GloCal Health Fellowship Career Development Webinar

Ermias Kebreab

Associate Dean, College of Agricultural and Environmental Sciences
Professor and Sesnon Endowed Chair in Sustainable Agriculture
Director, World Food Center

University of California, Davis

December, 2021

SUSTAINABLE AGRICULTURE at UCDAVIS


ARCTIC OCEAN
Greenland
(Denmark)
Svalbard
(Norway)
ARCTIC OCEAN
United States
Canada
Iceland
Russia
Norway
Sweden
Finland
U.K.
Ireland
Den.
Neth.
Belg.
Germany
Poland
Belar.
Ukraine
Mol.
Estonia
Latvia
Lithuania
Kazakhstan
Mongolia
United States
ATLANTIC OCEAN
Portugal
Spain
France
Italy
Rom.
Bul.
Greece
Turkey
Cyprus
Georgia
Armenia
Az.
Uzbek.
Turkm.
Kyrgyzstan
Tajikistan
China
Japan
N. Korea
S. Korea
Iran
Iraq
Syria
Lebanon
Israel
Afghan.
Pakistan
Nepal
Bhutan
India
Kuwait
Qatar
Jordan
Saudi Arabia
U.A.E.
Oman
Yemen
Laos
Vietnam
Taiwan
Bur.
Bangl.
Thai.
Cambodia
Philippines
Mexico
Caribbean
Western Sahara
Morocco
Tunisia
Algeria
Libya
Egypt
Eritrea
Djibouti
Sudan
Senegal
Maurit.
Mali
Niger
Chad
The Gambia
B. Faso
Guinea-Bissau
Guinea
Sierra Leone
Liberia
Cote d'Ivoire
Nigeria
Ghana
Benin
Togo
Equatorial Guinea
Gabon
Cam.
C.A.R.
South Sudan
Ethiopia
Ken.
Somalia
Dem. Rep. of Congo
Congo
Uganda
Rwanda
Burundi
Tanz.
Angola
Zambia
Zim.
Namibia
Bots.
South Africa
Lesotho
eSwatini
Malawi
Mozambique
Madagascar
PACIFIC OCEAN
Central America
Guyana
Suriname
French Guiana (France)
Venez.
Colombia
Ecuador
Peru
Brazil
Bolivia
Paraguay
Chile
Argentina
Uruguay
ATLANTIC OCEAN
INDIAN OCEAN
Sri Lanka
Malaysia
Indonesia
Timor-Leste
Papua New Guinea
Solomon Islands
Australia
New Caledonia
Fiji
New Zealand
PACIFIC OCEAN
SOUTHERN OCEAN
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University of Asmara

1987 - BSc. Asmara University,

Asmara, Eritrea

University of Reading

1998 - MSc., PhD
University of Reading,
Reading, UK

University of Guelph

2006 – Post doctoral fellow

University of Guelph,

Guelph, Canada

Experience - U of Guelph

Research:

- 25 publications in about 3 years – mostly first author
- 5 grant proposals awarded
- Young Scientist Award from Canadian Society of Animal Science

Teaching:

- Co-taught course on mathematical modeling of biological systems
- Co-advised 4 PhD and 2 MSc students

Outreach:

- Several oral presentations at national and international conventions

University of Manitoba

2009 – Associate Professor & Canada Research Chair

University of Manitoba, Winnipeg, Canada

Experience – U of Manitoba

Research:

- 42 publications in about 2.5 years – most as senior author
- Several grant proposals awarded
- Early Career Achievement Award from American Society of Animal Science

Teaching:

- Developed new course on mathematical modeling of biological systems
- Advised 2 PhD, 1 MSc student and 3 postdocs

Outreach:

