Prospects and Bottlenecks in the Midwestern Hazelnut Industry

SAVANNA INSTITUTE

Laying the groundwork for widespread agroforestry in the Midwest

STRATEGIC PLAN

MISSION: Catalyze the development and adoption of resilient, scalable agroforestry.

Tree Crops

Productive, resilient tree crops
for food & fodder

Robust supply chains
with scalable products &
infrastructure

Farming Systems

Ecological resilience
via effective tree-crop-livestock
integration

Economic resilience
via scalable, multifunctional
systems

Stakeholders

Expert agroforestry farmers

Engaged landowners & investors

Social resilience
via robust stakeholder connectivity

VISION: A multifunctional agriculture in the Midwest US based on agroforestry systems of integrated trees, crops, and livestock and fostering ecological resilience, climate stability, economic prosperity, and vibrant communities.

RESEARCH & DEVELOPMENT

EDUCATION & OUTREACH

18 Oct 2014

PERENNIALMAP.ORG
NAVIGATE THE FUTURE OF FARMING.

COORDINATION & COLLABORATION

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PERENNIALMAP.ORG
NAVIGATE THE FUTURE OF FARMING.
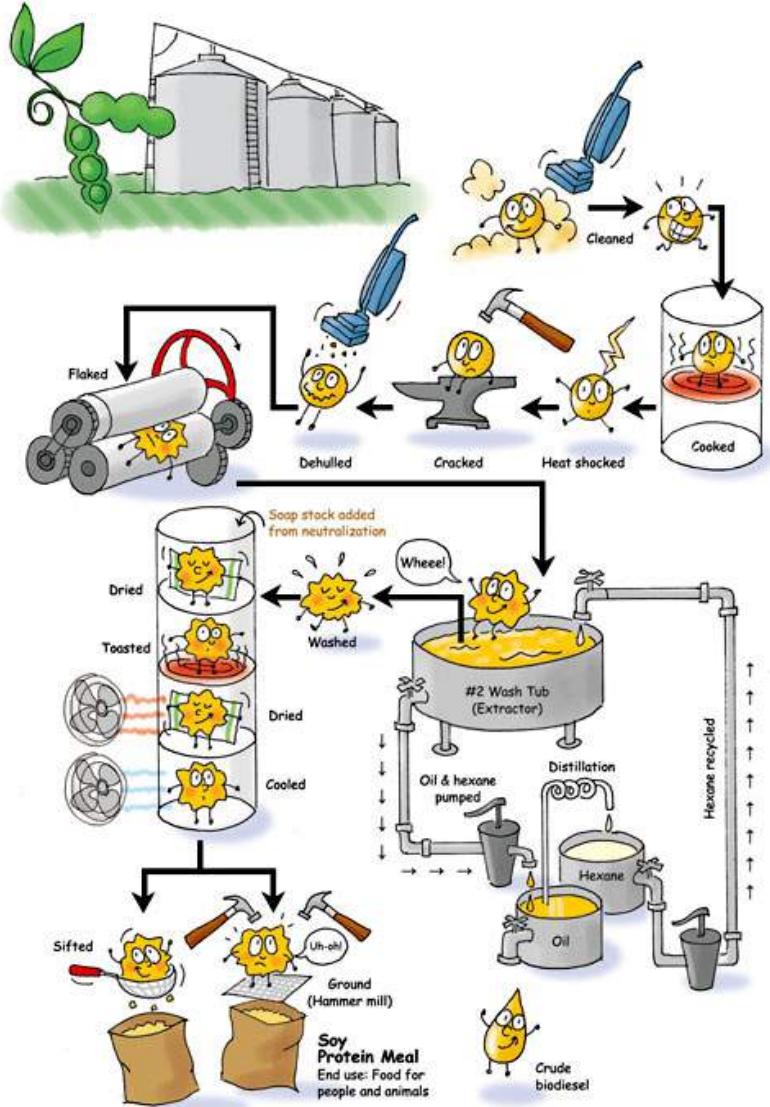
Priority Midwest Tree Crops

Chestnut
"Maize on Trees"

Hazelnut
"Soy on Trees"

