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# Environmental Aspects in Global Value Chain

With examples from coffee, apparel and footwear industries

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[conferenceboard.ca](http://conferenceboard.ca)

# Overview

## WHAT?

- **What are the environmental aspects of GVCs?**

## WHY

- **Why do we care about environmental issues in GVCs?**
- **GVC Environmental Impacts in Developing Countries**

## HOW?

- **How to achieve greener value chains?**

## WHEN

- **When does it pay to be green?**



## WHAT?

### What are the environmental aspects of GVCs?

#### **Environmental aspects in global value chains (GVC):**

the integration of environmental considerations into “the full range of activities to bring a product from its conception to end use and beyond.” The goal of environmental integration is to reduce negative environmental impacts and increase the positive ones

<https://globalvaluechains.org/>



# WHY?

## Why do we care about environmental issues in GVCs?

- Environment is embedded in the value chains since the majority of economic activities require environmental inputs (e.g., natural resources, energy) from, and produce waste to, the environment
- The longer a product's value chains, and the bigger its trade volume, the greater environmental impacts
- The environmental impacts of globally traded commodities are spread between exporting and importing countries
- A product lifecycle assessment provides a method to understanding the environmental impacts of its global value chains



# Some highlights in coffee industry:

- Coffee is the world's second largest traded commodity after oil with \$30-32 billion market worldwide (Specialty Coffee Association of America, 2012)
- With global consumption of approximately 1.6 billion cups per day, the social, economic, and environmental impacts of coffee industry are substantial (International Coffee Organization/ICO)
- Carbon footprint of 1 kg green coffee bean (produced in Costa Rica and consumed in Europe) is approximately 4.98 kg CO<sub>2</sub>e  
([http://www.balas.org/BALAS\\_2013\\_proceedings\\_data/data/documents/p639212.pdf](http://www.balas.org/BALAS_2013_proceedings_data/data/documents/p639212.pdf))
- World coffee exports amounted 91.3 million bags (@60kg) in 2016 ([www.ICO.org](http://www.ICO.org)) and thus, potentially produced 27.28 megaton CO<sub>2</sub>e. The greenhouse gas emissions are spread globally between producing and consuming countries.
- On average, one acre of new forest can sequester about 2.5 tons of carbon annually (Gopan, 2014). More than 10 million ha forest required to sequester 27.28 megaton CO<sub>2</sub>e ?



# Apparel/ footwear

<http://www.ecouterre.com>

## The skinny on trashing textiles.

### Tons of Textile Waste



According to the EPA, **13.1 million tons of textiles are trashed each year**, and only 15% – or 2 million tons – are recovered for reuse or recycling.



Nearly half of us (48%, to be precise) still trash perfectly reusable textiles.

**78%** OF PEOPLE DID NOT KNOW THAT **11 MILLION TONS** OF TEXTILES ARE TRASHED EACH YEAR.



In 2010 the world produced and purchased almost 25 billion shoes, nearly all of which (more than 90%) were manufactured in developing countries (Sport Business Research Network, 2011)

A typical pair of running shoes made of synthetic materials produced approx. 14 (+/- 2.7)kg CO<sub>2</sub>e (<http://hdl.handle.net/1721.1/102070>)