- Several oral presentations at national and international conventions

Research – U of Manitoba

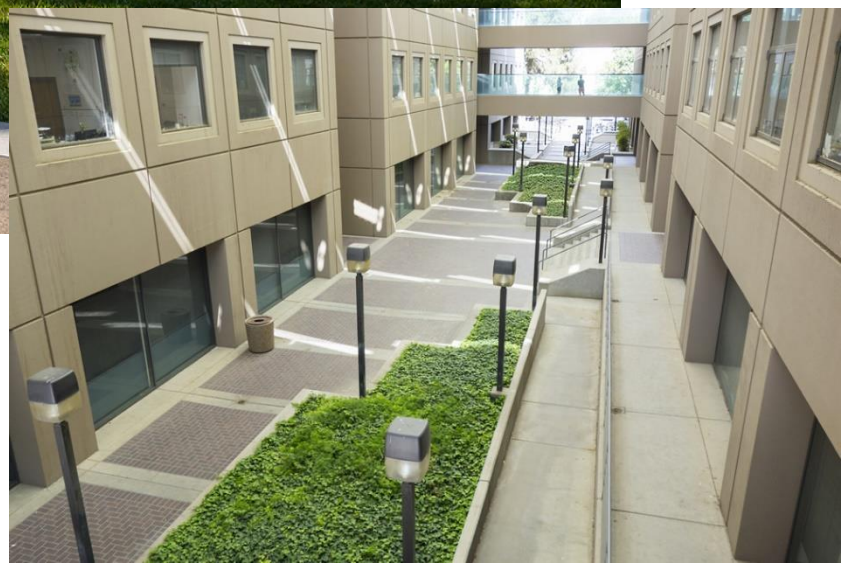
Fields of study:

- Quantification and evaluation of mitigation of GHG emissions in agriculture using a whole systems approach.
- Energy and nutrient utilization/requirement models.
- Impact of animals on environment (environ. sustainability).

Funding

- National Science and Engineering Research Council
- Ministry of Agriculture, Province of Manitoba
- Industry groups

U California, Davis (2009 -)



Professor & Sesnon Endowed Chair
University of California, Davis, USA

SUSTAINABLE AGRICULTURE at UCDAVIS

Experience – UC Davis

Research:

- 155 publications in about 12 years – mostly as senior
- Total grant awarded >$15 million
- Excellence in Ruminant Nutrition and International Ag Award from ASAS

Teaching:

- Adopted course on mathematical modeling of biological systems
- Developed new course on sustainable animal ag.
- Advised 10 PhD, 4 MSc student and 10 postdocs

Outreach:

- >150 presentations globally

Research – UC Davis

Fields of study:

- Quantification and evaluation of **mitigation** of GHG emissions
- Nutrient utilization/requirement models in **cattle**.

Funding

- Federal - USDA (AFRI, NIFA, FAS), USAID ($5 million)
- State – CA Air Resources Board ($2 million)
- Foundation for Food and Agriculture Research ($1 million)
- Industry groups - Dairy, Pork, Beef, DSM, Burger King ($5 million)
- Philanthropy & Gifts ($2 million)

Holistic Approach to Research

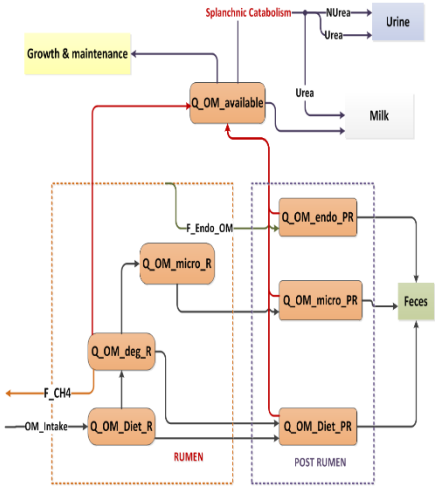
Biological Research

Experimentation

Modeling

Trinity: *In vivo* *In vitro*

In silico



Examples of Research

- Quantification and evaluation of **mitigation** of GHG emissions

Global Change Biology

Global Change Biology (2014) **20**, 2140–2148, doi: 10.1111/gcb.12471

Prediction of enteric methane emissions from cattle

LUIS E. MORAES[1], ANDERS B. STRATHE[2], JAMES G. FADEL[1], DAVID P. CASPER[3] ERMIAS KEBREAB[1]

[1]*Department of Animal Science, University of California, Davis, CA 95616, USA,* [2]*Department of Basic Animal and*

Global Change Biology

Global Change Biology (2016) **22**, 3039–3056, doi: 10.1111/gcb.13339

Models for predicting enteric methane emissions from dairy cows in North America, Europe, and Australia and New Zealand

JAYASOORIYA A. D. R. N. APPUHAMY[1], JAMES FRANCE[2] and ERMIAS KEBREAB[1]

[1]*Department of Animal Science, University of California, One Shields Avenue, Davis, CA 95616, USA,* [2]*Centre for Nutrition Modelling, Department of Animal Biosciences, University of Guelph, Guelph, ON N1G 2W1, Canada*

