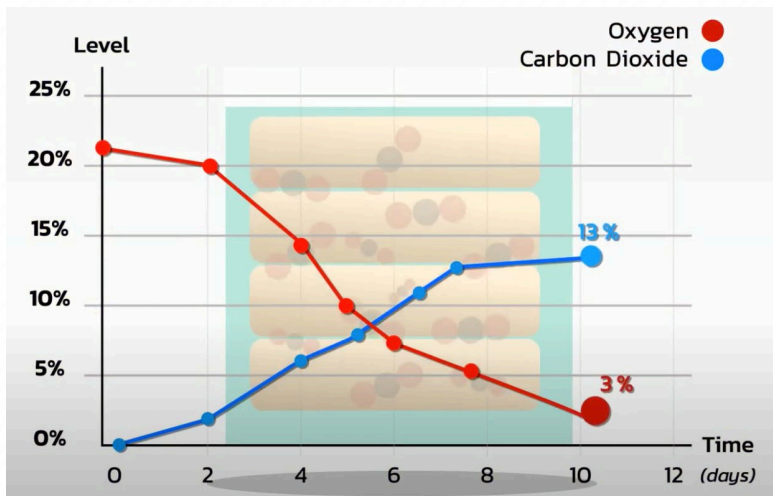




# The Importance of the Hermetic Storage

Hermetic technology is defined simply as the technology that uses gas-tight and moisture-tight materials to seal or store commodities that are prone to deterioration when exposed to air, moisture or foreign objects.

It use the concept of Modified Atmosphere, where the levels of O<sub>2</sub> decrease while the levels of CO<sub>2</sub> increase, this is because the low permeability of the storage unit.





**Commodity:** Coffee beans  
**User:** Café Britt  
**Country:** Costa Rica  
**Capacity:** 5 Tonnes  
**Product:** GrainPro SVC Cocoon

### Challenges

- Infestation and coffee bean quality deteriorates when stored for long term
- A commercial trial comparing a well-ventilated warehouse storage and Cocoon Storage for 6-month storage period

**Results Based on Observations of Café Britt**  
*(Captured by blind cupping results)*

Parameters	Warehouse	Cocoon
Aroma	With strong “damp” / “old aroma”	Pleasant fresh aroma
Cupping results	Had perfectible old and harsh “flavor” in the cup	Ranked highest in taste, aroma, body and acidity



Parameters	Hermetic Cocoon	Warehouse
Temperature	Minimum: 12.3	Minimum: 15.4
	Maximum: 14.3	Maximum: 34.5
	Average: 13.6	Average: 21.4
Relative Humidity	Minimum: 54.2%	Minimum: 33.10%
	Maximum: 57.4%	Maximum: 88.3%
	Average: 56.43%	Average: 69.74%
Initial Moisture Content (11%-MC)	After 6 months: 11.5%	After 6 months: 13%

# CUPPING RESULTS

Captured by blind cupping results

LENGTH OF STORAGE	3 MONTHS			4 MONTHS			6 MONTHS		
METRICS	HERMETIC COCOON	COFFEE IN SACKS (WAREHOUSE)	COFFEE IN BULK (WAREHOUSE)	HERMETIC COCOON	COFFEE IN SACKS (WAREHOUSE)	COFFEE IN BULK (WAREHOUSE)	HERMETIC COCOON	COFFEE IN SACKS (WAREHOUSE)	COFFEE IN BULK (WAREHOUSE)
Taste	4	3.5	4	4	4	4	3.5	3	2.8
Aroma	4	4	4	4.5	3.8	4	3.5	3.5	2.5
Body	4.5	3.5	4.5	4	4	4	4	3	3
Acidity	3.5	3.5	3.8	4	4	3.8	4	3.5	3
Cup Average	4	3.5	3.8	4	4	3.8	4	3	3

Scale 0.5 to 5.0

## Hermetic Cocoon

Appearance Green/Clear

Aroma Fresh

## Coffee in Sacks (Warehouse)

Appearance Green/Clear

Aroma Fresh

## Coffee in Bulk (Warehouse)

Appearance Green/Clear

Aroma Fresh

Observations after 6 months storage:

Sabor muy bueno a pesar de ser de cosecha vieja, sabor floral leve  
Very good flavor despite being from previous harvest. Slight floral flavor.

