Technical Note No.:	200-ECN-5	November 2, 2017
Subject:	ECN – Guidelines for Economic Impact Analysis With IMPLAN	

Purpose. To revise existing Technical Note, "Guidelines for Economic Impact Analysis with IMPLAN," to conform to changes in the Conservation Stewardship Program (CSP) and the manner in which the economic impacts of changes in labor and proprietor income are modelled.

Effective Date. Effective upon receipt.

Explanation. This technical note is a revision to one previously developed to guide NRCS staff in using IMPLAN appropriately and consistently. The diversity of NRCS conservation programs and projects to which IMPLAN can be applied makes it difficult to define a single recipe to follow for all analyses. This guidance focuses on general principles that need to be followed when conducting economic impact analysis with IMPLAN. It assumes that readers are familiar with IMPLAN and how the model is to be used.

Major revisions in the technical note include—

- Changes to the way CSP expenditures are modeled. This was done because of the changes in the way payments under the Program were calculated starting in FY 2017. CSP now relies on payment schedules to pay for new enhancements and conservation practices, so we will model the economic impacts of this portion of CSP payments the same way we model EQIP payments. The program will also make a payment to producers for number of resource concerns met and type of land. These payments are supposed to compensate producers in part for the cost of maintaining existing conservation practices. As a result, we will allocate the portion of payment for existing practices to hired labor rather than to proprietor income.

- Changes in the way that payments allocated to wage compensation (Sector 5001) and proprietor income (Sector 6001) are treated. Currently, we just increase wage compensation and proprietor income in IMPLAN and use the results it reports. Now, for programs like EQIP and CSP, where the increase in labor income results from direct purchase of hired labor separate from labor that is used in the production function of an existing sector or industry, we will add in the initial payments for wage compensation and proprietor income to the direct impacts. This will increase the estimated economic impacts of these expenditures.

  We are doing this because IMPLAN only accounts for the induced impacts from changes in wage and proprietor income. It does not account for their direct impacts. In IMPLAN, wage compensation and proprietor income typically represent the portion of the value of production of a commodity that is not devoted to the purchase of inputs. Thus, changes in wages and compensation result from a change in the demand for a commodity. When this is the case, the direct impact is represented by the increase in the demand for the commodity not for the labor used to produce it. Thus, the only impact to measure is the increase in consumption induced by the increased labor income from the increase demand for a commodity.   In the case we face with EQIP and CSP, the increased in labor income is from a direct increase in demand for labor not represented in the production function of another sector. As a result, the direct impacts are not represented in IMPLAN so we need to add them into the results.

- Changes to the way economic impacts of NRCS wage compensation to its employees are estimated. Currently, we do not account for the direct economic impacts of NRCS wages because of the way we model them in IMPLAN. Now, we will add in the wages paid to NRCS employees into the direct economic impacts. This is based on same argument made for adding in payments for labor into the direct economic impacts for EQIP and CSP.

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- Changes to the description of the IMPLAN model in the Background section. The figure 1 has been changed to a snapshot of the actual SAM depiction in IMPLAN rather than a generic depiction of an input-output model. This required a major revision in the text in this section.

- A more detailed explanation of the NRCS IMPAN Database tool and how to use it.

Distribution. This directive is available on the NRCS eDirectives website at https://directives.sc.egov.usda.gov/.

Filing Instructions. Due to printing and distribution costs, the availability of this information is limited to electronic format.

Contact. For assistance, contact Mark Peters, Senior Economist, Resource Economics and Analysis Division, at (301) 504-1564 or by email at mark.peters@wdc.usda.gov.

 /s/

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Attachment

Guidelines for economic impact analysis with IMPLAN

Contents

Purpose

NRCS economists use IMPLAN to estimate the economic impact of NRCS conservation expenditures. IMPLAN's detail, scalability, and ease of use make it a flexible model that can generate results for the impact of NRCS projects and programs. Used properly, IMPLAN provides valuable information on the support that NRCS expenditures provide to county, State, and regional economies.   These guidelines were developed to guide NRCS staff in using IMPLAN appropriately and consistently. The diversity of NRCS conservation programs and projects to which IMPLAN can be applied makes it difficult to define a single recipe to follow for all analyses. This guidance focuses on general principles that need to be followed when conducting economic impact analysis with IMPLAN. It assumes that readers are familiar with IMPLAN and how to use it. For detailed IMPLAN terminologies and analysis techniques please consult the IMPLAN.COM website. The IMPLAN Version III Users Guide and IMPLAN Version II Handbook are available from NRCS sources.

