

# THE ECONOMIC CONTRIBUTION OF AGRICULTURE

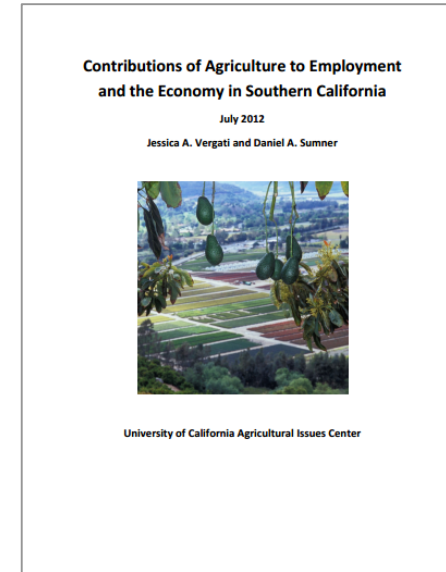
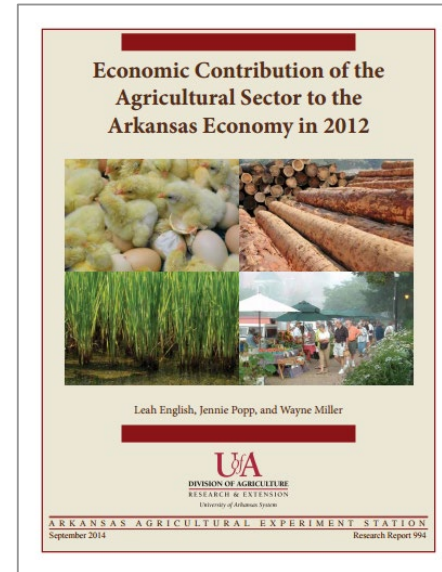
A review of methods, reporting, and public perception

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AEDE Workshop Webinar  
06/29/2017

# CONTRIBUTION OF AGRICULTURE:

- Over the past decade, at least **24 states** have used IMPLAN to conduct agriculture analyses at some level



# CONTRIBUTION OF AGRICULTURE:

**\$20,117,634,954**

Agriculture accounted for \$20.1 billion of Value Added<sup>a</sup> to the Arkansas economy in 2012.

That's almost 18 cents of every \$1 of Value Added.

<sup>a</sup>Value Added is the sum of employee compensation, proprietary income, other property-type income and indirect business taxes.

Sources: "Economic Contribution of the Agricultural Sector to the Arkansas Economy in 2012," by English, L., J. Popp, and W. Miller. Research Report 994 and "Economic Contribution of Agriculture and Food to Arkansas' Gross Domestic Product 1997-2012", by English, L., J. Popp, and W. Miller. Research Report 995. Arkansas Agricultural Experiment Station, University of Arkansas System Division of Agriculture, Fayetteville. Forthcoming 2014.



**The total output and employment impacts of agriculture, forestry, and related industries were \$70.4 billion and 580,295 jobs.**

[www.aces.edu](http://www.aces.edu)



**\$76  
BILLION**

Agriculture and Agribusiness, including the farming, processing, wholesaling and retailing of food, natural fiber and forestry products, accounted for \$76 billion of value added to the North Carolina economy.<sup>1</sup>

**THAT'S 16 CENTS  
OF EVERY DOLLAR.**

<sup>1</sup> **Value-added** is the sum of the returns to factors of production in the state and includes employee compensation, proprietary income, other property-type income, and indirect business taxes.

**Source:** *Agriculture and Agribusiness in North Carolina*, Dr. Michael L. Walden, NC State University, May 2015. Data are for 2013.

# IN THE NEWS:

OPINION: DAILY JOURNAL

## Another Day, Another Phony Economic Impact Study



Dr. Roy Cordato  
in [Daily Journal](#)

November 21, 2013  
12:00AM

RALEIGH — [Making the news](#) recently are results of a new “economic impact” study funded by a trade association representing the nuclear industry. The study purports to show that the nuclear industry in North Carolina and South Carolina generates \$25 billion annually in economic activity for the two states and creates 29,000 jobs.