I. Prospects

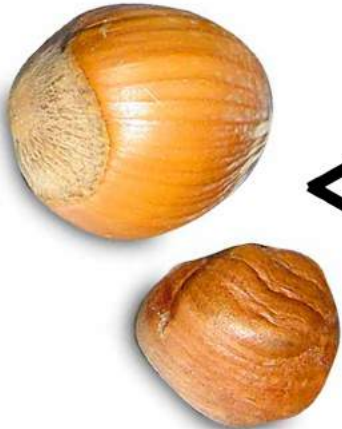

SOYBEAN
HAZELNUT

1. Protein meal

2. Oil

3. Biodiesel

I. Prospects

HAZELNUTS: Scope of present & potential markets

Specialty Markets
$7bn   current, global
$14bn within decade

Commodity Markets
Supplant soybean market
$40bn on 34m hectares in US

Protein
soy-free, gluten-free food

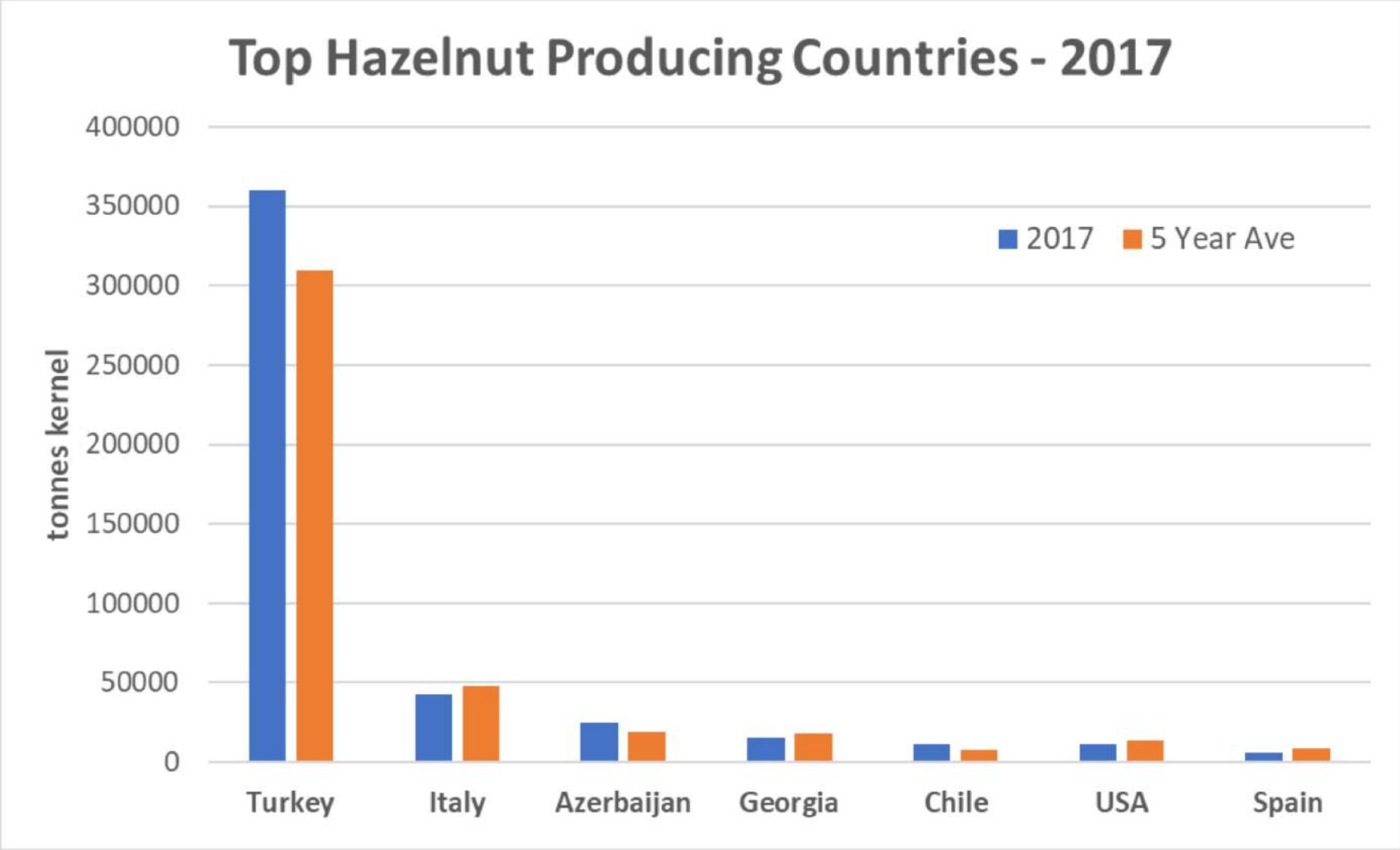**Animal Fodder**
complete protein

Oil
food / biodeisel

Item	Soybean *modern*	Soybean *historical*	Hazelnut *best*
Caloric yield (Mcal/ha)	13	4	13
Oil yield (Mg/ha)	0.6	0.2	1.3

(Wolz *et al*. 2018)