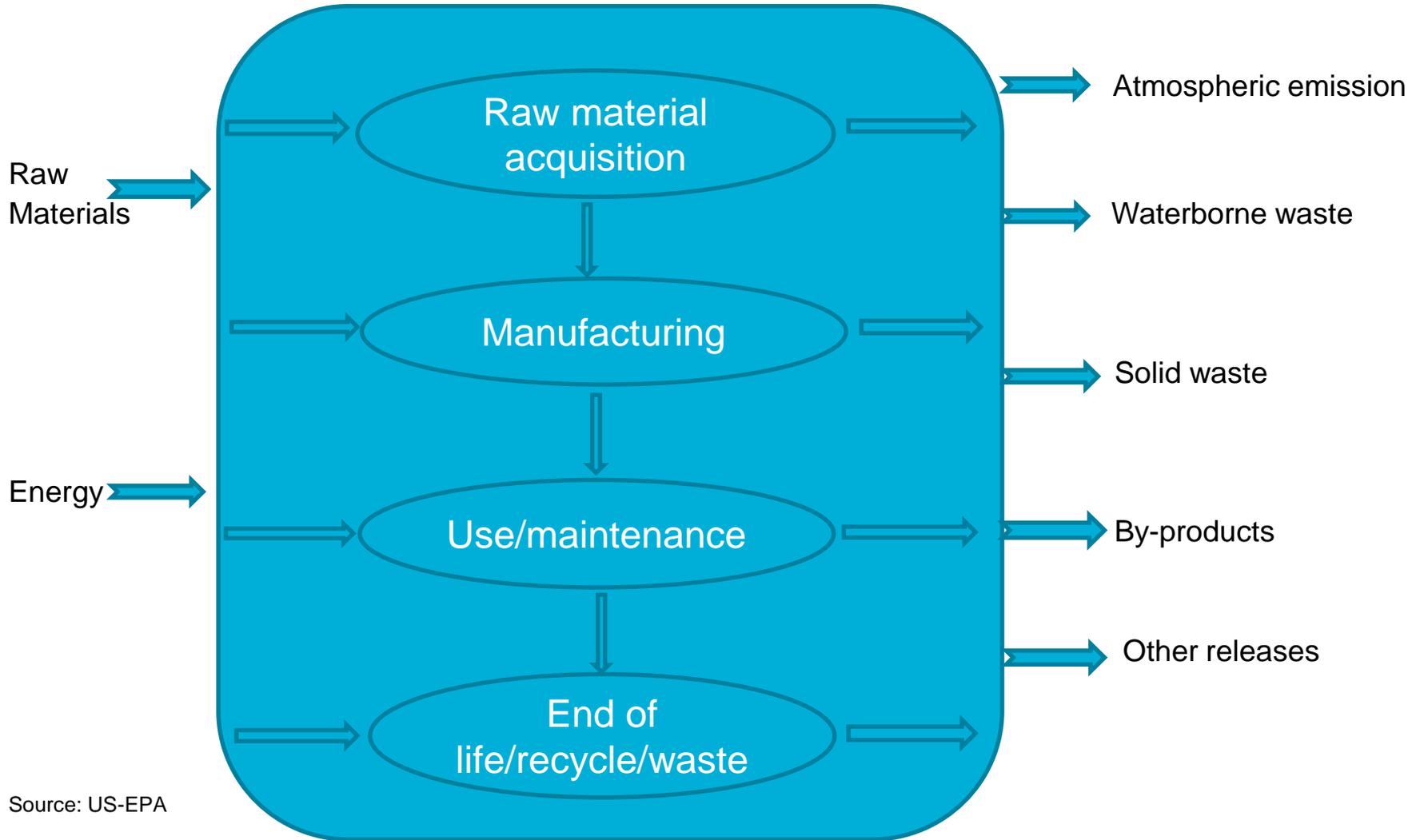


# Environmental Aspects in A Product Life-cycle

## Inputs

## Life-cycle stages

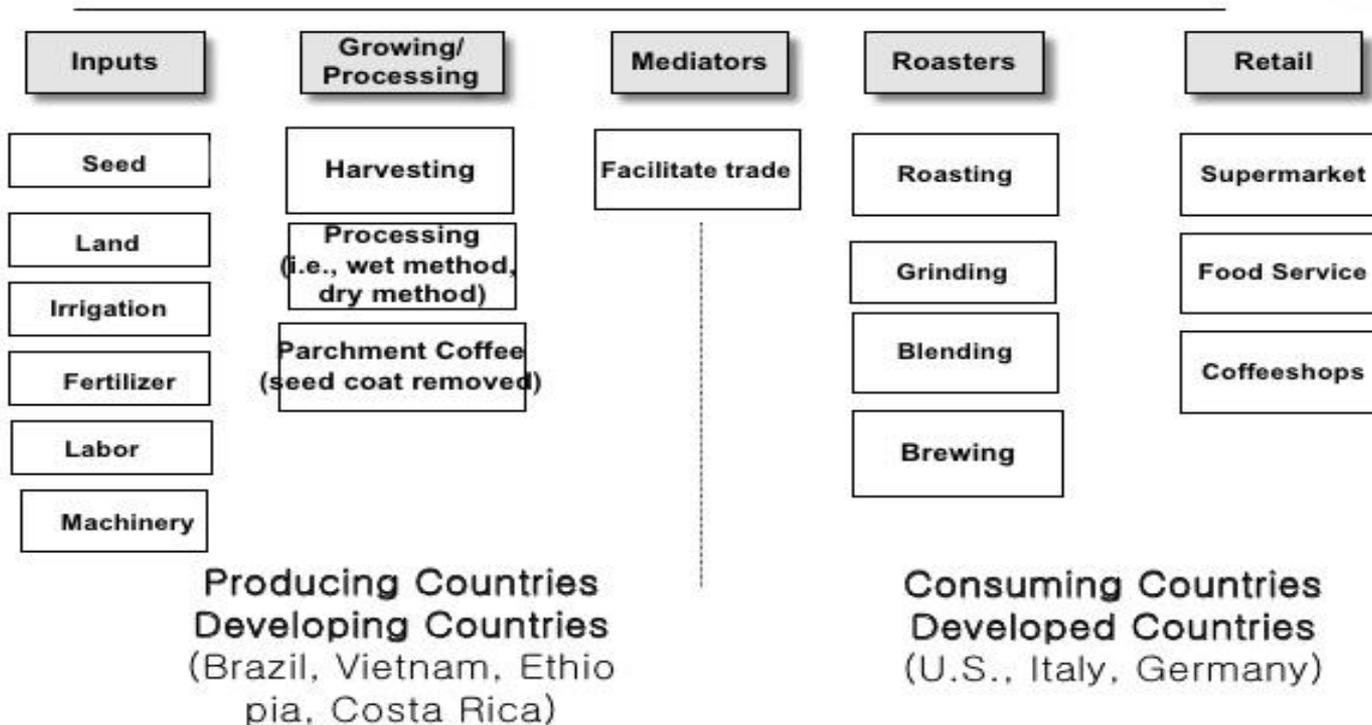
## Outputs



# Distribution of environmental impacts depend on where the economic activities take place

## Coffee Global Value Chain Input - Output Stages

DUKE/VIU  
INTERNATIONAL  
SLIMMER  
RESEARCH  
WORKSHOP



# GVC Environmental Impacts in Developing Countries

## **Two opposing opinions on global and free trade impact on environment:**

(-) Some argue environmental quality will be compromised as developing countries will adopt less stringent environmental standards to increase their global competitiveness (“race to the bottom” hypotheses)

(+) Others argue that trade globalization could encourage more efficient allocation of resources, technical innovation, improved environmental standards (to meet the requirements from the developed markets) and the adoption of corporate codes of conduct (“gains from trade” hypotheses)