IMPLAN is a social accounting matrix (SAM) based an input-output (I-O) model. Analysts typically use these types of models to estimate the impacts of an influx of government or private expenditures into a community or region on its economy. The impacts are typically measured in terms of changes in income, value added, output, and jobs. The standard I-O model traces the impacts through the market economy: interindustry trade, household demand, government purchases, capital investment, and trade. The SAM extends the standard I-O model beyond industries to nonmarket transactions, chiefly interinstitutional transfers, such as payment of taxes and receipt of corporate dividends.

In IMPLAN, an increase in expenditures on a commodity, such as grains, not only increases production in the grains sector but also increases production in those sectors, such as fertilizer, construction, manufacturing, and transportation, that furnish inputs to the grains sector. The increase in production in these sectors in turn leads to increases in production of those industries that supply them with their inputs. IMPLAN tracks the impacts of these successive increases backwards through the economy until no more expenditures occur. IMPLAN also tracks the increase in consumption and economic activity resulting from the increase in income earned by workers and business owners. IMPLAN does not track impacts forward through the economy from the point where the initial change occurs. That means that while IMPLAN captures the increase in industry trade and consumption resulting from the increase in grains production it does not capture the increase in industry production and consumption needed to absorb the increased production.

Figure 1. 2014 IMPLAN U.S. National Social Accounting Matrix (SAM) Model, Simplified, in Billions
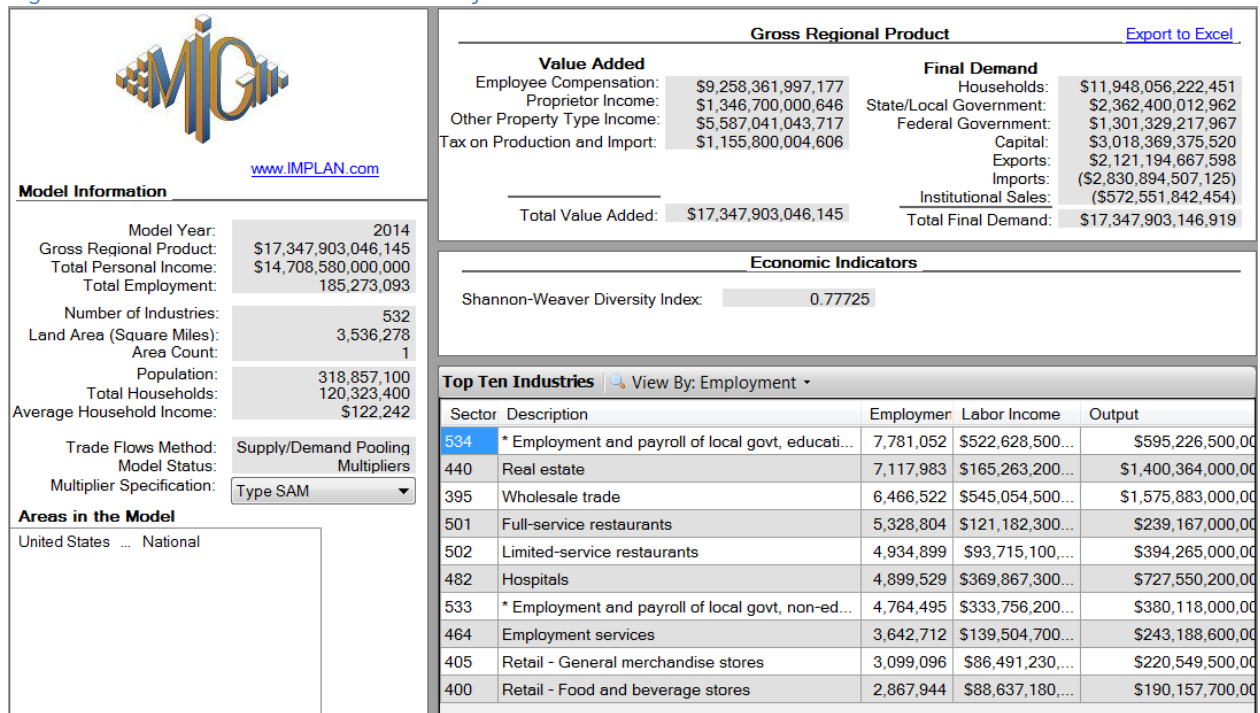
Type Code	Description	Industry Total	Commodity Total	Employee Compensation (Wages)	Proprietor Income (Profits)	Other Property Type Income	Tax on Production and Imports	Households	Government (3 Fed + 3 St/Local)	Enterprises (Corporation Profits)	Capital	Inventory Additions/ Deletions	Foreign Trade	Domestic Trade	Total
	Aggregated IxC SAM		2014 IMPLAN US National Social Accounting Matrix (SAM), simplified, in Billions of 2014 $$		Value Added Sectors					Copyright 2017 Minnesota IMPLAN Group, Inc.					
1001	Industry Total	-	29,731	-	-	-	-	-	-	-	-	-	2,109	0	31,840
2001	Commodity Total	12,949	-	-	-	-	-	11,151	3,472	-	2,635	84	-	-	30,291
5001	Employee Compensation	9,258	-	-	-	-	-	-	-	-	-	-	-	-	9,258
6001	Proprietor Income	1,347	-	-	-	-	-	-	-	-	-	-	-	-	1,347
7001	Other Property Type Income	5,587	-	-	-	-	-	-	-	-	-	-	-	-	5,587
8001	Tax on Production & Imports	1,156	-	-	-	-	-	-	-	-	-	-	-	-	1,156
10001	Households	-	3	8,143	1,287	1,185	-	254	2,930	815	1,039	-	1	-	15,657
11001	Government	-	435	1,097	60	77	1,156	1,875	2,457	521	1,369	-	5	-	9,051