# CONTRIBUTION OF AGRICULTURE:

- **Contribution versus Impact**

- Watson et al. – Determining Economic Contribution and Impacts: *What is the difference and why do we care?*
- Economic Impact – the net changes in new economic activity associated with an industry, event, or policy in an existing regional economy – ***ex ante***
- Economic Contribution – the gross change in economic activity associated with an industry, event or policy in an existing regional economy – ***ex post***

# CONTRIBUTION OF AGRICULTURE:

- **Output versus Value Added**

- Output – sales or receipts and other operating income, commodity taxes, and inventory change
- Value Added – equals the difference between an industry's gross output and the cost of its intermediate inputs

# CONTRIBUTION OF AGRICULTURE SURVEY:

- **Methodology & Definition of Agriculture:**
  - 18 full responses
    - 44% perform contribution of agriculture analyses annually
    - 28% perform analyses every 2-4 years
    - Most respondents also perform regional and/or county level analyses in addition to state-level
  - Primary audiences are state legislatures and agricultural commodity groups



# CONTRIBUTION OF AGRICULTURE METHODOLOGY:

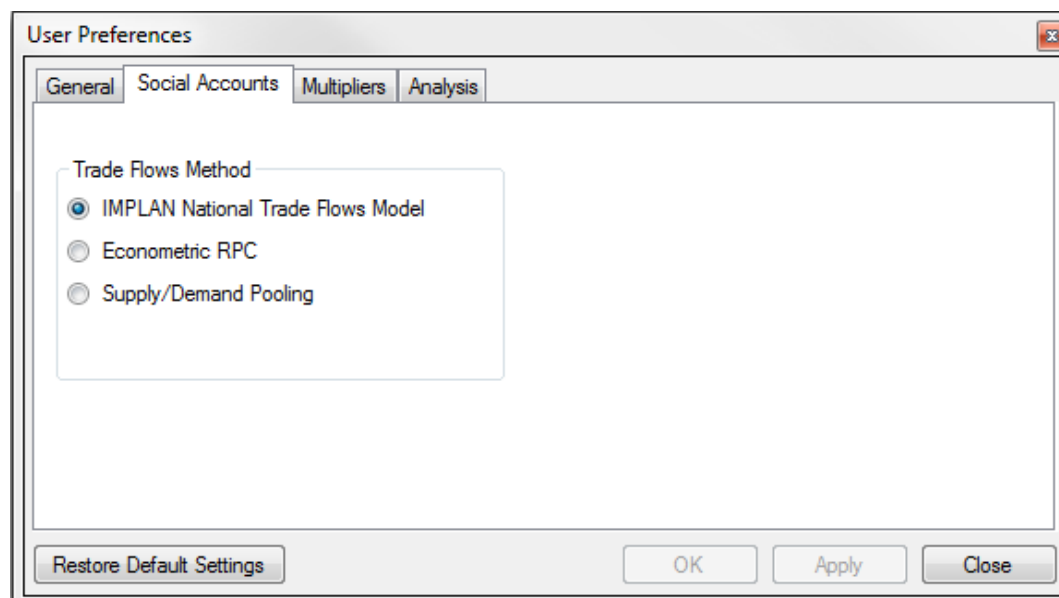
- **Multi-Industry Contribution Analysis:**

- IMPLAN offers general guidelines for conducting multi-industry contribution analyses
  - Customize Study Area Data
  - Modify Commodity Production – edit commodity production so that each industry produces only its primary commodity
  - Modify Trade Flows – zero out the Local Use Ratio (RSC) or RPC's so that no one will purchase from these industries beyond the amount specified when setting up your events
  - Set Up Contribution Analysis:
    - Add a new industry change activity and generate events for each agriculture sector.
    - Enter sector output values for each industry in the Industry Sales column.
    - Make sure the Event Year reflects your data set.
    - Create a new scenario and analyze.