Received: 10 August 2017 | Revised: 15 December 2017 | Accepted: 29 January 2018

DOI: 10.1111/gcb.14094

PRIMARY RESEARCH ARTICLE

WILEY Global Change Biology

Prediction of enteric methane production, yield, and intensity in dairy cattle using an intercontinental database

Mutian Niu[1] | Ermias Kebreab[1] | Alexander N. Hristov[2] | Joonpyo Oh[2] |

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Examples of Research

- Nutrient utilization/requirement models in **cattle**

J. Dairy Sci. 100:7116–7126
https://doi.org/10.3168/jds.2017-12584

Estimating the energetic cost of feeding excess dietary nitrogen to dairy cows

K. F. Reed,*[1] H. C. Bonfá,† J. Dijkstra,‡ D. P. Casper,§ and E. Kebreab#

J. Dairy Sci. 99:2748–2761
http://dx.doi.org/10.3168/jds.2015-10427

Casein infusion rate influences feed intake differently depending on metabolizable protein balance in dairy cows: A multilevel meta-analysis

R. Martineau,*[1] D. R. Ouellet,† E. Kebreab,‡ and H. Lapierre†

J. Dairy Sci. 100:1–9
https://doi.org/10.3168/jds.2016-11017

Exogenous β-mannanase improves feed conversion efficiency and reduces somatic cell count in dairy cattle

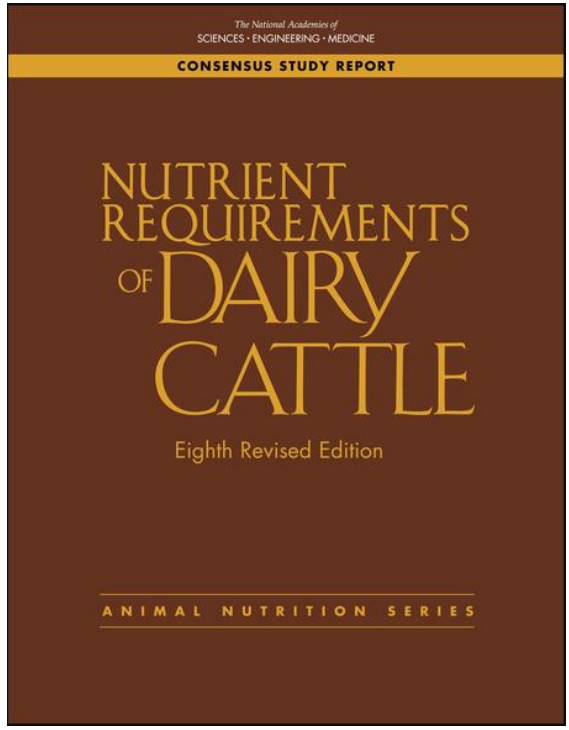
T. A. Tewoldebrhan,* J. A. D. R. N. Apphuamy,* J.-J. Lee,† M. Niu,* S. Seo,‡ S. Jeong,‡ and E. Kebreab*[1]

J. Dairy Sci. 94:2520–2531
doi:10.3168/jds.2010-3836

A Bayesian approach to analyze energy balance data from lactating dairy cows[1]