I. Prospects

Top Hazelnut Producing Countries - 2017
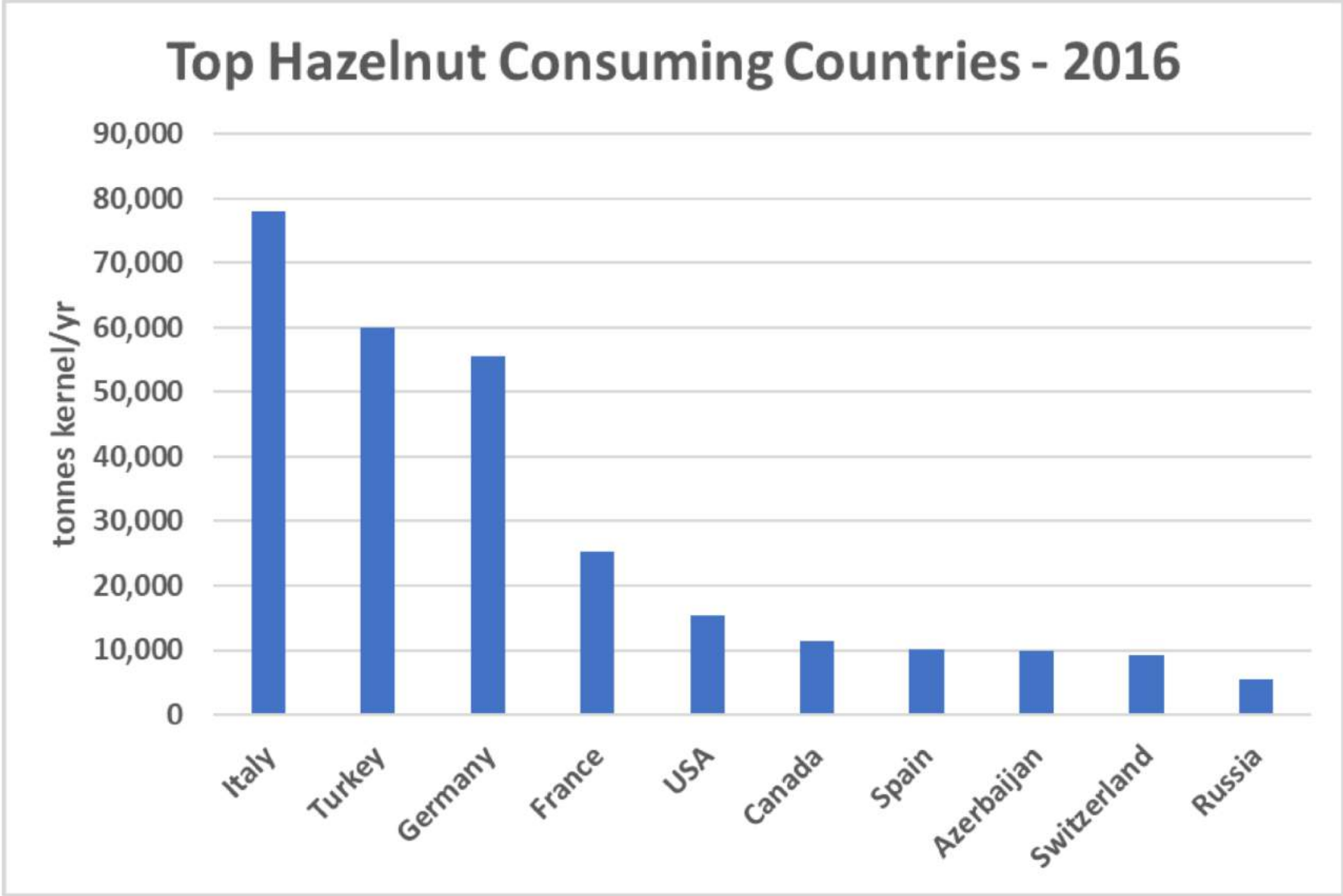
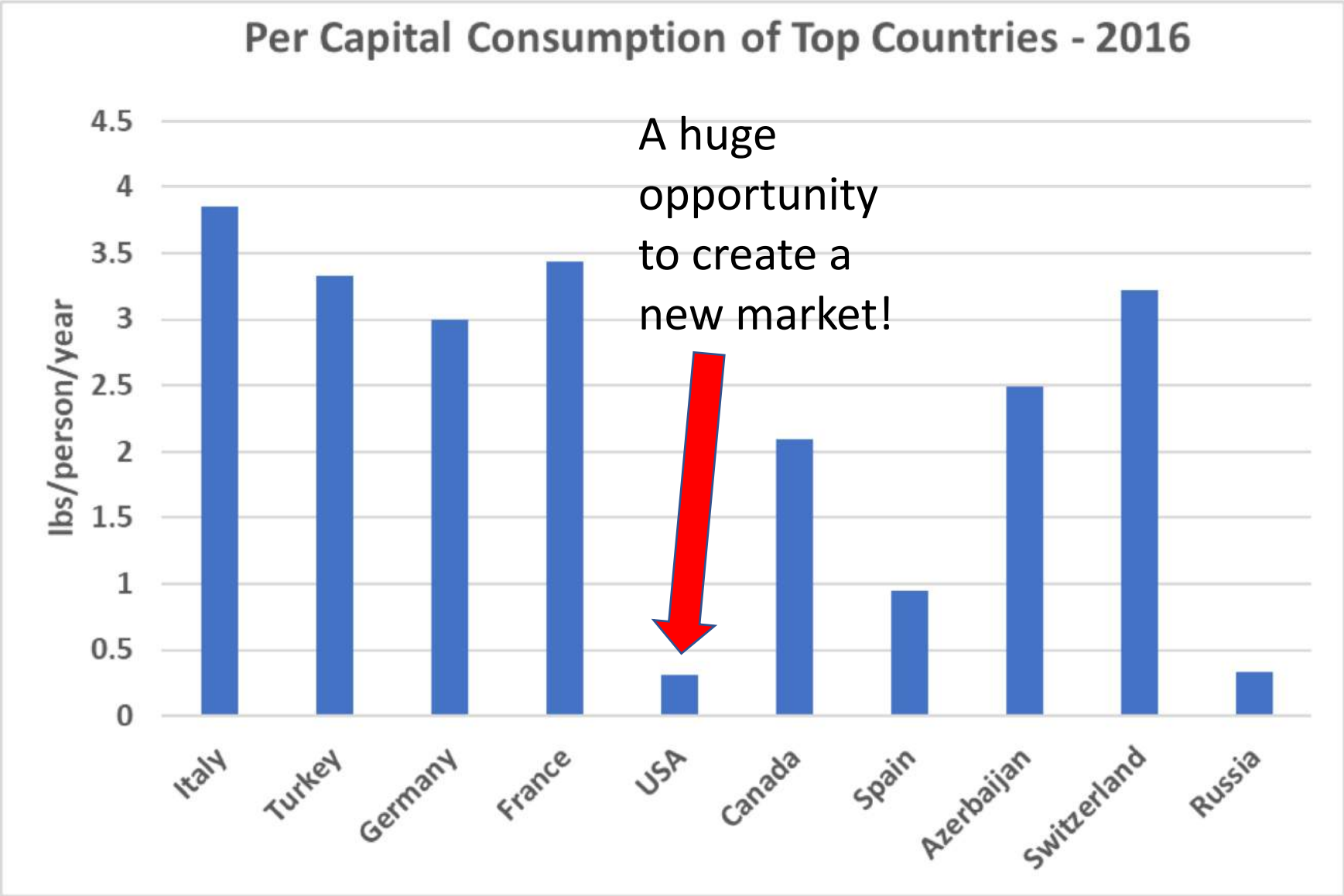International Nut and Dried Fruit Council Foundation, 2017

"Turkey's hazelnut sector is already threatened and will deteriorate unless we are able to increase efficiency and decrease the cost"

– Kadir Durak, Turkish processor board member

I. Prospects

Top Hazelnut Consuming Countries - 2016

International Nut and Dried Fruit Council Foundation, 2017

I. Prospects

Per Capital Consumption of Top Countries - 2016

A huge opportunity to create a new market!