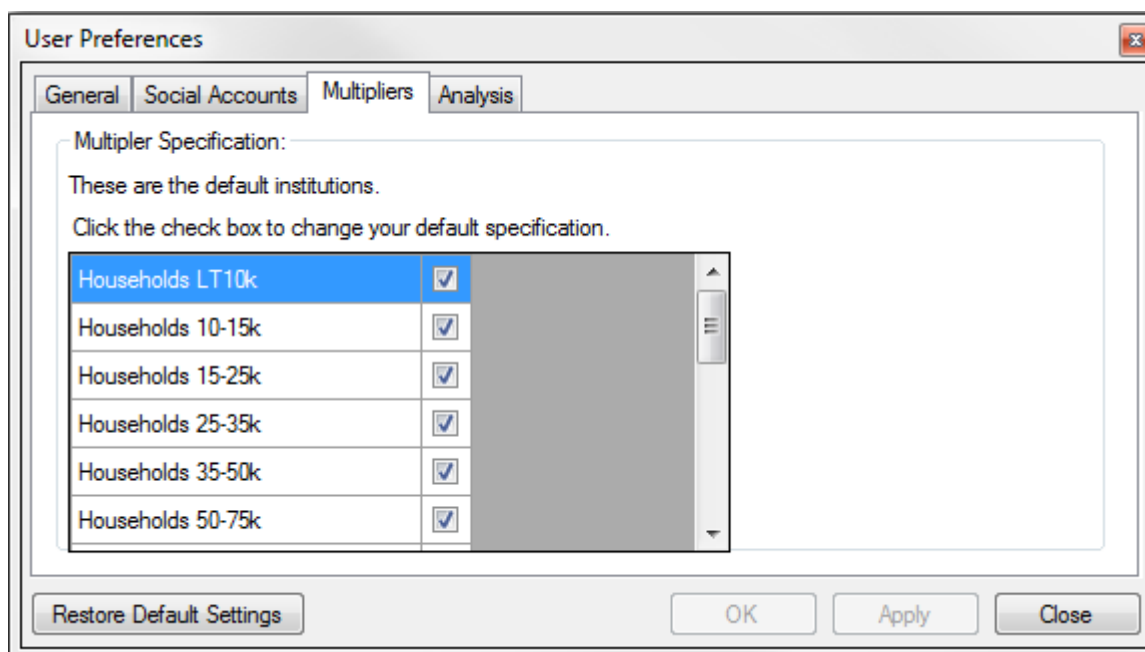
# CONTRIBUTION OF AGRICULTURE METHODOLOGY:

- **Factors that can affect analysis outcome:**
  - Selection of Trade Flows Method – 72% use IMPLAN National Trade Flows method



# CONTRIBUTION OF AGRICULTURE METHODOLOGY:

- **Factors that can affect analysis outcome:**
  - Specification of Multipliers – 100% included households, 44% added state/local gov't multipliers, 31% included corporations, 2 respondents used all multipliers



# CONTRIBUTION OF AGRICULTURE METHODOLOGY:

- Factors that can affect analysis outcome:
  - Study Area Data – 67% make adjustments to study area data

The screenshot displays the 'Edit an Industry' window. On the left, an 'Industry List' shows '1 Oilseed farming' selected. The main panel, titled 'Make the changes to the items you know, then click update totals.', contains several input fields and a table. The 'Employment' section has a 'Total' value of 4,740.9. The 'Output, Value Added' section includes 'Edit Options' (radio buttons for 'Edit totals then update per worker values' and 'Edit per worker values then update'), and a table with three columns: 'Total', 'Per Worker', and 'National Per Worker'. The table lists 'Output (Value of Production)', 'Value Added' (Employee Compensation, Proprietor Income, Other Property Type Income, Tax on Production and Imports), and 'Intermediate Expenditures'.

	Total	Per Worker	National Per Worker
<b>Output (Value of Production):</b>	\$1,840,620,000	\$388,243	\$508,438
<b>Value Added:</b>			
Employee Compensation:	\$4,858,855	\$1,025	\$1,872
Proprietor Income:	\$580,224,000	\$122,387	\$178,719
Other Property Type Income:	\$524,099,400	\$110,549	\$125,801
Tax on Production and Imports:	\$33,265,210	\$7,017	\$9,189
<b>Total Value Added</b>	<b>\$1,142,447,000</b>	<b>\$240,977</b>	<b>\$315,580</b>
<b>Intermediate Expenditures:</b>	<b>\$698,172,000</b>	<b>\$147,266</b>	<b>\$192,857</b>

Buttons at the bottom include 'Reset Industry', 'Update', 'Zero Out Industry', 'Save', and 'Cancel'.