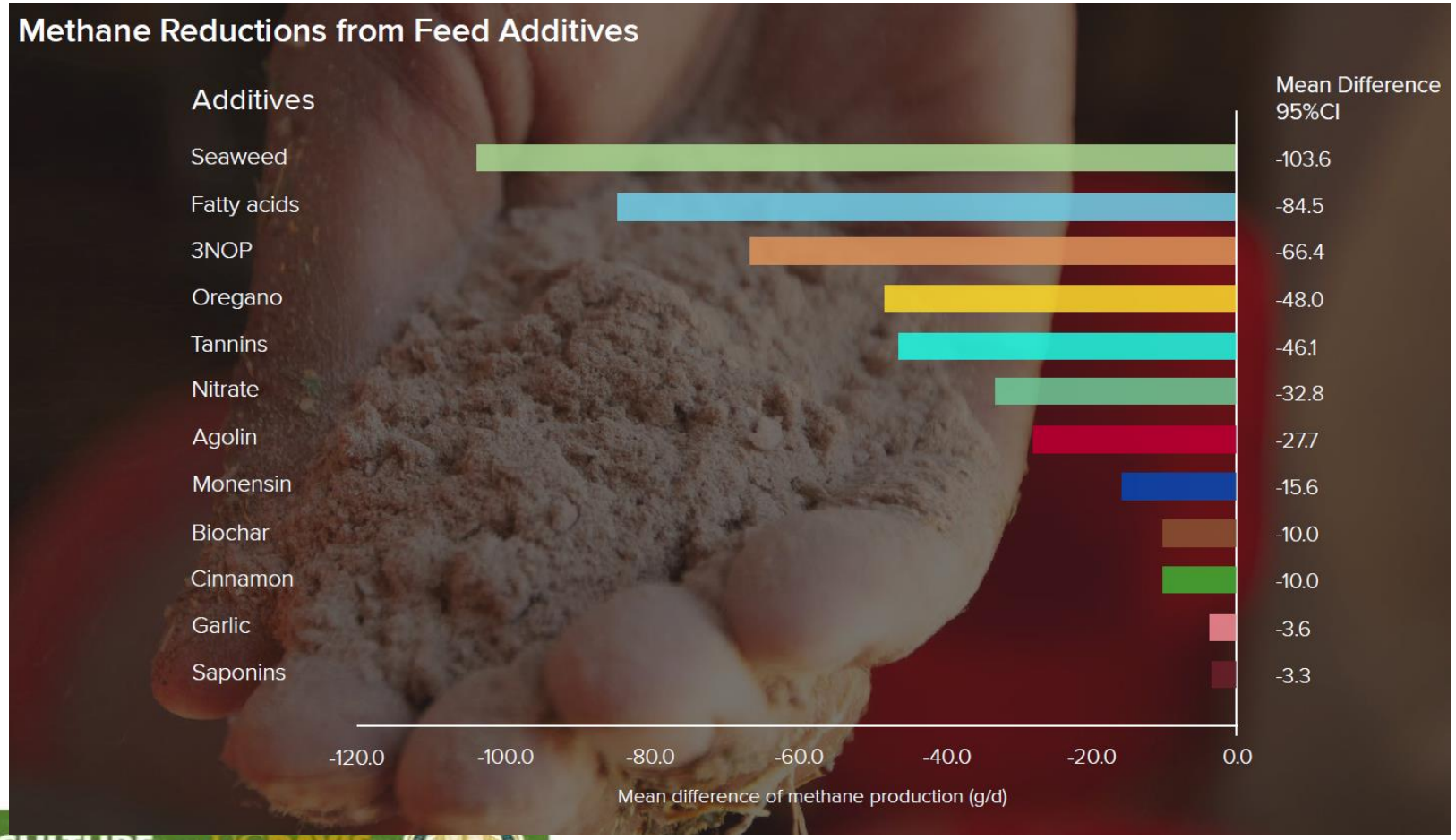
A. B. Strathe,*[2] J. Dijkstra,† J. France,‡ S. Lopez,§ T. Yan,# and E. Kebreab*