13001	Enterprises (Corporations)	-	-	-	-	1,800	-	-	-	-	-	-	-	-	1,800
14001	Capital	-	102	-	-	2,535	-	1,580	-	464	-	-	720	-	5,401
14002	Inventory Additions/Deletions	-	20	-	-	-	-	-	-	-	77	-	5	-	102
25001	Foreign Trade	1,543	-	19	0	(10)	-	797	192	-	282	18	0	-	2,840
28001	Domestic Trade	-	-	-	-	-	-	-	-	-	0	-	-	-	0
	Total	31,840	30,291	9,258	1,347	5,587	1,156	15,657	9,051	1,800	5,401	102	2,840	0	114,331
	Total Value Added				$17,348										
	Actual IMPLAN Sectors included in columns	From 1 to 536	3001 to 3536	5001	6001	7001	8001	10001 to 10009	11001-12003	13001	14001	14002	25001	28001	

The SAM depicted in figure 1 shows a representation of the interactions and transactions mentioned earlier. The SAM combines IMPLAN's 536 industry sectors, 536 commodity sectors, 9 household sectors, and 6 government sectors into a set of single rows and columns for each. Foreign trade is a net of exports and imports. Domestic trade represents goods imported or exported outside the region, but still originating within the United States. The columns show the industry's or institution's use through its expenditures on products supplied by other sectors. The rows show the sales or transfers of commodities or services produced by other sectors and institutions. The inner green area in the table represents the industry to industry sales (the I-O model sectors used to calculate the core direct and indirect impacts). The blue area represents the institutional sectors used to calculate the

induced impacts (SAM impacts). The IMPLAN model can also include Federal or local government sectors within the SAM impact model calculations, but that is neither the default IMPLAN practice nor standard NRCS usage. In the U.S. model below, net domestic trade is $0. For sub-State regions and smaller States, domestic trade becomes quite large.

More specifically, the sum along the first row, "Industry Total" ($31,840 billion), equals the market value of all commodities and services produced for sale by industries, including the total market value of intermediate inputs. This value, "Total Output" (the two orange cells above) can also be measured down the third column as industry expenditures on intermediate products ($12,949 billion) plus value added (employee compensation, proprietor income (profits), other property type income (rent) and government (taxes)) and trade. Value added (yellow items above) also equates to "Final Demand," which is equal to gross domestic product (GDP with respect to the U.S. economy) or gross regional product (GRP) for a State or region. Value added does not include the value of intermediate products used in production as their value is already included in the value of final sale of the commodity. Value added ($17,348 billion) is also itemized in Figure 2, "IMPLAN Economic Overview of 2014 U.S. Model."