Observations after 6 months storage:

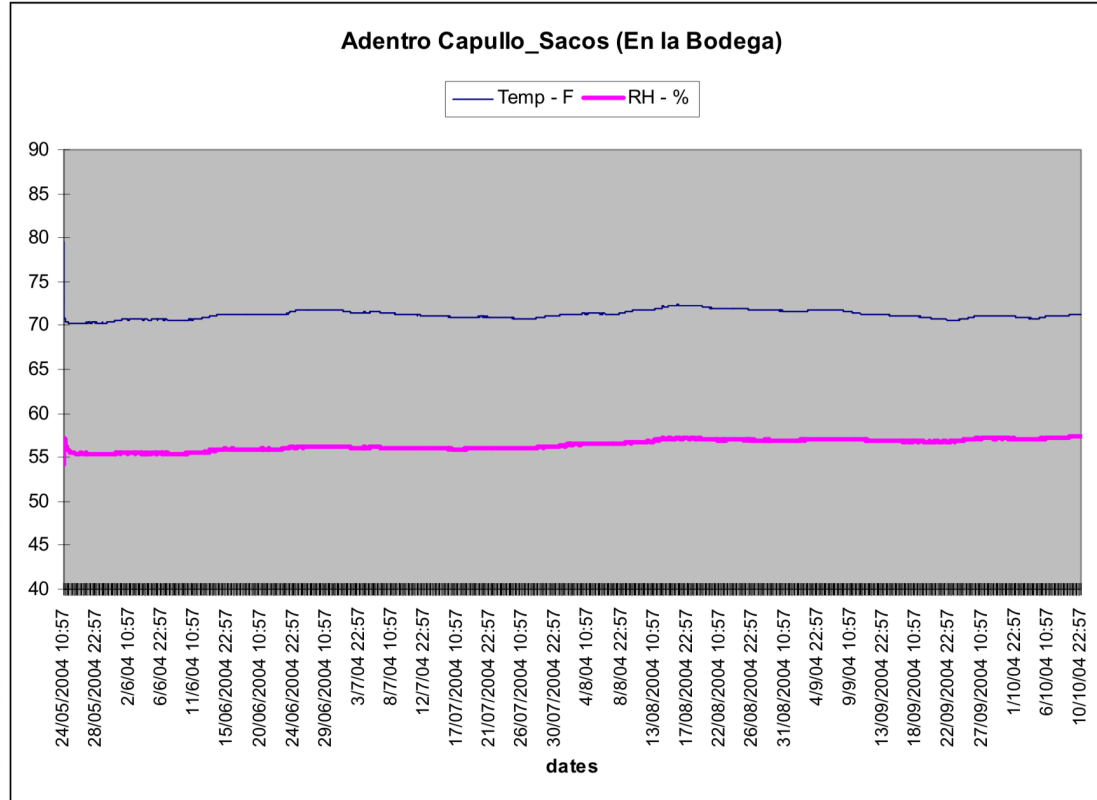
leve viejo perceptible un poco en la taza, áspero leve, manchoso.  
Slight old flavor perceptible in the cup. Slight harshness, tainted.