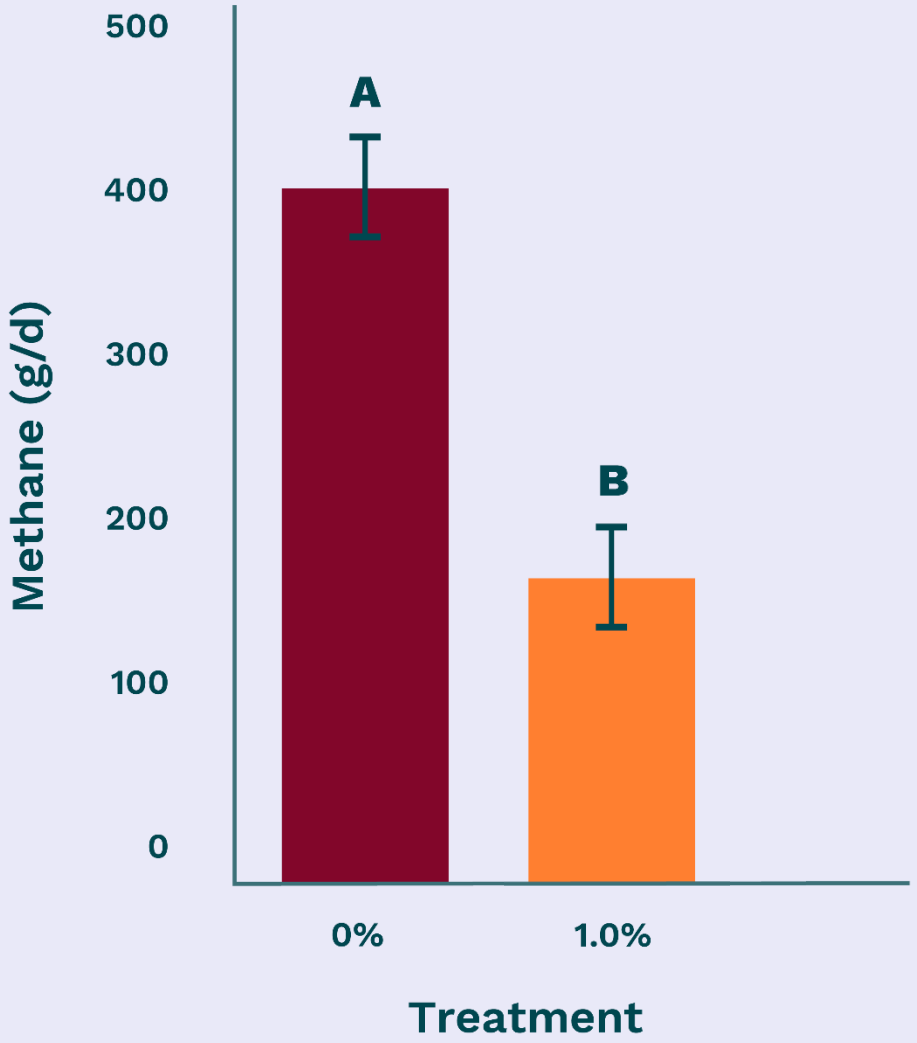
SUSTAINABLE AGRICULTURE at

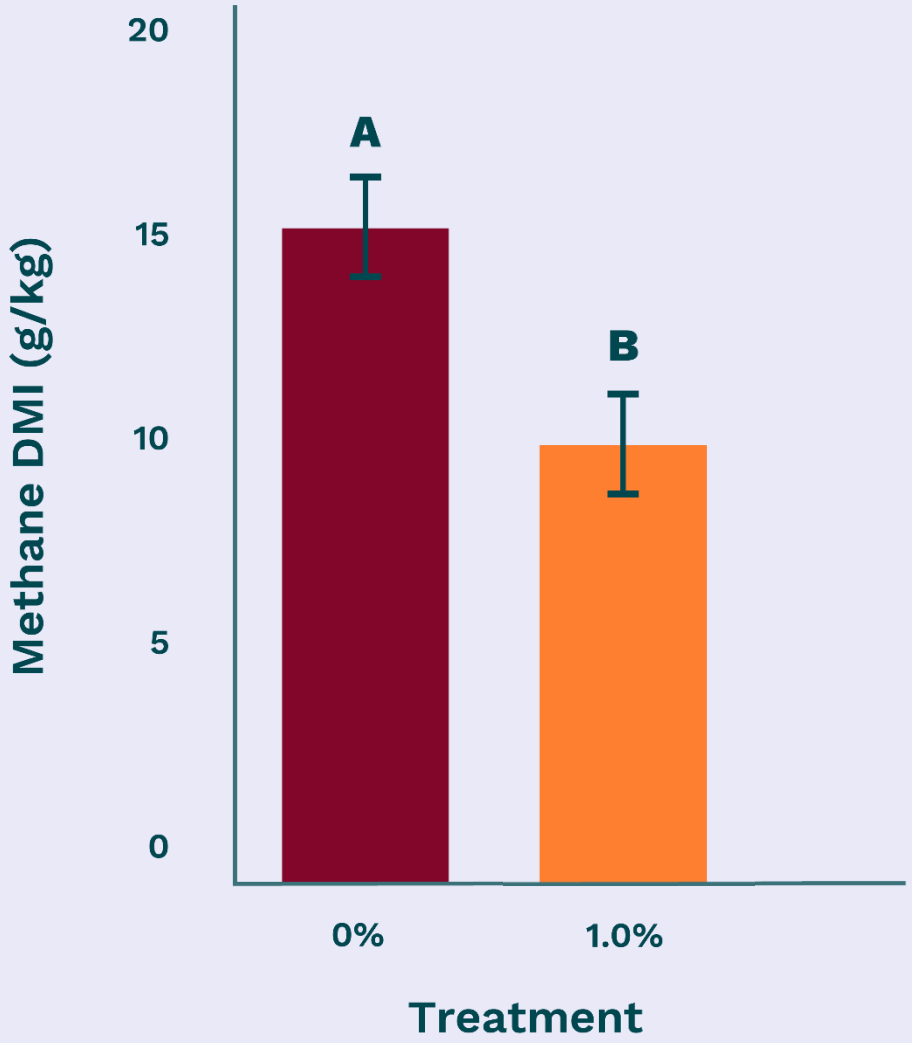


Current Focus – Climate Change

Role of feed additives to reduce methane emissions (high income) countries




Methane (g/d)
500
400
300
200
100
0
A
B
0%
1.0%
Treatment


Methane DMI (g/kg)
20
15
10
5
0
A
B
0%
1.0%
Treatment

al., 2019

Societal Impact

SCIENCE FRIDAY

SEGMENT | 16:25

Seaweed Might Help Cows Go Green

Cattle are one of the largest producers of methane. Could a change in their diet reduce their greenhouse gas emissions?

READ MORE →

npr

SPIEGEL Wissenschaft

Treibhausgas

Kühe stoßen bis zu 82 Prozent weniger Methan aus – wenn man sie mit Algen füttert

Die Landwirtschaft trägt erheblich zum Ausstoß klimaschädlicher Gase bei. Dabei lässt sich ein Großteil der Emissionen vermeiden, zeigt eine aktuelle Studie. Kühe müssten nur etwas anderes fressen.

18.03.2021, 18.00 Uhr

The New York Times

Over the past year, Ermias Kebreab, a professor of animal science at the University of California, Davis, and his colleagues have been testing seaweed diets on Holstein cows. Early results are

The Guardian

Feeding cows seaweed could cut their methane emissions by 82%, scientists say

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la Repubblica

Servite alle mucche una dieta di alghe per ridurre il metano

Secondo una ricerca appena pubblicata sulla rivista scientifica Plos One e condotta da ricercatori dell'Università della California si potrebbero in questo modo ridurre le emissioni provenienti dagli allevamenti fino all'82%