International Nut and Dried Fruit Council Foundation, 2017

I. Prospects

Table 5: Global and US hazelnut demand estimates (t)[31,75]

Region	2018	2028	Differential
World	841,431	1,762,823	921,392
USA	45,482	103,490	58,008

I. Prospects

Table 6: Projected potential market opportunity for Midwestern hazelnuts (Yield and trees per acre assumptions[93]:

Metric	Existing markets	Potential markets	Total
Target volume (t)	43,000	168,000	211,000
Target volume (lbs)	94,772,000	370,272,000	465,044,000
Yield (lbs per acre)	2679	2679	-
Area (acres)	35,376	138,213	173,589
# of trees (908 trees/acre)	32,121,305	125,497,191	157,618,496

II. Bottlenecks

#1: Scaling Hybrid Hazelnut Micropropagation

#2: Complete Initial Harvesting & Processing Line

#3: Nut Aggregation, Processing, Marketing

#4: Centralized Variety Development

#5: Research and Development Funding Pool

#6: Establish Large Scale Pilot Farm & Farmer Training

#7: Permanent Industry Coordinator Position

#8: Farm Establishment Credit Mechanism

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#3: Nut Aggregation, Processing, Marketing

Markets for Hazelnuts

Human consumption & products
- Confectionary
- Whole nuts
- Pharmaceuticals
- Cosmetics
- Edible oils
- Crushed nuts
- Flour
- Beverages

Agricultural uses
- Animal Feed
- Mushroom Production
- Shell compost

Industrial uses
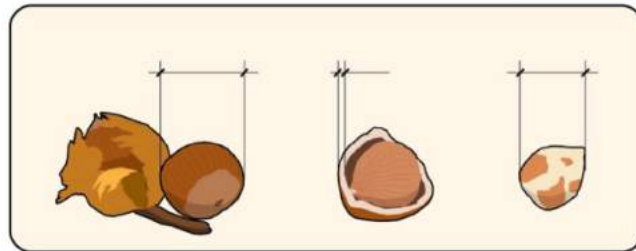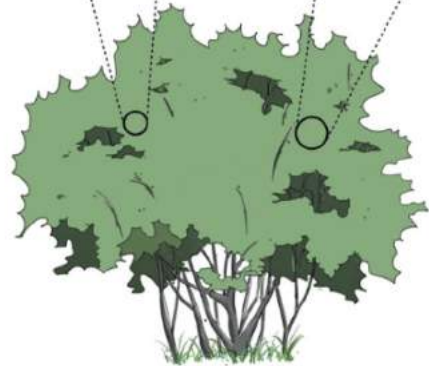- Biofuels