Observations after 6 months storage:

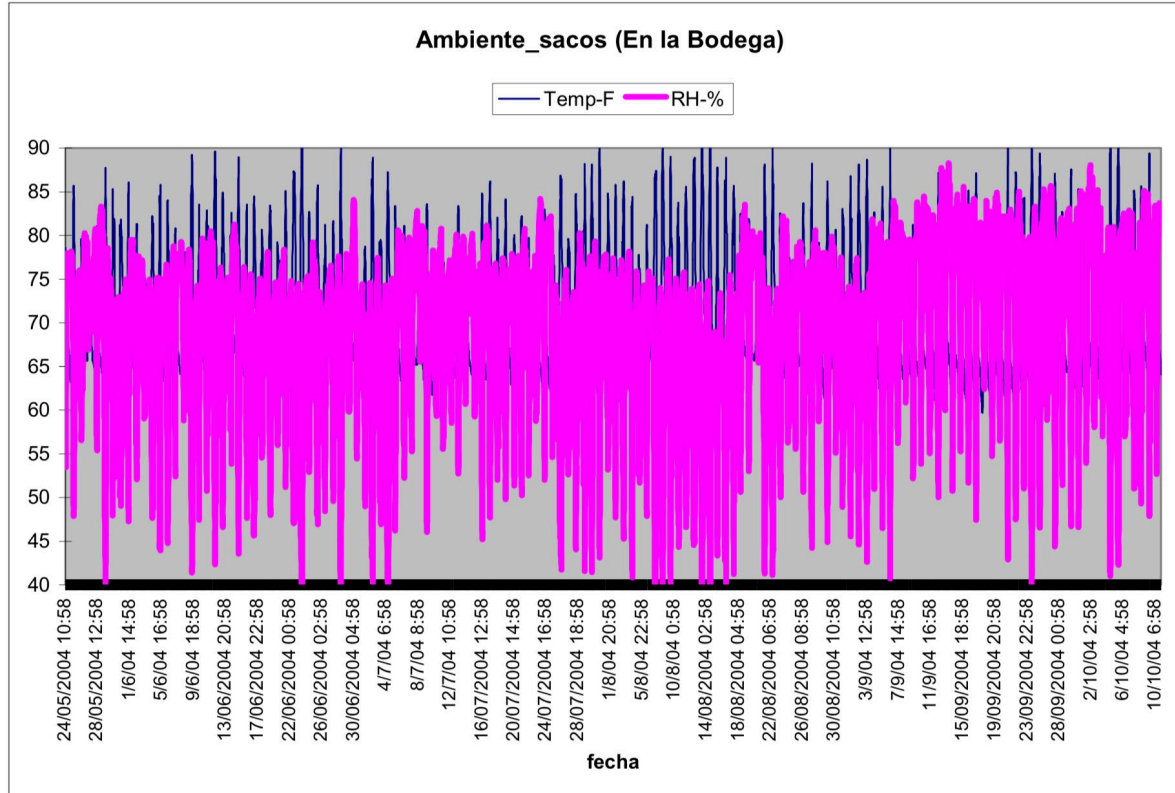
viejo perceptible en la taza, áspero leve, manchoso.  
Old flavor perceptible in the cup. Slight harshness, tainted.

- Coffee stored in Cocoon **retained better quality** than coffee in regular storage
- Difference in quality are more apparent in cupping test over time

# Application of Hermetic Storage in real life



# Application of Hermetic Storage in real life





**Commodity:** Coffee beans

**User:** Coffee exporter

**Country:** Vietnam

**Capacity:** 16 Tonnes

**Product:** TranSafeliner

### Challenges

- Infestation and coffee bean quality deteriorates when stored for long term

### Results

Because of problems on recurring infestation when chemical fumigation is performed, our customer used TSL and CO2 fumigation as way to manage and prevent infestation from recurring specially on a shipment that takes about weeks to arrive (LatAm and US).





Commodity: Coffee beans

User: Coffee Miller

Country: PNG

Product: SGB bags

### Challenges

- Long-term storage trial

### Results

The coffee beans after subjecting to a two and a half (2 ½) year of storage was submitted for a cupping test. The cupping score was 82%, passed as “very good\*” based on SCA cupping score scheme although showing some ageing in the papery notes of the sample.