Media

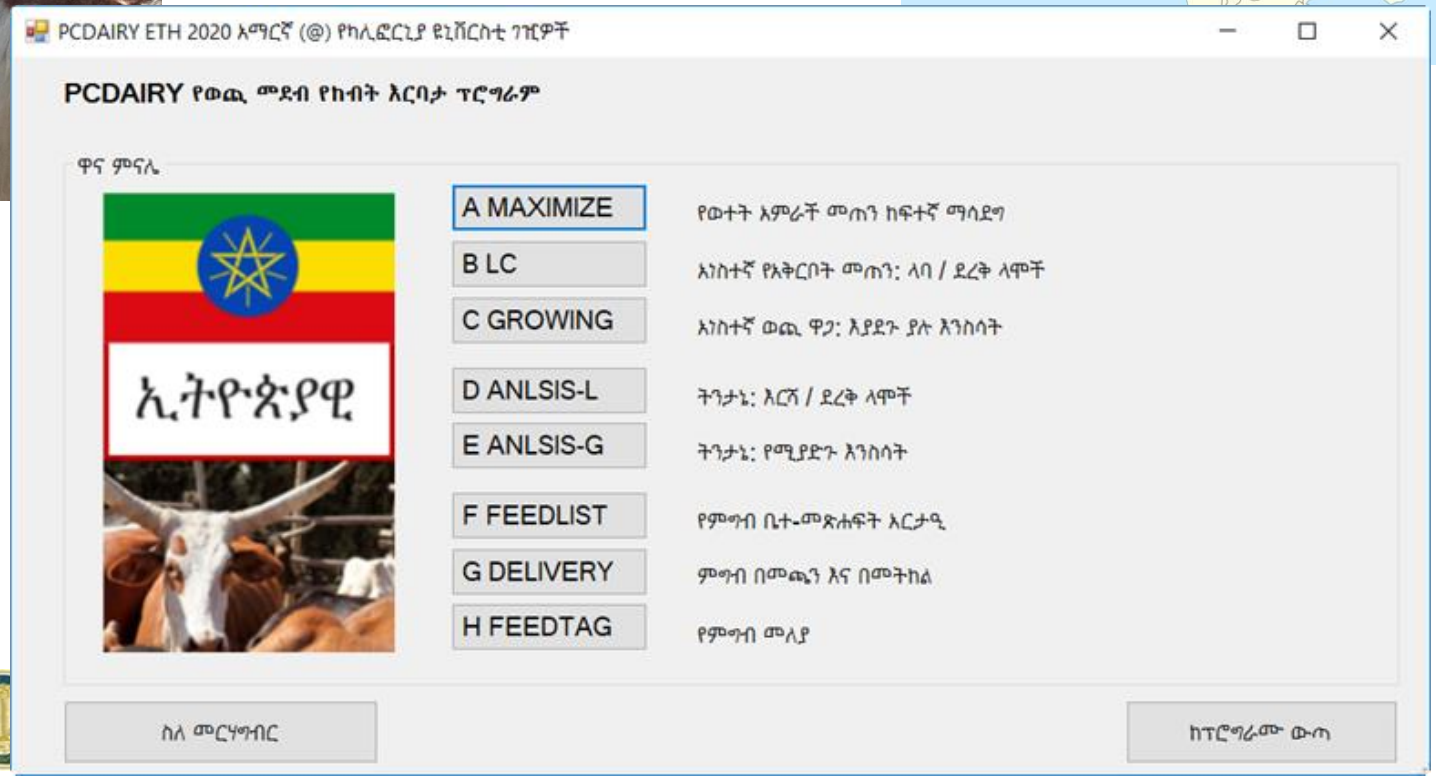
Improving Production - Burkina

USAID FROM THE AMERICAN PEOPLE

BILL & MELINDA GATES foundation

SUSTAINABLE AGRICULTURE at UCDAVIS

Improving Production - Ethiopia



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SUSTAINABLE AGRICULTURE at UCDAVIS

Improving Production - Vietnam

USDA FAS

Cambodia, Laos & Nigeria

SUSTAINABLE AGRICULTURE at UCDAVIS

USDA FAS

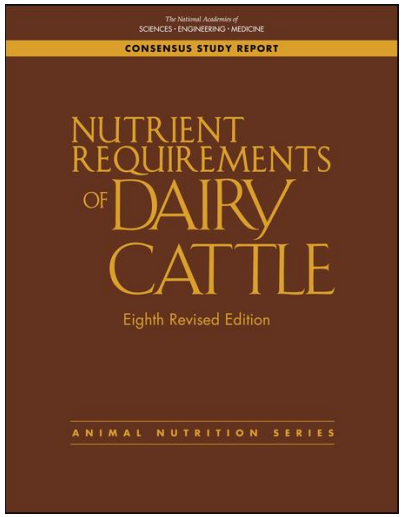
Leadership - University

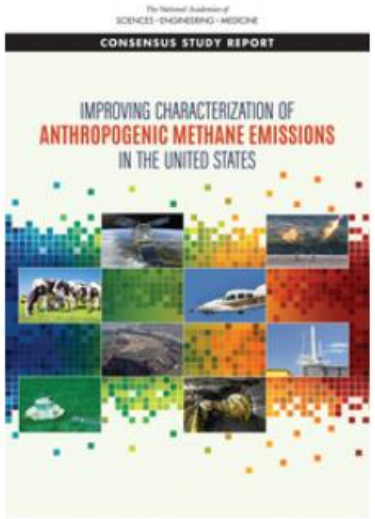
- Associate Vice Provost – Global Affairs
- Associate Dean/Director – College of Ag and Env. Sciences

Leadership - National

The National Academies of SCIENCES ENGINEERING MEDICINE

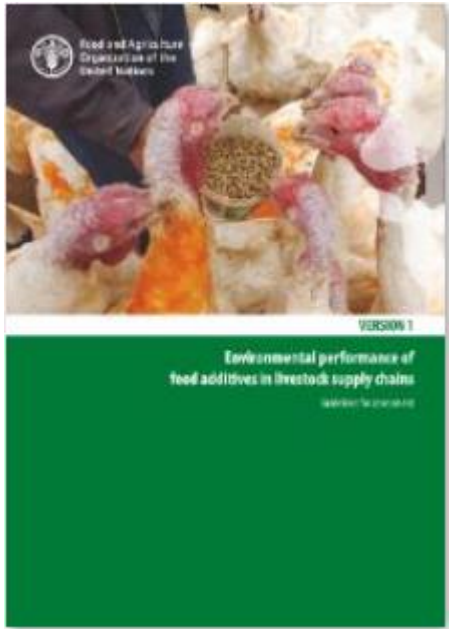
BOARD ON AGRICULTURE AND NATURAL RESOURCES