Figure 2. IMPLAN Economic Overview of 2014 U.S. Model

Gross Regional Product		Export to Excel
Value Added		
Employee Compensation:	$9,258,361,997,177	
Proprietor Income:	$1,346,700,000,646	
Other Property Type Income:	$5,587,041,043,717	
Tax on Production and Import:	$1,155,800,004,606	
Total Value Added:	$17,347,903,046,145	

Final Demand	
Households:	$11,948,056,222,451
State/Local Government:	$2,362,400,012,962
Federal Government:	$1,301,329,217,967
Capital:	$3,018,369,375,520
Exports:	$2,121,194,667,598
Imports:	($2,830,894,507,125)
Institutional Sales:	($572,551,842,454)
Total Final Demand:	$17,347,903,146,919

Model Information

Model Year:	2014
Gross Regional Product:	$17,347,903,046,145
Total Personal Income:	$14,708,580,000,000
Total Employment:	185,273,093
Number of Industries:	532
Land Area (Square Miles):	3,536,278
Area Count:	1
Population:	318,857,100
Total Households:	120,323,400
Average Household Income:	$122,242
Trade Flows Method:	Supply/Demand Pooling
Model Status:	Multipliers
Multiplier Specification:	Type SAM

Areas in the Model

United States ... National

Economic Indicators

Shannon-Weaver Diversity Index: 0.77725

Top Ten Industries — View By: Employment ▾

Sector	Description	Employment	Labor Income	Output
534	* Employment and payroll of local govt, educati...	7,781,052	$522,628,500...	$595,226,500,00
440	Real estate	7,117,983	$165,263,200...	$1,400,364,000,00
395	Wholesale trade	6,466,522	$545,054,500...	$1,575,883,000,00
501	Full-service restaurants	5,328,804	$121,182,300...	$239,167,000,00
502	Limited-service restaurants	4,934,899	$93,715,100,...	$394,265,000,00
482	Hospitals	4,899,529	$369,867,300...	$727,550,200,00
533	* Employment and payroll of local govt, non-ed...	4,764,495	$333,756,200...	$380,118,000,00
464	Employment services	3,642,712	$139,504,700...	$243,188,600,00
405	Retail - General merchandise stores	3,099,096	$86,491,230,...	$220,549,500,00
400	Retail - Food and beverage stores	2,867,944	$88,637,180,...	$190,157,700,00

Appropriate use

IMPLAN is useful for tracking the economic impacts of conservation program expenditures beyond the farm or ranch and into the surrounding community and economy. However, the assumptions made that allow IMPLAN to do this (including fixed proportions production technology, constant returns to scale, no factor substitution, no product substitution, fixed prices, and no supply or demand constraints) lead to a representation of the behavioral relationships underpinning the economy that economists view as overly restrictive.

IMPLAN is better suited for analysis of the economic impacts of small- to medium-sized projects than

large projects. Small or medium refers to the size of the shock relative to the size of the markets or the major sectors being affected, not to geographic scope. For example, if the size of an economic impact is large enough to cause changes in product prices, household allocation of consumption expenditures, or aggregate income, then IMPLAN should not be the only model used. Also, IMPLAN should not be used to analyze the economic impacts of changes in input or product prices or changes in resource constraints. For relatively large projects, analysts may wish to use other models. Most NRCS activities cause little change in product prices and only affect a small percent of any particular industrial sector.

When looking at the impact of Federal spending on a national level, IMPLAN does not consider the impact of how the spending is funded. This is not a major issue for NRCS when looking the impact of NRCS expenditures alone as these expenditures are small with respect to total Federal spending. It does become an issue when looking at the impact of NRCS expenditures nationally in conjunction with other Federal spending. The first time IMPLAN was used by NRCS for a national analysis was when analyzing the impacts of the 2009 stimulus bill. This was deemed appropriate in this instance because of the collapse in investment demand and the belief that resources were not being fully employed during the economic crisis.