SG-7220	PNG Western Highlands Honey	Type sample	2021	Jiwaka Coffee Limited	Black Cherry, Dark Chocolate, Honey, Passion Fruit, Plum, Raisin, Red Apple, Winey		84.5
SG-7221	PNG Western Highlands SC17+ Honey	Type sample	2019/20	Jiwaka Coffee Limited	Apple, Black Tea, Dark Chocolate, Honey, Plum	Mild flavor, soft honey note, short finish	83
SG-7222	PNG Western Highlands SC16+ Honey	Type sample	2019/20	Jiwaka Coffee Limited	Apple, Black Tea, Dark Chocolate, Honey, Plum		84
SG-7223	PNG Western Highlands Peaberry Washed	Type sample	2019/20	Jiwaka Coffee Limited	Black Tea, Brown Spice, Dark Chocolate, Honey, Nutty		83
SG-7224	PNG Western Highlands Natural	Type sample	2018	Jiwaka Coffee Limited	Dark Chocolate, Honey, Mandarin Orange, Papery		82





Commodity: Coffee beans  
 User: Coffee Processor/ Trader - NKG  
 Country: **Colombia**  
 Product: Cocoon

### Challenges

- Quality deterioration in high RH ambient.

### Results

Whitened Beans	Initial	Final	Difference
<b>COCOON</b>	0.30%	1.92%	<b>+1.62%</b>
<b>Control</b>	0.30%	7.88%	<b>+7.58%</b>
Defective Beans	Initial	Final	Difference
<b>COCOON</b>	4.69%	4.83%	<b>+0.14%</b>
<b>Control</b>	4.69%	5.27%	<b>+0.58%</b>
TOTAL Rejected	Initial	Final	Difference
<b>COCOON</b>	4.99%	6.75%	<b>+1.76%</b>
<b>Control</b>	4.99%	13.15%	<b>+8.16%</b>





# GrainPro Bag – Twist & Tie



Multi-layered polyethylene with gas barrier.



Color: Green transparent.



500 times more airtight than normal plastics.



Two different capacities:

- SPECIAL - 50 Kilograms (based on coffee beans) 26 x 43 (W x L) inches
- LARGE - 69 Kilograms (based on coffee beans) 30 x 51 (W x L) inches



Designed for storage and transportation.



Twist and Tie closing mechanism.



No need to vacuum the air.



# GrainPro Bag – Zipper



 Multi-layered polyethylene with gas barrier.

 Color: Green transparent.

 500 times more airtight than normal plastics.

 Three different capacities:

- **SMALL** - 15 Kilograms *(based on coffee beans)* 16 x 28 (W x L) inches
- **MEDIUM** - 30 Kilograms *(based on coffee beans)* 26 x 32 (W x L) inches
- **LARGE** - 69 Kilograms *(based on coffee beans)* 28 x 43 (W x L) inches

 Designed for storage and transportation.

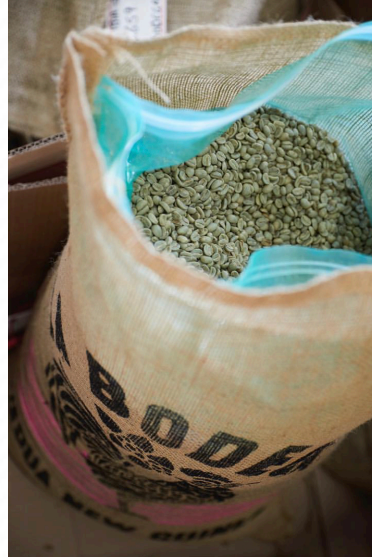
 Two track zipper closing mechanism.

 No need to vacuum the air.

# Users around the world



Ecom Trading, Global



Café Imports, USA



Sustainable Harvest, USA



La Bodega Coffee, Kenya



El Injerto, Guatemala

# GrainPro Cocoon Indoor



Designed to store bagged commodity on indoor conditions.



Transportable, Flexible and Lightweight warehouse.



No need of additional structure.



Multi-layered polyethylene with gas barrier.



