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One Health: Sustainable Farming and Agriculture

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One Health: Sustainable Farming and Agriculture

Abstract

The exponential growth of the human population is resulting in depletion of our resources and driving extreme land use changes across the world to feed the expanding population. Many innovations and improvements have been made over time to assist the farming industry. However, with the main concern being the financial benefit of the farmers and their customers, not the surrounding ecosystems. Working towards farming that is conscious about the ecological health, the reduction of waste, the use of space, and the emissions of carbon provides a large benefit for sustainability of the planet. Combating these issues involve the exploration of space-efficient structures, effective locations of farms, and looking into the drawbacks and benefits of small farming vs industrial farming. Improving the ecological efficiency while also maintaining the monetary benefit of farming will be challenging, but it is necessary for the success of future generations. The One Health approach helps tackle these challenges as experts can provide knowledge for improvements in ecological, financial, and sustainable aspects of farming and agriculture.

One Health: Sustainable Farming and Agriculture



BOISE STATE UNIVERSITY

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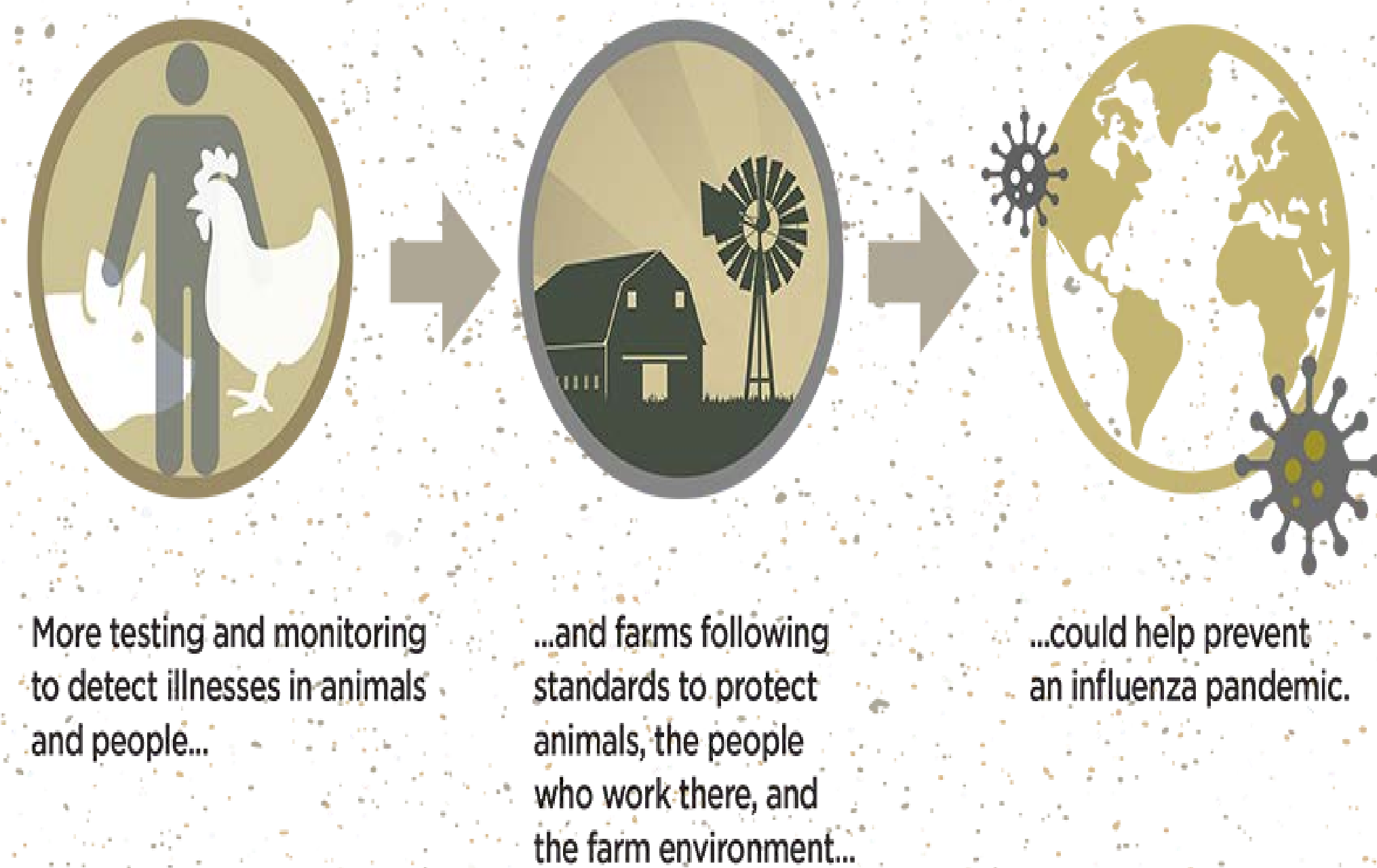
RESEARCH SUPPORTING THE TRANSITION TO SUSTAINABLE AGRICULTURE PRACTICES