IMPLAN should not be used within the National Economic Development (NED) account of Watershed Plans (under the 1983 P&G),[1] or for Ecosystem Service Valuation of Projects or Programs evaluated using the process described in the USDA Departmental Regulation 9500-013.[2] IMPLAN could be used in developing the Regional Economic Development (RED) account.[3] Similarly, IMPLAN should also not be used for analysis of social benefits or costs under OMB Circular A-94 (see Section 6.b.1, "Multiplier Effects"),[4] "since analyses should treat resources as if they were likely to be fully employed. Generally, analyses should treat resources as if they were likely to be fully employed. Employment or output multipliers that purport to measure the secondary effects of government expenditures on employment and output should not be included in measured social benefits or costs."

Sorting NRCS Budget Data for Analysis

According to Title 340, General Manual, Part 413, all NRCS budget analyses with the IMPLAN model must use data obtained by the Resource and Analysis Division (READ). NRCS budget expenditures (payments) should be used, not future obligations. Payments provide measurable impacts to local economies. Obligations are not a guarantee of economic impact since they can be canceled, modified, or spread over a period of time. Obligations can be used for an analysis of the likely impacts of funds allocated to a program or project in a given year. In this case it should be noted that actual expenditure of funds may be smaller than the funded amount.

IMPLAN analysis uses both FMMI and ProTracts data to estimate regional economic impacts. NRCS budget expenditures are contained in the Financial Management Modernization Initiative (FMMI)

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[1] It can, however, be used in developing the Regional Economic Development (RED) account[2] for these plans.
[2] Departmental Regulation 9500-013, Conducting Analyses Under the Principles, Requirements, and Guidelines for Water and Land Related Resources Implementation Studies and Federal Water Resource Investments
[3] Sheets, Keith and David Buland, Turkey Creek Watershed, NE/KA, AAEA 1998; https://www.nrcs.usda.gov/wps/PA_NRCSConsumption/download?cid=stelprdb1257596&ext=pdf.
[4] OMB Circular No. A-94 Revised: Guidelines and Discount Rates for Benefit-Cost Analysis of Federal Programs https://obamawhitehouse.archives.gov/omb/circulars_a094/

data system. Expenditure information is sorted by budget object classification, program, unit, and State in the data system. Additional data on expenditures are found in the NRCS Program Contracts System (ProTracts). The ProTracts information is used to further breakdown the budget object classifications for private contracts into payments for components used to install conservation practices. Fiscal year data is generally available 10 weeks after the close of the previous fiscal year from READ data.

Although many programs like the Environmental Quality Incentives Program (EQIP) provide a payment rate as an estimated percent cost of the total practice cost, NRCS analysts should not include estimates of the landowner share of costs within the analysis. NRCS payments represent new funds coming from outside the region. The funds for the landowner share of the cost of installing the practice are viewed as coming from within the region and possibly replacing other farm expenditures that would occur that year.

Requesting Data

READ performs all sorting of budget data for national, State and special initiative analysis with IMPLAN. Technical assistance (TA) data is found in FMMI. This data is translated from business object classification (BOC) codes to IMPLAN sectors. Financial assistance (FA) data for ProTracts programs (e.g., EQIP) is translated from practice code totals to IMPLAN sectors. Other FA expenditure data for non-ProTracts programs, easement programs, or local contracts is recorded in FMMI.

Data requests to READ should allow for 2 weeks of data processing time. The request should clearly specify the following FMMI query sort terms:

- Programs
- Division, unit, or State
- Fiscal year
- Expenditures (not obligations)
- BOCs for FMMI queries
- Payments and practice codes for ProTracts queries

ProTracts requests need to emphasize payments made on certified practices, not planned practices. NRCS normally does not estimate landowner in-kind contributions for regional economic analysis with IMPLAN since these funds are viewed as coming from within the region and likely replacing other local farm expenditures.

NRCS IMPLAN Database
READ has developed a useful annual IMPLAN data tool that has the data and queries for most IMPLAN analyses.   This tool will be ready each January for the previous fiscal year for regular IMPLAN users. Cross-reference tables for translation of TA and FA budget codes to IMPLAN sector codes are maintained and updated within the current IMPLAN data tool. This IMPLAN database has annual expenditures paid by program from FMMI and ProTracts data. This IMPLAN tool also includes reports of expenditures by practice and component (payment schedule scenarios).