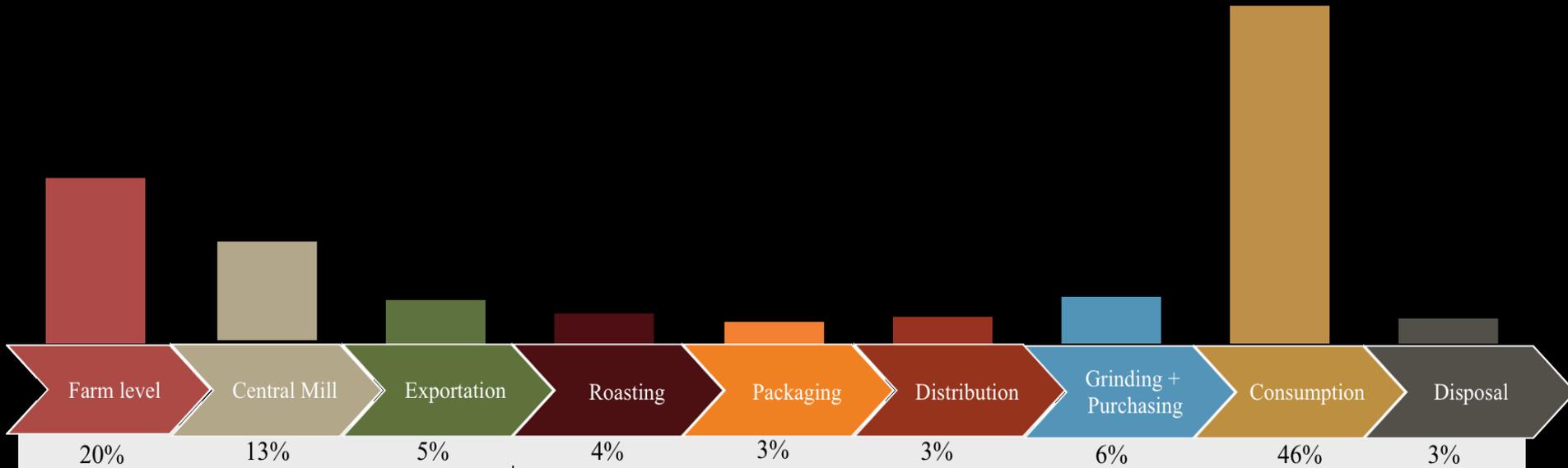
# Understanding A Product's Environmental Impacts through Lifecycle Analysis

- Life Cycle Assessment method provides a tool to assess environmental impacts (i.e., resource consumptions and emission to the environment) across the full life cycle of a product, from material acquisition to manufacturing, use, and final disposal.
- Environmental “hotspots” refer to the activity that cause the highest environmental impacts in a product lifecycle (e.g. dyeing process in textile manufacture).
- If environmental hotspots are known, efforts to reduced environmental impacts can be focused.