Color: Green transparent.



500 times more airtight than normal plastics.



Four different capacities and price idea:

- Small – 7.8 cu. meters 2.5 x 2.5 x 1.25 (L x W x H) meters
- Medium – 13 cu. meters 2.5 x 2.5 x 2.3 (L x W x H) meters
- Large – 50 cu. meters 3.25 x 5 x 3 (L x W x H) meters.
- X Large – 100 cu. meters 5 x 5 x 4. (L x W x H) meters



Designed for safe storage.



Two track zipper closing mechanism at the top.



Fumigation port for organic pest control.



# Users around the world



Ona Coffee/ Tim Horton's,  
Canada



Mercon Coffee,  
Guatemala



Folgers, USA



Olam, Colombia

# GrainPro Cocoon Lite



Designed to store bagged commodity on outdoor/ indoor conditions, made of weather resistant and lightweight multi layer co-extruded polyethylene.



No need of additional structure.



Color: White



Bottom and Top portion joined with a high resistance zipper.



Wide range of capacities:

- Cocoon Lite 5M – 5 Metric Tons 3.00 x 1.6 x 1.5 (L x W x H) meters
- Cocoon Lite 10M – 10 Metric Tons 3.3 x 2.94 x 1.5 (L x W x H) meters
- Cocoon Lite 20MT – 20 Metric Tons 4.5 x 3.3 x 2.0 (L x W x H) meters
- Cocoon Lite 50MT – 50 Metric Tons 8.90 x 4.4 x 2.0 (L x W x H) meters
- Cocoon Lite 100MT – 100 Metric Tons 8.60 x 5.80 x 3.0 (L x W x H) meters
- Cocoon Lite 150MT – 150 Metric Tons 8.90 x 8.5 x 3.0 (L x W x H) meters
- Cocoon Lite 300MT – 300 Metric Tons 11.8 x 11.8 x 3.0 (L x W x H) meters



Designed for safe storage.



Fumigation port for organic pest control.

# Users around the world



Syngenta Coffee, Brazil



Zamorano, Honduras



# GrainPro FIBC Pouch



Designed to store FIBC (1MT Big Bags).



Multi-layered polyethylene with gas barrier.



Color: Green transparent.



500 times more airtight than normal plastics.



Two different capacities:

- FIBC Pouch-1 – 1 Big Bag inside 45 x 45 x 43/inches
- FIBC Pouch-2 – 2 Big Bags inside 45 x 45 x 87/inches



Designed for storage and transportation.



Two track zipper closing mechanism at the top.



Fumigation port for organic pest control.



# Users around the world



Colombia



Vietnam



United States

# GrainPro TranSafeliner



Designed to protect the commodities in shipping containers while in transit.



Multi-layered polyethylene with gas barrier.



Color: Green transparent.



500 times more airtight than normal plastics.



Two different capacities:

- TSL-20 – for 20ft containers
- TSL-40 – for 40ft containers



Designed for transportation and fumigation.



Two track zipper closing mechanism at the front of the liner.



Available option for bulk shipping.

# Users around the world



Olam, Global



Maersk, USA

# THANK YOU - धन्यवाद - ಧನ್ಯವಾದಗಳು - TERIMA KASIH - භවභවකුඹ

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Morning Bell Coffee Roasters



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**morningbellcoffeeroasters** We've started working with Ryan and Taylor from @yepocapacoffee to reuse GrainPro bags at origin. These bags recently went to Guatemala with Ryan for reuse! These bags cost farmers \$10 each, so it's a beautiful thing to be able to help farmers save money and save the world at the same time. We look forward to seeing some of these bags back in Ames in the future with the next crop of Yepocapa green coffee sometime this summer! As far as we know, we are the only roaster anywhere sending GrainPro bags back to origin countries for reuse. We hope we can inspire more roasters to join us!



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**rustydogcoffee** Thanks @grainproinc\_ for keeping our beautiful beans sealed and safe! .