# CONTRIBUTION OF AGRICULTURE METHODOLOGY:

- Factors that can affect analysis outcome:
  - Industry Production Coefficients – 44% make adjustments

The screenshot displays the 'Edit Industry Production' window with an 'Options' dropdown. On the left, a list of 22 industries is shown, with '1 Oilseed farming' selected. Below this list, three input fields are visible: 'Total Absorption Value: 0.379314', 'Value Added Coefficient: 0.620686', and 'Total Production Function: 1.000000'. A 'Production Function Editing' section provides instructions: '1. Select the commodity you want to change and make your edit change.', '2. After you are done with your edit changes, click Balance to make the Production Function add to the total Absorption Coefficient.', and '3. Click Save to save your work.' An 'Importing' section follows with instructions: '1. You need to select the production function that you are replacing prior to importing.', '2. Click Options Library then Import. Select the one you want to import. Note the sector does not have to match the sector you are importing into.' The main table lists commodities with their codes, descriptions, coefficients, and fixed status. The 'Balance' button is at the bottom left, and 'Save' and 'Cancel' buttons are at the bottom right.

Commodity Code	Commodity Description	Coefficient	Fixed
3001	Oilseeds	0.075102	<input type="checkbox"/>
3010	All other crops	0.009346	<input type="checkbox"/>
3011	Beef cattle	0.000650	<input type="checkbox"/>
3013	Poultry and egg products	0.000232	<input type="checkbox"/>
3014	Animal products, except cattle and poultry and eg...	0.000500	<input type="checkbox"/>
3019	Support activities for agriculture and forestry	0.060995	<input type="checkbox"/>
3030	Stone	0.000739	<input type="checkbox"/>
3033	Potash, soda, and borate mineral	0.000027	<input type="checkbox"/>
3034	Phosphate rock	0.000005	<input type="checkbox"/>
3035	Other chemical and fertilizer mineral	0.000019	<input type="checkbox"/>
3049	Electricity transmission and distribution	0.003238	<input type="checkbox"/>
3050	Natural gas distribution	0.000565	<input type="checkbox"/>
3051	Water, sewage and other systems	0.003877	<input type="checkbox"/>
3062	Maintained and repaired nonresidential structures	0.012223	<input type="checkbox"/>
3122	Rope, cordage, twine, tire cord and tire fabric	0.000018	<input type="checkbox"/>
3123	Other textile products	0.000010	<input type="checkbox"/>
3140	Cut stock, resawn and planed lumber	0.000056	<input type="checkbox"/>
3142	Wood containers and pallets	0.000060	<input type="checkbox"/>
3152	Sanitary paper products	0.000084	<input type="checkbox"/>
3154	Printed materials	0.000061	<input type="checkbox"/>
3156	Refined petroleum products	0.024055	<input type="checkbox"/>
3159	Petroleum lubricating oil and grease	0.000149	<input type="checkbox"/>
3160	All other petroleum and coal products	0.000061	<input type="checkbox"/>
3164	Other basic inorganic chemicals	0.002860	<input type="checkbox"/>

# CONTRIBUTION OF AGRICULTURE METHODOLOGY:

- **Factors that can affect analysis outcome:**
  - Commodity Production Coefficients – 50% make adjustments

Edit Commodity Production Options

Commodity Code	Commodity Description	Coefficient	Fixed
3001	Oilseeds	1.000000	<input checked="" type="checkbox"/>
3019	Support activities for agriculture and forestry	0.000000	<input type="checkbox"/>
3496	Other amusement and recreation	0.000000	<input type="checkbox"/>

Total Byproducts Value: 1.000000

Byproduct Editing:  
1. Select the commodity you want to change and make your edit change.  
2. After you are done with your edit changes, click Balance to make the Byproduct add to 1.  
3. Click Save to save your work.