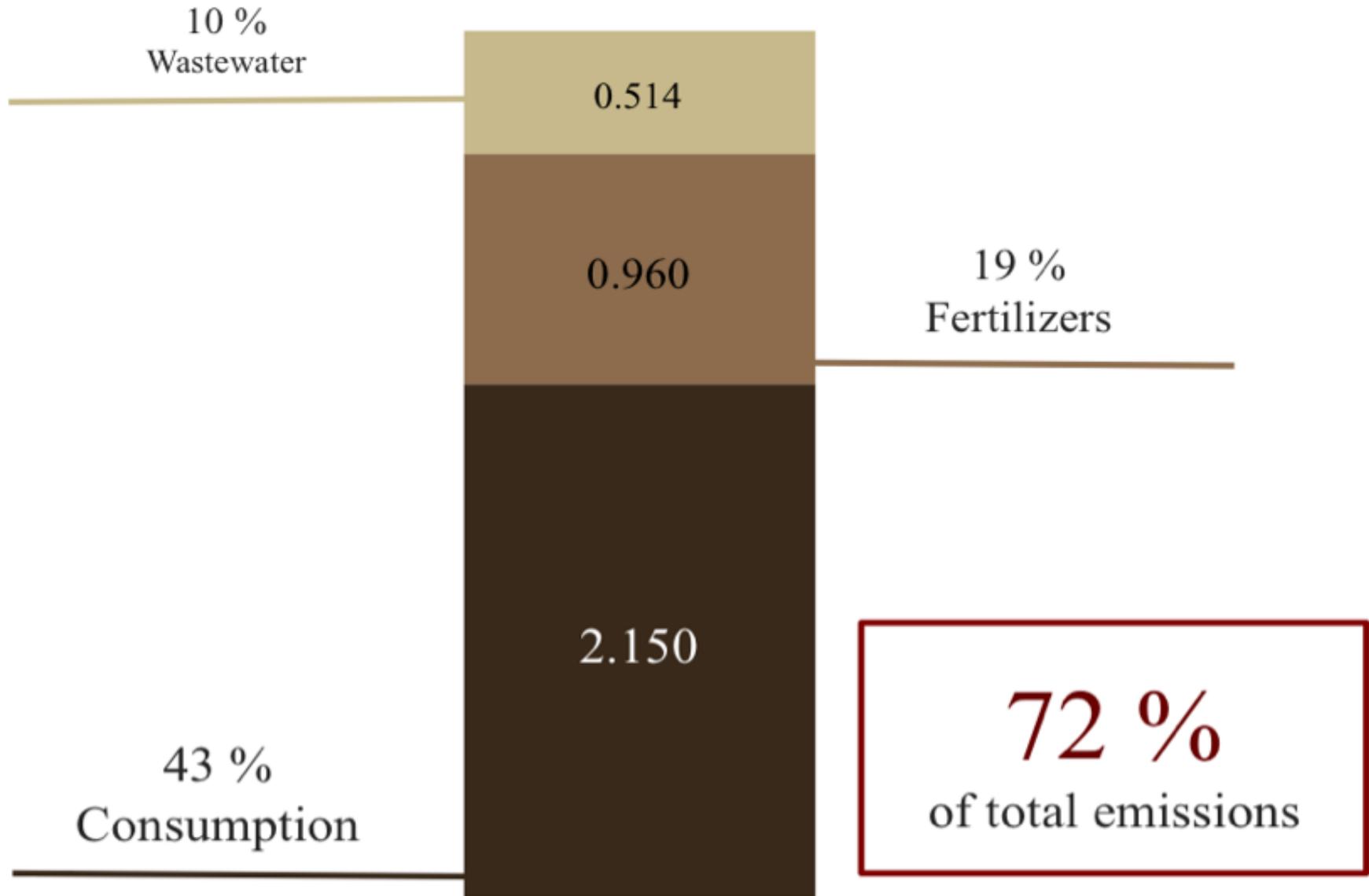
# Example from coffee lifecycle

CO<sub>2</sub>e emissions of 1 kg coffee green bean produced in Costa Rica, consumed in Europe ([http://www.balas.org/BALAS\\_2013\\_proceedings\\_data/data/documents/p639212.pdf](http://www.balas.org/BALAS_2013_proceedings_data/data/documents/p639212.pdf))