To use the tool (see figure 3), first select your State, then load the reports and copy the needed data into Excel. The FA expenditures, TA expenditures, and RA funds are already summed by practice, then by IMPLAN sector. For expenditures on smaller scales, use the county FA reports. The "Practice Components" reports include the ProTracts payments by contract, practice, and components (payment schedule scenarios).

Figure 3. NRCS IMPLAN Database (FY2016)
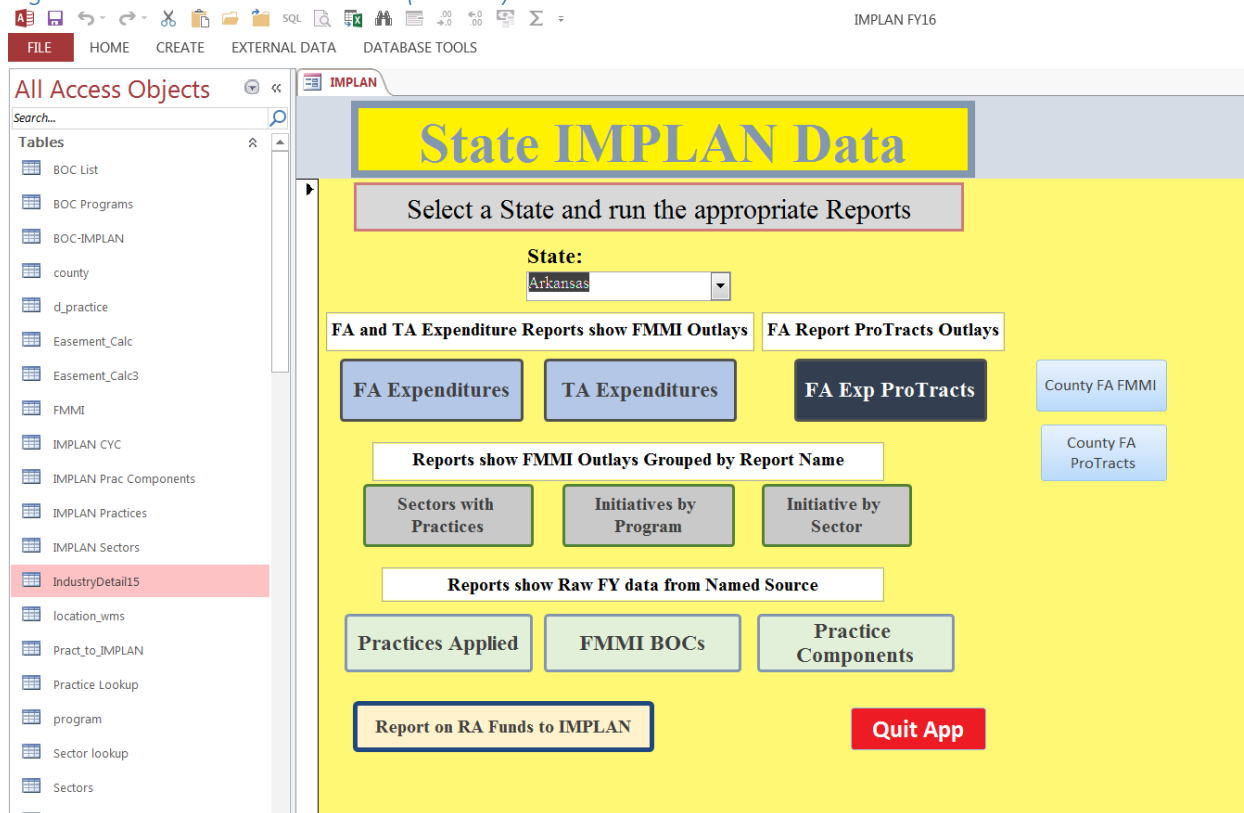
IMPLAN NRCS Expenditures Analysis Procedure

EQIP, AMA, and Related Cost-Share Conservation Programs

NRCS FA and TA expenditures for these programs are generally made in the year the financial conservation practices are installed and consequently it's possible to represent the economic impact of the expenditures by distributing them to the IMPLAN sectors that provide the inputs and services used to install them. Participant and partner contributions are not considered new investments and are not assumed to increase demand in the study area unless these contributions are from outside the region.