INTRODUCTION

One Health is a holistic approach that encourages specialists to work outside of their silos to help to solve multi-layered issues in a collaborative manner. The One Health concept when applied to sustainable farming and agriculture will tackle issues concerning the reduction of waste, proper usage of land, carbon emissions, and the transmission of zoonotic viruses.

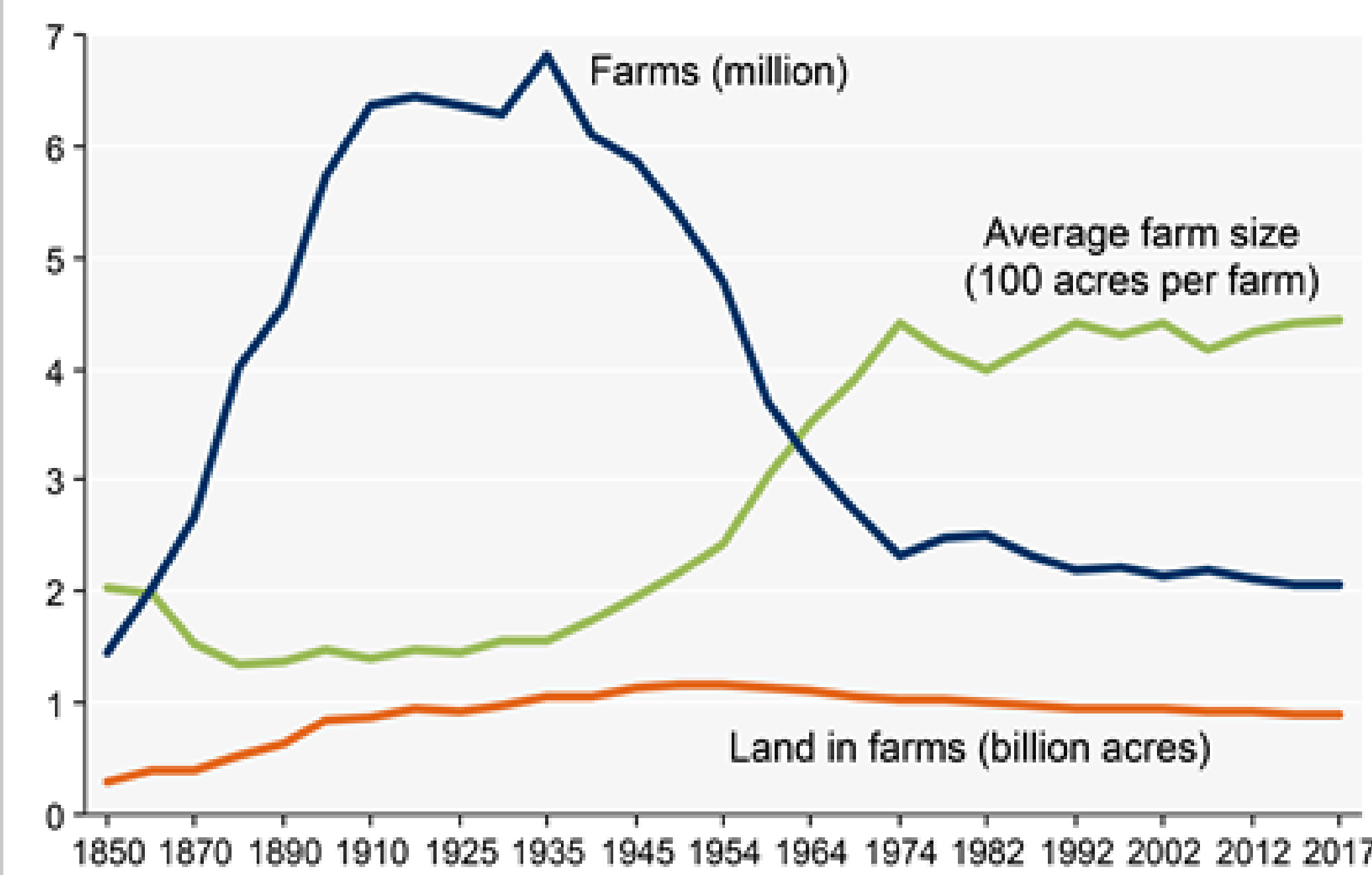
MOTIVATION

The exponential growth of the human population is resulting in depletion of our resources and driving extreme land use changes across the world to feed the expanding population. Many innovations and improvements have been made over time to assist the farming industry. However, with the main concern being the financial benefit of the farmers and their customers, not the surrounding ecosystems.