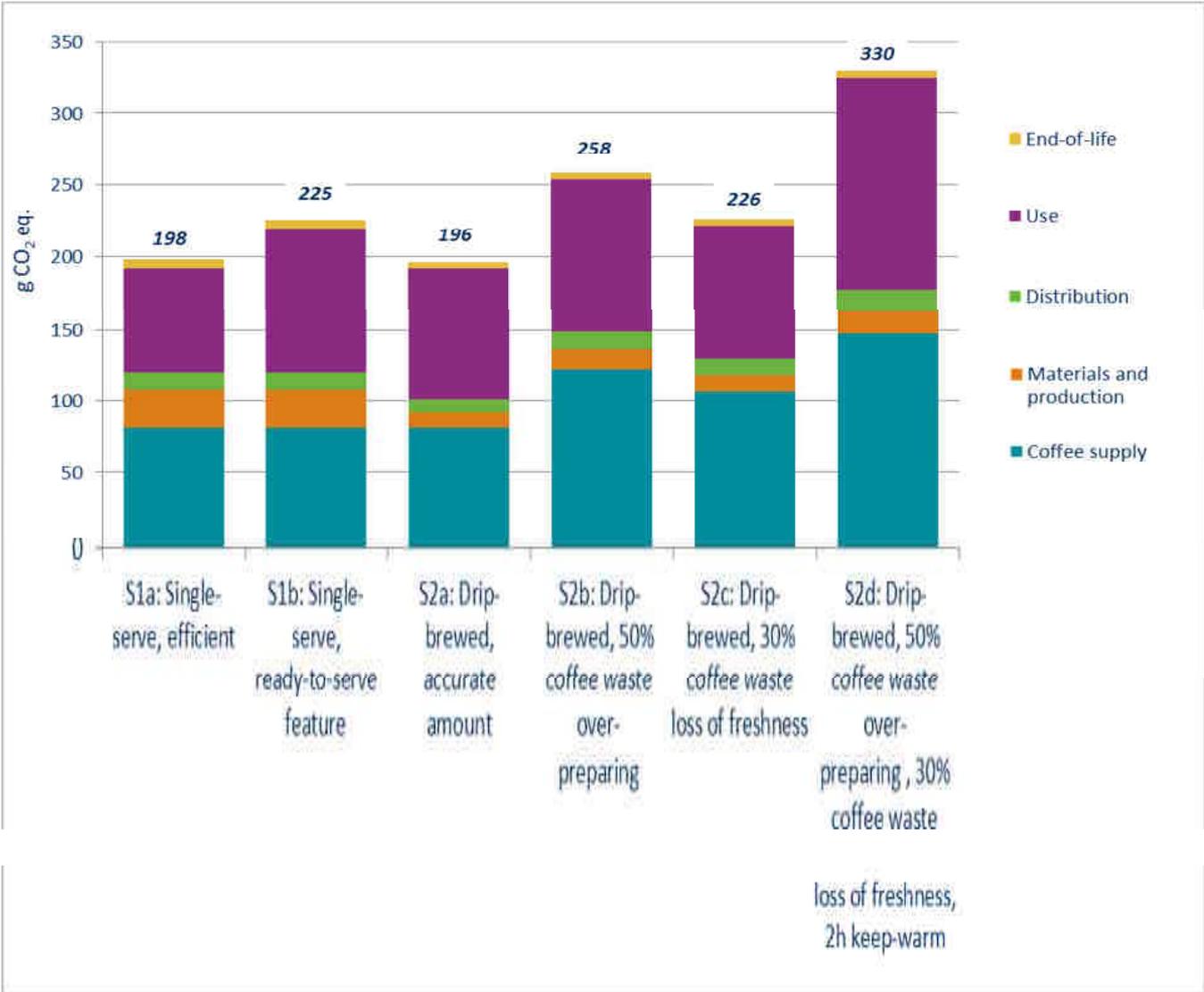


# Environmental Hotspots for CO2 emissions

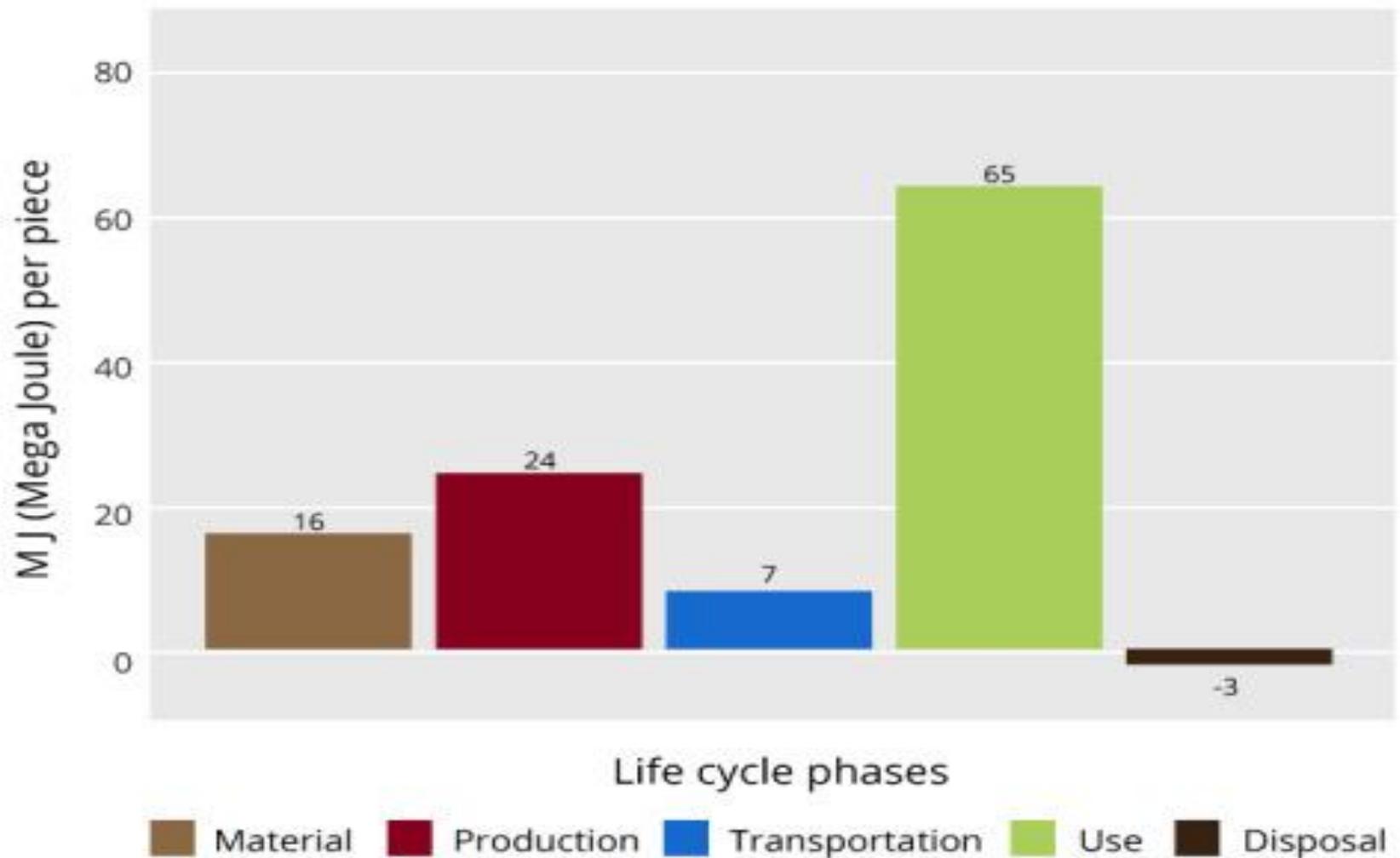
([http://www.balas.org/BALAS\\_2013\\_proceedings\\_data/data/documents/p639212.pdf](http://www.balas.org/BALAS_2013_proceedings_data/data/documents/p639212.pdf))