To do this, assign FA and TA expenditures are assigned to the appropriate industrial or commodity sector according to the cross-reference tables in the NRCS IMPLAN data tool for BOC and practice codes.

EQIP payments to labor and proprietor income (IMPLAN codes 5001 and 6001) should be added as

direct effects to labor income, value added, and output. The labor and proprietor payments represent expenditures by producers for hired labor to install a conservation practice, such as fencing and income earned by proprietor from implementing a conservation practice, such as nutrient management. As such, they have direct economic impacts. IMPLAN treats these payments as having only induced effects. Thus, the analyst needs to add the initial payment to the direct and total results for labor, value added, and output (see "IMPLAN Analysis by Parts" video for an example) to account for the direct effect.

Conservation Stewardship Program

In the Conservation Stewardship Program (CSP), payments are made for both stewardship (existing installed practices) and enhancements (new practices installed).[5] Prior to fiscal year (FY) 2017, payments for both existing practices and enhancements were based on environmental performance points. To represent the economic impacts the payments to participants were then divided between the two payment categories based on their share of the total points. The stewardship portion of the payment was allocated to proprietor income (IMPLAN sector 6001) and the enhancement portion was allocated to agricultural and forestry support services (IMPLAN sector 19).[6]

Starting in FY 2017, CSP changed the basis of its payments for additional conservation activities from environmental performance to the cost of implementation. For new practices and enhancements, payments will be based on the cost of installation as represented in the payment schedules. This portion of the annual payment will vary each year based on the conservation activities applied. The current estimate for FY 2017 payments for new practices is the estimated cost of enhancements and 10 percent of estimated cost of installation for conservation practices. The actual practices and enhancements used will be available in FY 2017 data, so the calculations on new payments will be similar to EQIP. Use the appropriate industrial or commodity sector according to the cross-reference tables in the NRCS IMPLAN data tool for BOC and practice codes.

Starting in FY 2017, CSP also changed the basis for payment for existing conservation practices.[7] The payment for existing practices will be based on number of resource concerns being met on the operation and land use type covered. The payment is designed to cover the expected costs of operating and maintain existing conservation practices. As such, the payment should be assigned to IMPLAN sector 5001, wage compensation, since labor is the major expense for operations and maintenance (O&M) costs.

The treatment of payments for existing practices outlined for CSP starting in FY 2017 should be used in analysis of CSP for years prior to FY 2017 as well. CSP regulations have always stated that the program will offset operating and maintenance costs for existing conservation practices. Since the

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[5] "CSP participants agree to improve, maintain, and manage existing conservation activities and undertake additional conservation activities to address resource concerns." Regulatory Impact Analysis for the Conservation Stewardship Program, NRCS, 9/10/2014,
https://www.nrcs.usda.gov/wps/PA_NRCSConsumption/download?cid=stelprdb1264037&ext=pdf
[6] Only the portion of the payment that went towards the implementation of enhancements was viewed as having direct economic impacts. The stewardship portion of the payment was viewed as only inducing increased economic activity through its impact on proprietor income.
[7] CSP Program Payment information,
https://www.nrcs.usda.gov/wps/portal/nrcs/detailfull/national/programs/financial/csp/?cid=nrcseprd1297344

payments participants receive for existing practices are typically less than NRCS estimates of the operating and maintenance costs for conservation practices it is reasonable to assume that the payment are put towards operating and maintenance costs, using sector 5001, labor. The enhancement portion will continue to be allocated to agricultural and forestry support services (IMPLAN sector 19) for pre-FY-2017 CSP payments.

Watershed Programs

Watershed programs should be double checked with the program manager to ensure that the right IMPLAN sectors are being used. Often, the construction cost is paid for through a payment to a partner, either State or local government or an NGO. The FMMI data will show the payments made to these organizations, but the analyst should correct the sector to construction, legal, or land rights if they have better local knowledge.