Leadership – International

Food and Agriculture Organization of the United Nations



CGIAR Advisory Services

gfli
Global Metrics for Sustainable Feed

SUSTAINABLE AGRICULTURE at UCDAVIS

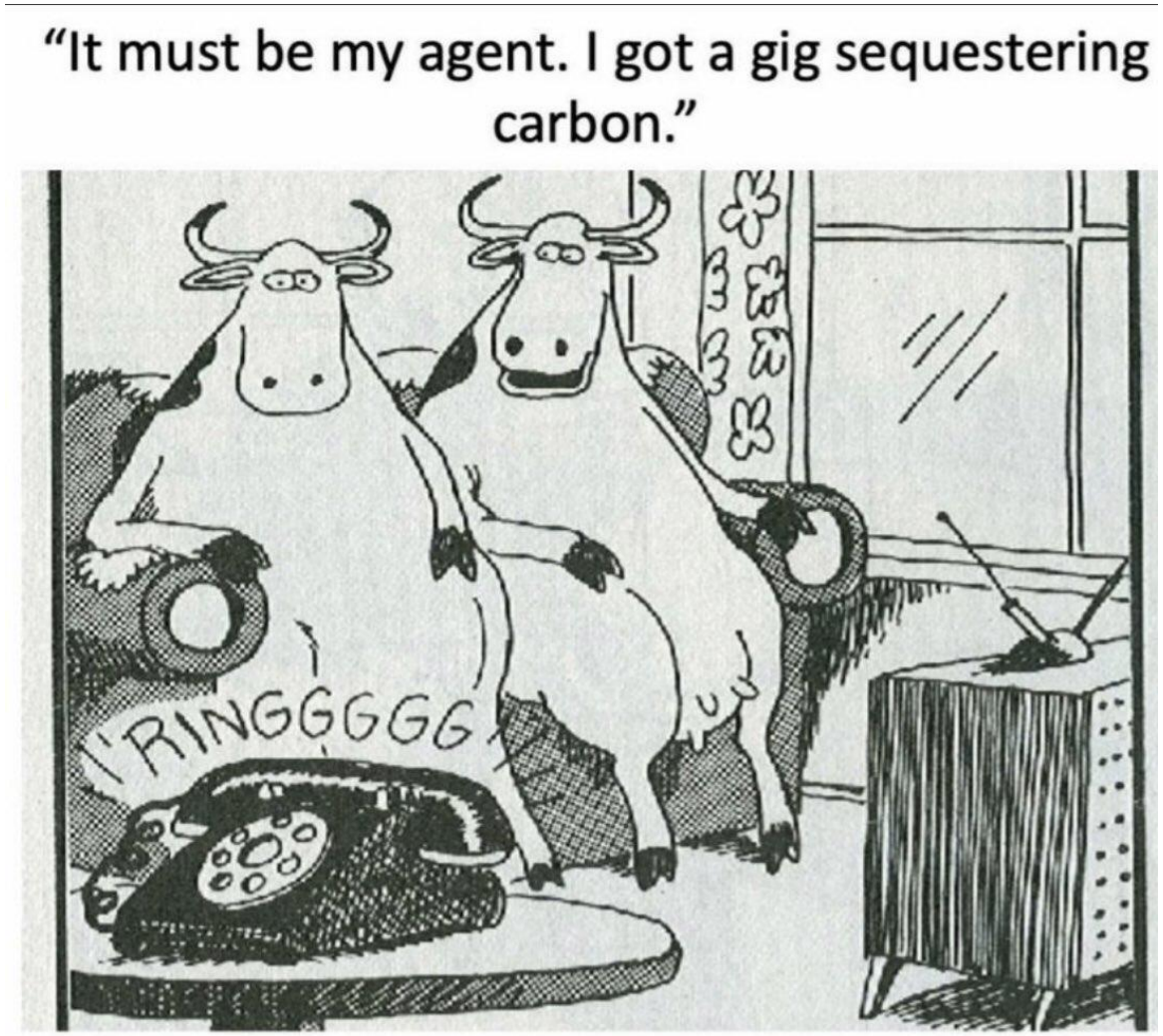
Highlight of the Year – TED talk


We Appreciate Your Business.

Team Spirit

Some notable funders

Thank You!



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