# Different CO2e emissions of different types of coffee



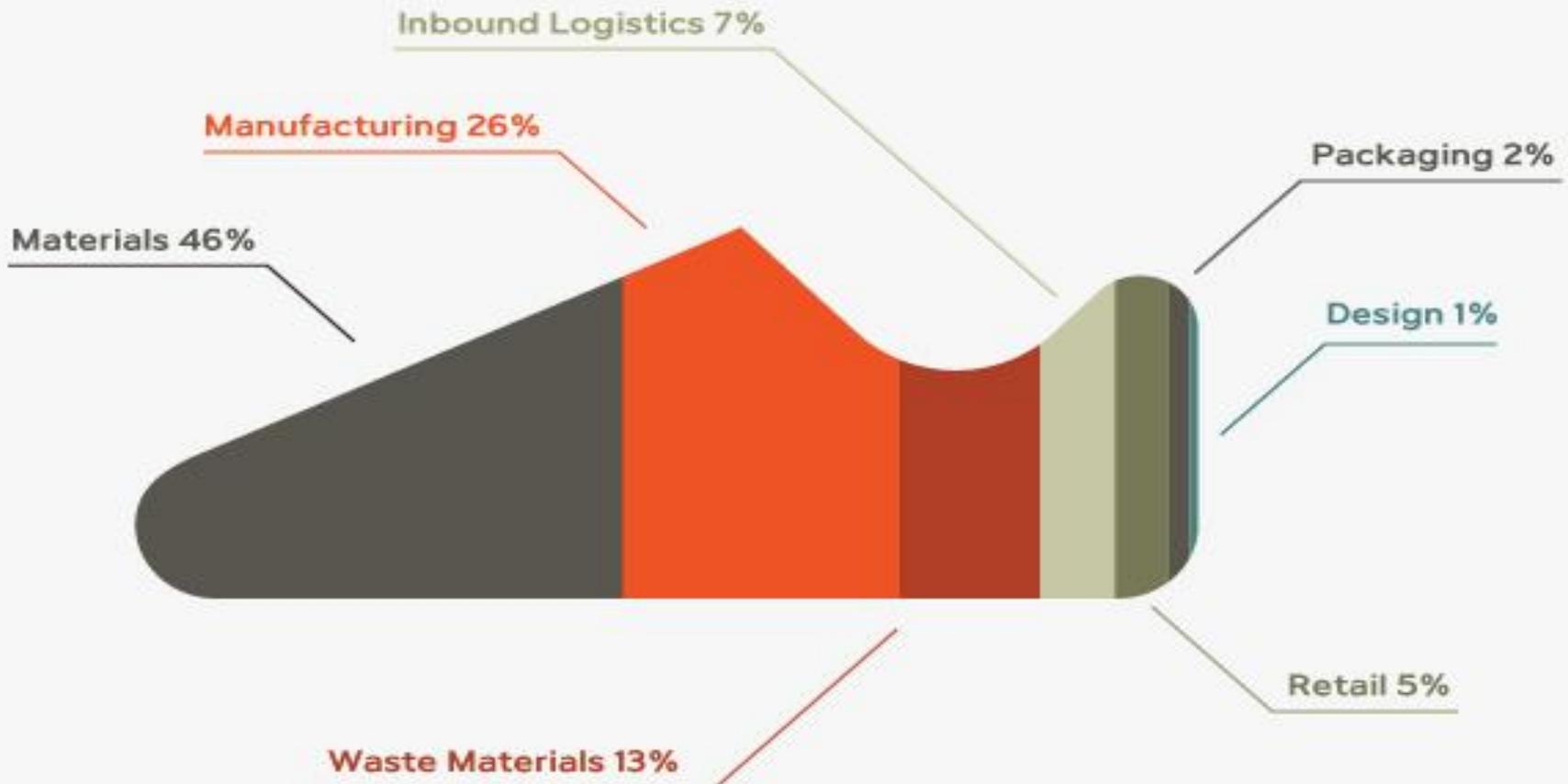
# Primary Energy Profile of a Cotton T-shirt



Source: [http://www.ifm.eng.cam.ac.uk/uploads/Resources/Other\\_Reports/UK\\_textiles.pdf](http://www.ifm.eng.cam.ac.uk/uploads/Resources/Other_Reports/UK_textiles.pdf)

A typical pair of running shoes generates 30 pounds of carbon dioxide emissions, equivalent to keeping a 100-watt light bulb on for one week (MIT, 2013)