Farms, land in farms, and average acres per farm, 1850-2017

Million farms, billion acres, or 100 acres per farm



Source: USDA, Economic Research Service using data from USDA, National Agricultural Statistics Service, Census of Agriculture (through 2012) and *Farms and Land in Farms: 2017 Summary*.

<https://www.ers.usda.gov/data-products/chart-gallery/gallery/chart-detail/?chartId=58268>

IMPACTS OF COMMERCIAL FARMING

“Approximately 30–80% of nitrogen applied to farmland escapes to contaminate water systems and the atmosphere as well as increasing the incidence of some disease vectors” (Smil 2001; Victor & Reuben 2002; Pretty et al. 2003a; Townsend et al. 2003; Giles 2005; Goulding et al. 2008)

12 plant species and 5 animal species make up 75% of the world's food population.

Lack of biodiversity creates an ecosystem of farm plants and animals that are more vulnerable to disease

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2610163/>

SUSTAINABILITY

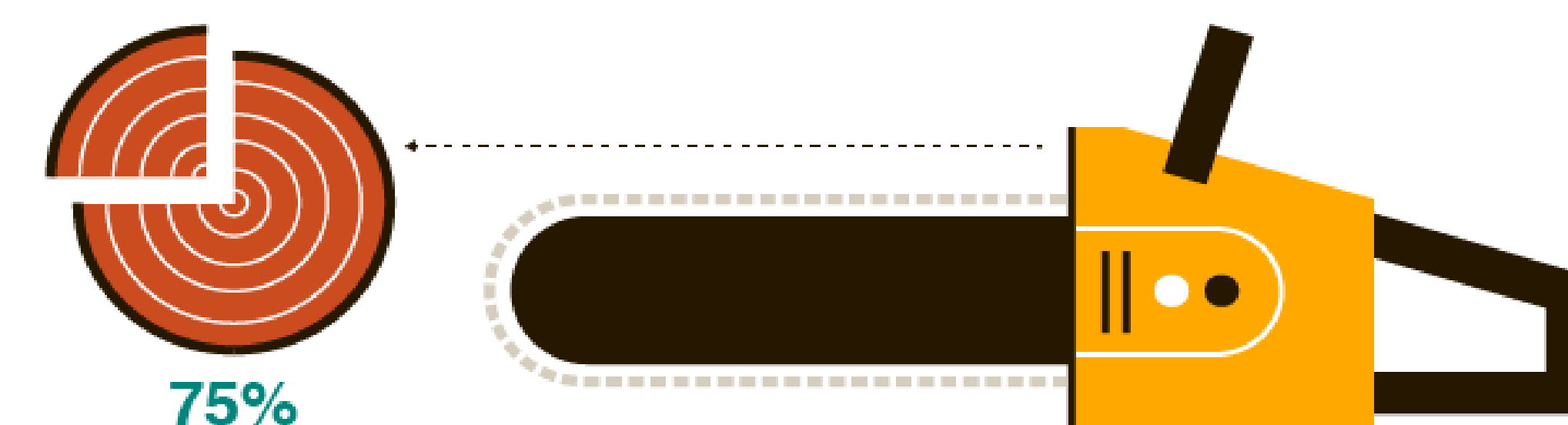
"Sustainable agriculture" was addressed by Congress in the 1990 "Farm Bill"

"the term sustainable agriculture means an integrated system of plant and animal production practices having a site-specific application that will, over the long term:

- satisfy human food and fiber needs;
- enhance environmental quality and the natural resource base upon which the agricultural economy depends;
- make the most efficient use of nonrenewable resources and on-farm resources and integrate, where appropriate, natural biological cycles and controls;
- sustain the economic viability of farm operations; and
- enhance the quality of life for farmers and society as a whole."