Balance Save Cancel

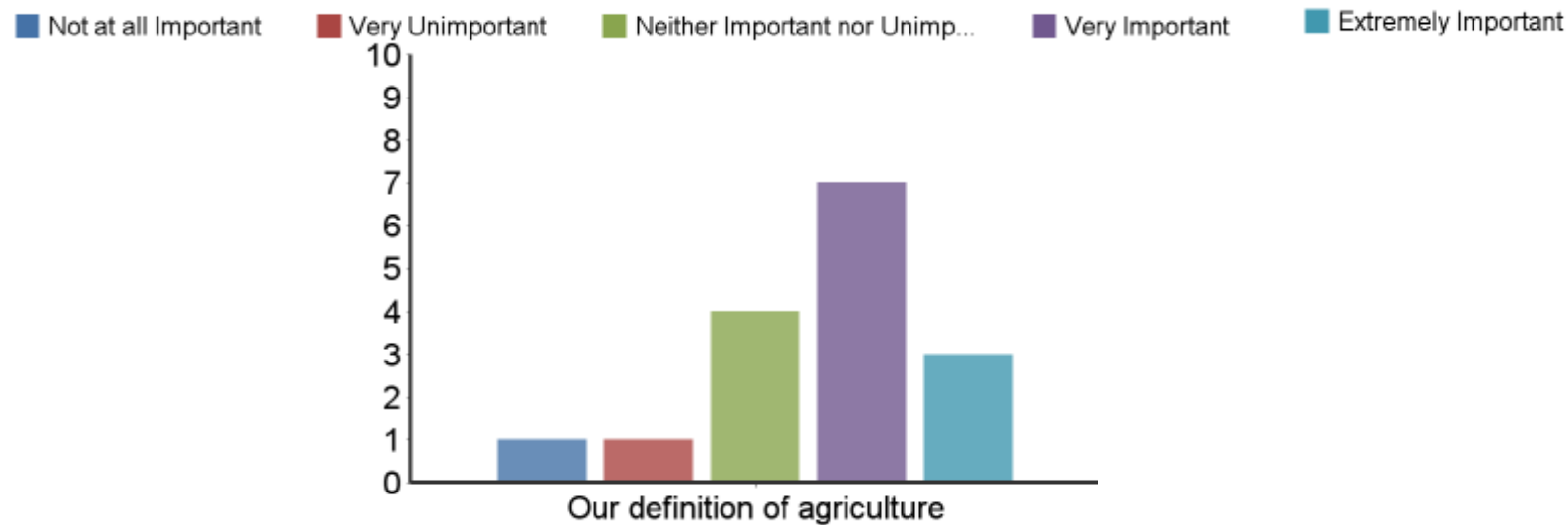
# CONTRIBUTION OF AGRICULTURE METHODOLOGY:

- Factors that can affect analysis outcome:
  - Trade Flows Coefficients – 67% make adjustments

Edit Trade Flows							
Trade Model							
	Sector	Description	Local Domestic Commodity Demand	Local Net Commodity Supply	Local Use of Local Supply	Local Use Ratio (RSC)	Average RPC
▶	3001	Oilseeds	\$1,046,077,000	\$1,334,028,000	\$0	0.000 %	22.665 %
	3002	Grains	\$2,258,543,000	\$1,934,119,000	\$0	0.000 %	46.355 %
	3003	Vegetables and melons	\$132,470,700	\$28,913,280	\$0	0.000 %	11.976 %
	3004	Fruit	\$89,635,580	\$6,595,488	\$0	0.000 %	3.750 %
	3005	Tree nuts	\$38,368,520	\$1,453,543	\$0	0.000 %	1.705 %
	3006	Greenhouse, nursery, and floriculture products	\$124,382,500	\$54,638,450	\$0	0.000 %	7.704 %
	3007	Tobacco	\$13,666	\$536,561	\$0	0.000 %	45.921 %
	3008	Cotton	\$24,641,130	\$88,126,260	\$0	0.000 %	87.537 %
	3009	Sugarcane and sugar beets	\$114,162	\$1,046,615	\$0	0.000 %	99.382 %
	3010	All other crops	\$266,995,500	\$300,529,400	\$0	0.000 %	72.965 %
	3011	Beef cattle	\$334,549,200	\$567,257,500	\$0	0.000 %	81.896 %
	3012	Dairy cattle and milk products	\$144,260,700	\$21,528,300	\$0	0.000 %	13.568 %
	3013	Poultry and egg products	\$3,939,980,000	\$4,091,708,000	\$0	0.000 %	77.363 %
	3014	Animal products, except cattle and poultry and eg...	\$139,283,600	\$179,665,300	\$0	0.000 %	77.414 %

# DEFINING AGRICULTURE:

- **63%** of respondents believe that it is either very important or extremely important that researchers are consistent in their definition of agriculture



- Some expressed concern that a standard definition might not be practical due to varying demands of legislators and industry leaders.