**EMBEDDED CO2 IN NIKE AIR PEGASUS 25 RUNNING SHOES – 18 KG/CO2/PAIR (40LB)**

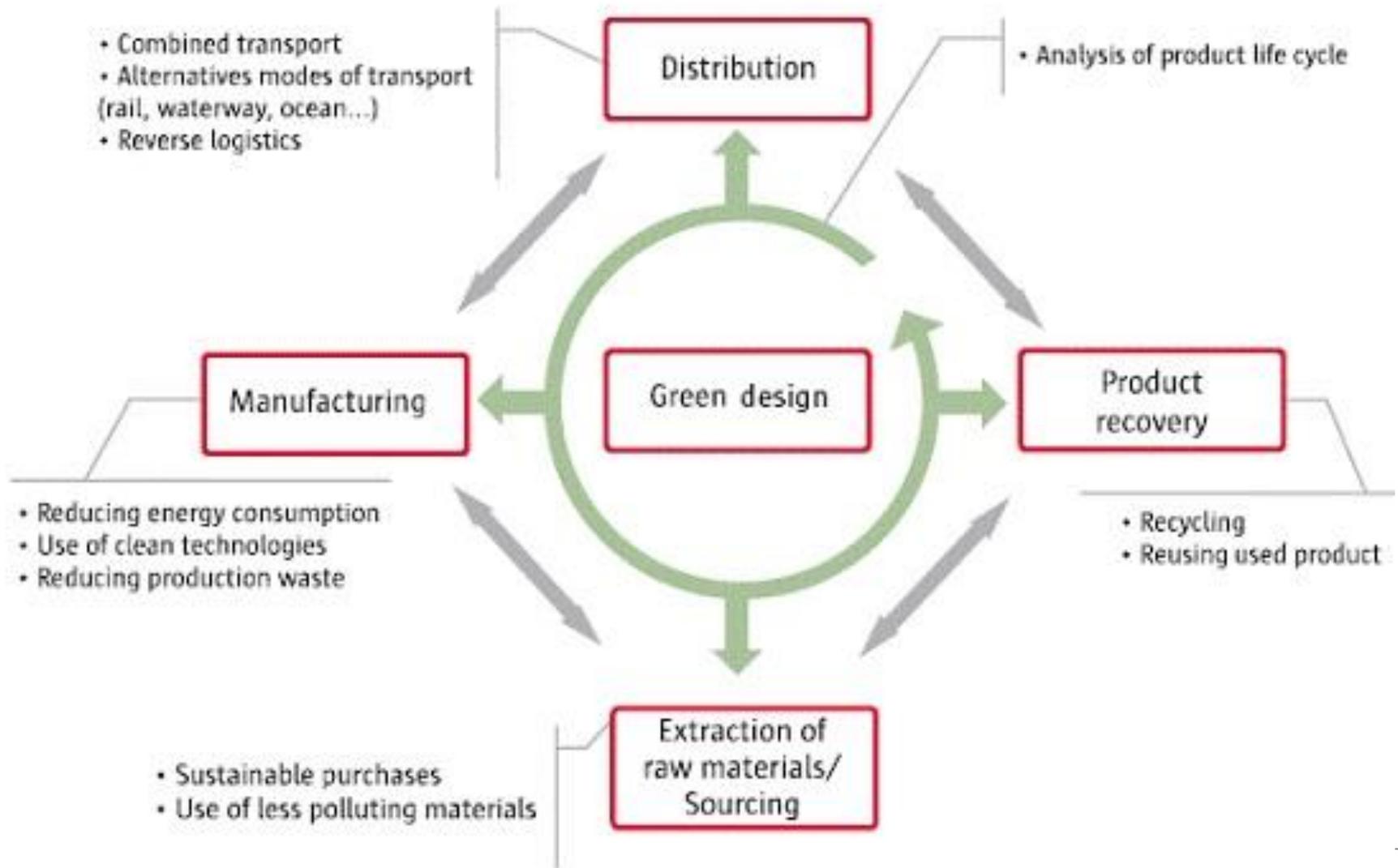


# HOW

- **How to achieve greener value chains?**
- The concept of green value chains is to integrate environmental thinking into supply chain management.
- GVC aims to minimize or eliminate adverse environmental impacts along supply chain, from product design, material resourcing and selection, manufacturing process, delivery of final product and end-of-life management of the product  
(Thoo Ai Chin et al., 2015)

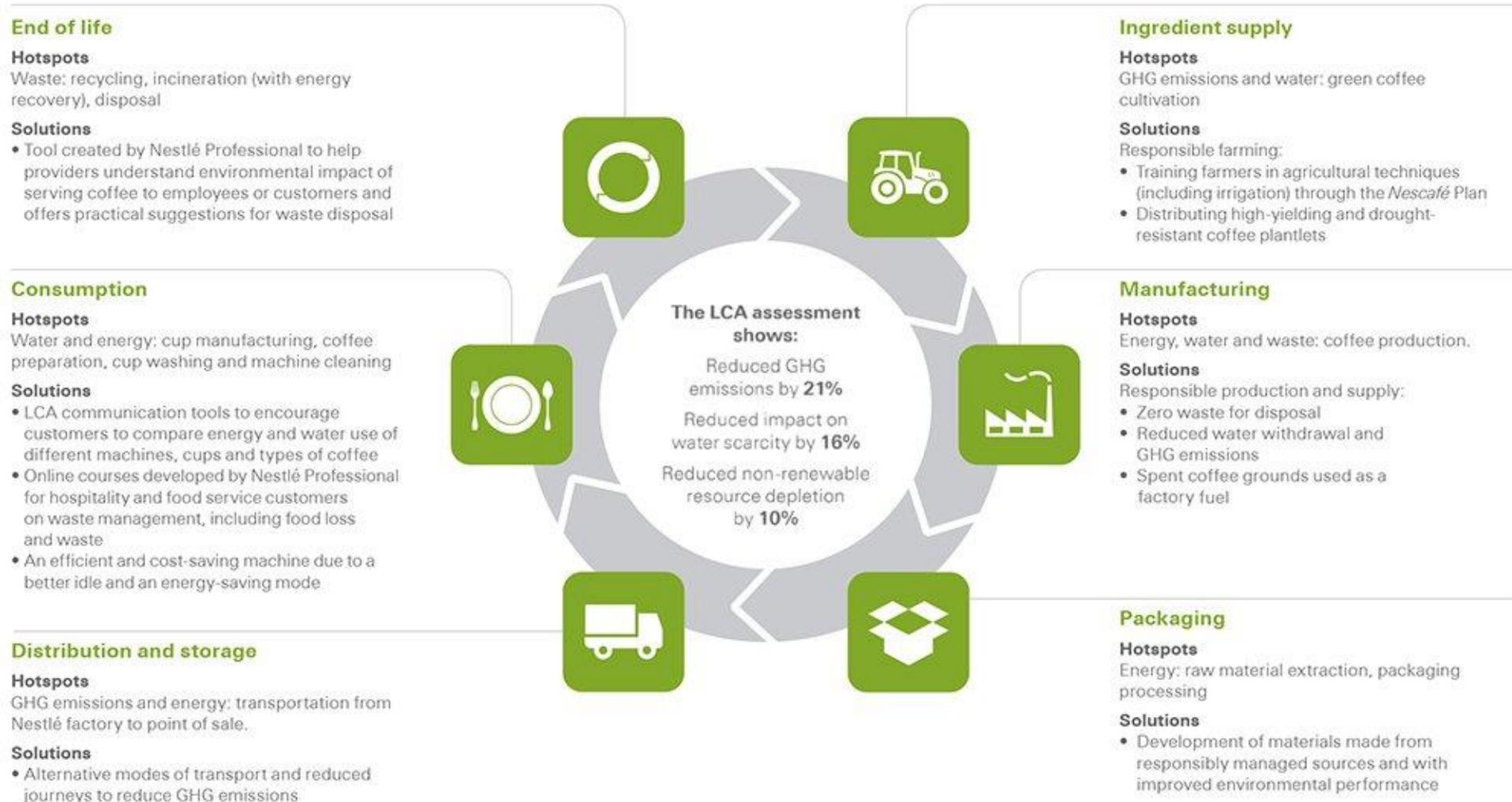


# Various business initiatives to make a greener value chain



Source: 2008 Supply Chain Monitor "How mature is the Green Supply Chain?"