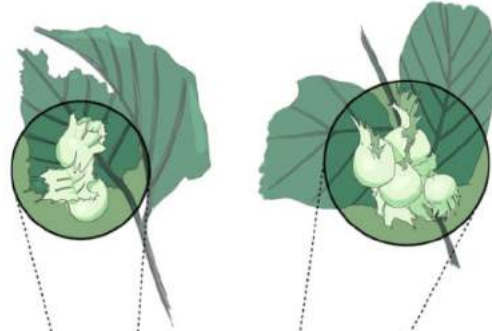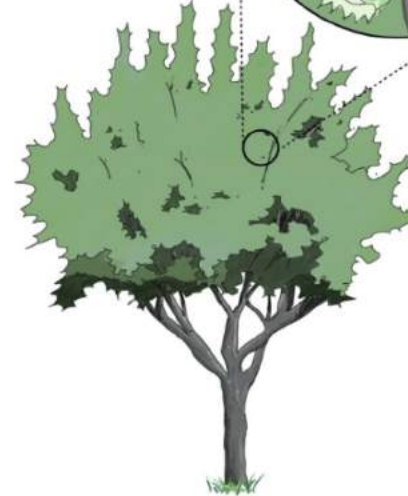Decreasing profit margins
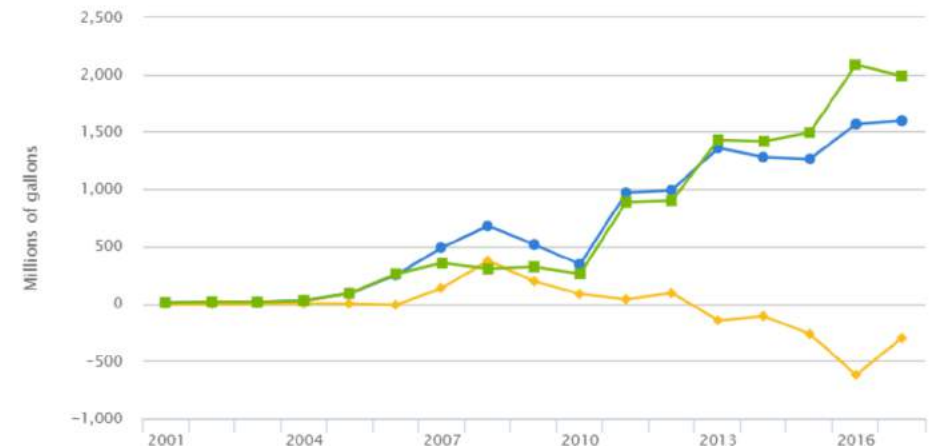
Figure 4: US Biodiesel production (blue circles), exports (yellow diamonds), and consumption (green squares)[87]
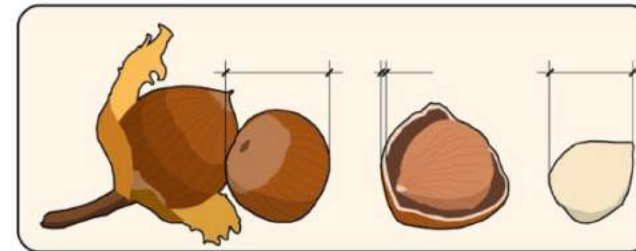
#4: Centralized Variety Development

American hazelnut
(*Corylus americana*)

European hazelnut
(*Corylus avellana*)

×

#4: Centralized Variety Development

Characteristic	American	Hybrids	European
Yield	medium	←	high
Nut size	small	←	large
Resistance to EFB	resistant	→	susceptible
Cold tolerance	high	→	low
Harvestability	mechanical "shake & catch"	→	mechanical "shake & vacuum"

#4: Centralized Variety Development

Figure 6: Visual comparison of nut characteristics of the top 10 hybrid hazelnut selections of the Upper Midwest Hazelnut Development Initiative (UMHDI).

#4: Centralized Variety Development

Actual Average Yields at Bayfield (Yrs 4-8), Projected Yields (Yrs 9-15)

Plant Age	Canopy Coverage (sq ft)	oz kernel per sq ft	lbs kernel per acre	lbs kernel per plant	lbs in-shell per plant	lbs in-shell per acre
4	10890	0.02	13	0.01	0.04	**32**
5	14520	0.17	152	0.17	0.42	**380**
6	18150	0.28	320	0.35	0.88	**801**
7	21780	0.42	576	0.63	1.59	**1441**
8	21780	0.62	844	0.93	2.32	**2110**
9	21780	0.66	901	0.99	2.48	**2252**
10	21780	0.72	981	1.08	2.70	**2452**
11	21780	0.85	1162	1.28	3.20	**2906**
12	21780	0.72	981	1.08	2.70	**2452**
13	21780	0.85	1162	1.28	3.20	**2906**
14	21780	0.72	981	1.08	2.70	**2452**
15	21780	0.85	1162	1.28	3.20	**2906**

Long-term bottlenecks

#5: Research and Development Funding Pool

#6: Establish Large Scale Pilot Farm & Farmer Training

#7: Permanent Industry Coordinator Position

#8: Farm Establishment Credit Mechanism

COLLABORATORS AND STAKEHOLDERS

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Thank you!

Questions?
Comments?
Scathing rebuttals?

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Those who are inspired by a model other than Nature, a mistress above all masters, are laboring in vain.

- Leonardo da Vinci