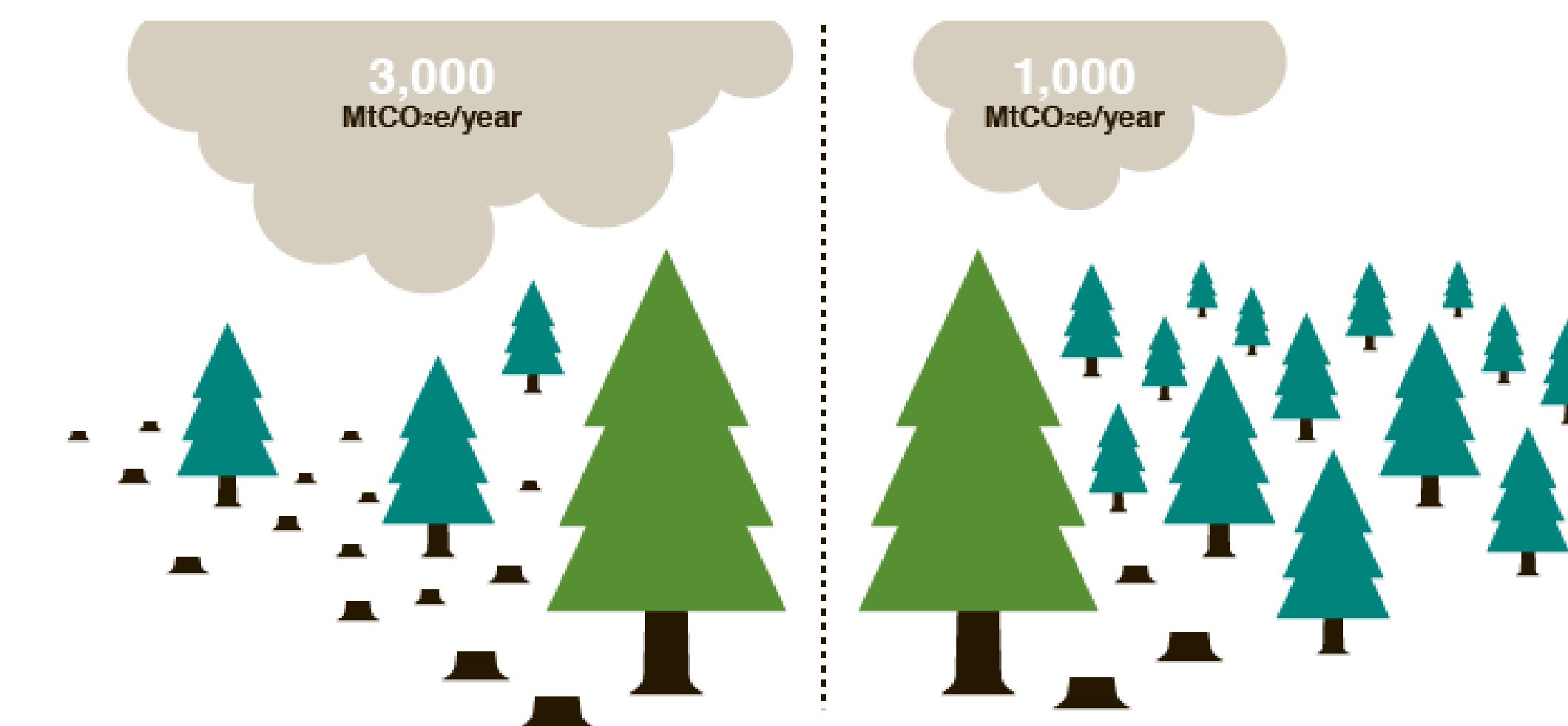
Food, Agriculture, Conservation, and Trade Act of 1990 (FACTA), Public Law 101-624, Title XVI, Subtitle A, Section 1603 (Government Printing Office, Washington, DC, 1990) NAL Call # KF1692.A31 1990

Agriculture is responsible for 75% OF GLOBAL DEFORESTATION.



If trends continue, ABOUT 10 MILLION km² OF LAND will likely be cleared by 2050 to meet food demand.

Alternative pathways would only require ABOUT 2 MILLION km² OF LAND be cleared.



Source: Blaser and Robledo, 2007; Tilman et al., 2011

Big Facts
ccafs.cgiar.org/bigfacts



https://unfccc.int/files/cooperation_and_support/financial_mechanism/application/pdf/blaser.pdf

HOW TO GET INVOLVED

Education and Awareness

Programs are being implemented with curriculums for One Health in grades K-12 and beyond to promote the holistic approach to solving complex issues

Organizations with One Health Approaches

- CDC (Centers for Disease Control and Prevention)
- WHO (World Health Organization)



CONNECTING HUMAN, ANIMAL, AND ENVIRONMENTAL HEALTH

<https://www.cdc.gov/onehealth/resource-library/one-health-graphics.html>

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