# Green measures in Nestle product lifecycle



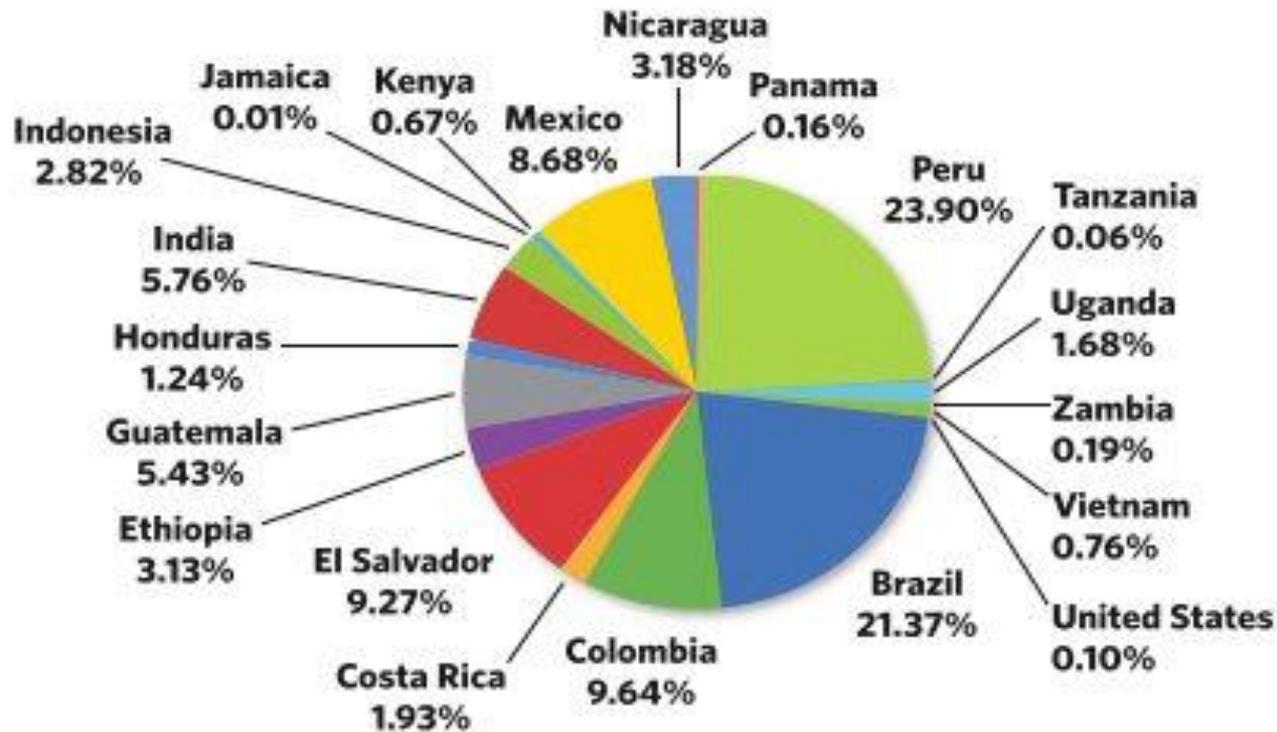
\* Assessment of life cycle environmental impacts: Ispirazione Italiana/Milano 2 MTS130 solution vs. average roast and ground solution serving a 40 ml black espresso to the consumer for out-of-home consumption in Europe.



# Most popular coffee ecolabels in Canada



# Global distribution of sustainable coffee growing areas



Source: IISD Sustainable Coffee 2010



# Green apparel



**NEW!** Organic  
100% cotton  
*ringspun & combed, the softest shirts ever!*

Fair Wear  



Source: Internet



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# Cloth recycling in one of H&M stores, Singapore (source: internet)



# Green Footwear

(Source: internet)



100% post-manufacturing cotton & recycled plastic bottle lining



100% recycled plastic bottle upper



extremely light at an average of 4.6 oz per shoe [W10 | M8.5 sample]



wide toe box

zero drop

3mm rubber outsole made with vegetable oils & 20% post-manufacturing content



WEAR IT | LOVE IT | RECYCLE IT

upcycle well-loved & well-worn kigos with our reclaim partner

**SOLES 4 SOULS**  
WEARING OUT POSITIVE



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# WHEN

When does it pay to be green?

## Generic competitive environmental strategies

Comparative advantage	Lower costs	<u>Strategy 1:</u> <b>Eco-efficiency</b>  (e.g., firms adopting Reduce, Reuse, Recycle practices)	<u>Strategy 4:</u> <b>Environmental Cost Leadership</b>  (e.g., biodegradable packaging)
	Product differentiation	<u>Strategy 2:</u> <b>Beyond Compliance Leadership</b>  (e.g., ISO 14001 certification)	<u>Strategy 3:</u> <b>Eco-Branding</b>  (e.g., organic coffee, organic apparel, eco-friendly vegan footwear)
		Organizational process	Product/ services

Source: Orsato, 2006