# DEFINING AGRICULTURE:

- **All respondents agreed that agriculture would include:**
  - Crop Production
  - Livestock Production
- **Most (~90%) would also include:**
  - Crop Processing
  - Livestock Processing
  - Support Activities

# DEFINING AGRICULTURE:

- **~70% would include forestry under the definition of agriculture:**
  - Forestry Production
  - Forestry Processing
- **65% of respondents would include ag related sectors such as:**
  - Commercial Hunting and Trapping
  - Commercial Fishing

# DEFINING AGRICULTURE:

- **Defining Ag Processing:**

- Over **75%** of respondents indicate that all industries classified under NAICS code 311 (Food Manufacturing) should be included in the contribution of agriculture analysis.
- A lower percentage felt that those falling under NAICS classification 312 (Beverage and Tobacco Product Manufacturing) should also be included.
- Less than **50%** would include Textile Mills, Textile Product Mills, Apparel Manufacturing, Leather and Allied Product Manufacturing, Wood Product Manufacturing, and Paper Manufacturing

# DEFINING AGRICULTURE:

- **41% would include:**
  - 262 - Farm machinery and equipment manufacturing
- **Around a quarter would add:**
  - 263 – Lawn and garden equipment and manufacturing
  - 267 – Food product machinery manufacturing
  - 269 – Sawmill, woodworking, and paper machinery
  - 459 – Veterinary services
  - 469 – Landscape and horticultural services
  - 501-503 – Food and drinking places

# DEFINING AGRICULTURE:

- **Other full sectors to consider:**
  - 35 – Other chemical fertilizer and mineral mining
  - 47 – Electric power generation – Biomass
  - 57 – Construction of new commercial structures, including farm structures
  - 164 – Other basic organic
  - 165 – Inorganic chemical manufacturing
  - 210 – Lime manufacturing
  - 215 – Mineral wool manufacturing
  - 368 – Wood kitchen cabinet and countertop manufacturing
  - 369 – Upholstered household furniture manufacturing
  - 370 – Non-upholstered wood household furniture manufacturing
  - 371 – Other household non-upholstered furniture manufacturing
  - 372 – Institutional furniture manufacturing
  - 373 – Wood office furniture manufacturing
  - 374 – Custom architectural woodwork and millwork
  - 376 – Showcase, partition, shelving, and locker manufacturing
  - 377 – Mattress manufacturing
  - 378 – Blind and shade manufacturing
  - 400 – Food and beverage stores

# DEFINING AGRICULTURE:

- **Partial contribution considerations:**

- 20 – Extraction of natural gas and crude petroleum
- 34 – Phosphate rock mining
- 41 – Electric power generation – Hydroelectric
- 42 – Electric power generation – Fossil fuel
- 43 – Electric power generation – Nuclear
- 44 – Electric power generation – Solar
- 45 – Electric power generation – Wind
- 46 – Electric power generation – Geothermal
- 51 – Water, sewage, and other systems
- 58 – Construction of other new nonresidential structures
- 62 – Maintenance and repair construction of nonresidential structures
- 173 – Medicinal and botanical manufacturing
- 176 – Biological product (except diagnostic) manufacturing
- 271 – All other industrial machinery manufacturing
- 395 – Wholesale trade
- 399 – Building material and garden equipment and supply stores
- 402 – Retail – Gasoline stores
- 406 – Retail – Miscellaneous store retailers
- 411 – Truck transportation
- 416 – Warehousing and storage
- 455 – Environmental and other technical consulting services
- 461 – Management of companies and enterprises
- 463 – Facilities support services
- 496 – Other amusement and recreation industries

# CONCLUSION:

- The methods used to conduct and report contribution of agriculture analyses appear to vary between researchers.
- The selection of sectors believed to directly influence agriculture varied greatly between researchers.
- As more public attention is being brought toward these types of analyses, it might be beneficial to work together to determine a standard for methodology for contribution of agriculture analyses.



# MOVING FORWARD:

- The Contributions and Impacts of Food, Fiber, and Forestry website.
  - Accessed from [cars.uark.edu](https://cars.uark.edu)
- Guidelines for conducting contribution of agriculture studies
- Working paper

**Thank You**