For Public Law 566 and related watershed planning, the NED analysis does not include IMPLAN analysis, but IMPLAN is an excellent tool for developing the Regional Economic Development (RED) Account analysis.[8]

Easement Programs

Easement Payments for the Agricultural Conservation Easement Program (ACEP) and its predecessor programs, the Farm and Ranch Lands Protection Program (FRPP), Grassland Reserve Program (GRP), and Wetlands Reserve Program (WRP) all need to be handled carefully.   Since the easements are paying for a permanent land right, the easement payment itself has no direct economic impact since it is a transfer payment for loses in the future value of the property. However, the uses to which the recipient puts the payment will result in immediate impacts on the economy.

Results from recent surveys of participants in agricultural easement programs in Ohio,[9] New York,[10] and the FRPP, indicate that participants put their easement payments towards several purposes or uses, some of which do not have an economic impact. These purposes include putting money into savings, stocks, bonds, retirement funds, and other financial investments; household uses; paying down debt; buying more agricultural land; construction or repair of buildings; purchases or repair of farm equipment; and other farm expenditures. The FRPP study, *Impacts of the Federal Farm and Ranch Lands Protection Program: An Assessment Based on Interviews with Participating Landowners,*[11] provides information on recipient's intended uses and their order of priority. This

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[8] Sheets, Keith and David Buland, Turkey Creek Watershed, NE/KA, AAEA 1998; https://www.nrcs.usda.gov/wps/PA_NRCSConsumption/download?cid=stelprdb1257596&ext=pdf

[9] Clark, Jill. (2010). *Ohio's Agricultural Easement Purchase Program: From Pilot to Permanent Presence--A Survey of AEPP Participants*. Columbus, OH: The Ohio State University.

[10] National Agriculture Statistics Service (2010), *The New York Farmland Protection Study, 2009.* Albany, NY: United States Department of Agriculture.

[11] Impacts of the Federal Farm and Ranch Lands Protection Program: An Assessment Based on Interviews with Participating Landowners, http://www.farmlandinfo.org/FRPPImpacts, survey developed by the American Farmland Trust and Dr. J. Dixon Esseks at the Center for Great Plains Studies of the University of Nebraska-Lincoln.

information was used to estimate the allocation of payment to each use. The estimated percentages are reported in table 1 and are recommended as the default allocation for easement payments.

This method addresses the easement payments to the landowner. Additional analysis may be needed to look at the impacts of changes in land value or land usage. IMPLAN can easily be used to measure the impact of loss of cropland with a wetland ACEP easement measuring the impact of decreased crop production. There are examples in the literature of this approach with both the old WRP program and the CRP program.

In some situations, specific information on the spending behavior of NRCS easement recipients may enable these payments to be analyzed in an alternative way to the default method. In these situations, the method used to measure recipient spending needs to be documented and the results compared to results obtained using the default method.

The READ Strategic Information and Data Team has incorporated table 1 in the NRCS IMPLAN database as the default allocation of easement payment IMPALN sectors to assist the analyst with the translations of easement payments to IMPLAN sectors.

Table 1. IMPLAN Sectors and Percentages Used for ACEP Easement Payments

Description	IMPLAN Sector	Percentage	IMPLAN Description	Local Economic Impacts
Easements Payments	15006	16.80%	Purchase Easement Land, Business Transfers	None
Easements Payments	15006	14.20%	Purchase new land, Business Transfers	None
Easements Payments	15012	23.20%	Personal Savings (Surplus) not use	None
Easements Payments	15027	4.20%	Personal Tax: Income Tax	None
Easements Payments	10007	14.10%	Households 75-100k Spending Pattern	Induced
Easements Payments	57	7.20%	Construction of new commercial structures, including farm structures	Direct
Easements Payments	3262	7.40%	Farm machinery and equipment	Direct
Easements Payments	19	12.90%	Support activities for agriculture and forestry	Direct

ACEP expenditures also include land rights, legal, surveying, construction (wetland restoration), and other costs that have direct economic impacts. These costs are also assigned to IMPALN sectors by the NRCS IMPLAN database. However, discussions with State program specialists are useful for verifying these expenditures.

Technical Assistance Expenditures

The NRCS IMPLAN database include our TA expenditures from the FMMI database linked to BOCs linked to IMPLAN sectors. Much of the TA payments are payroll items, separated in our accounting to payroll taxes, income taxes, known savings (Thrift Savings Plan deductions), health insurance deductions, life insurance deductions, and net pay. After all the deductions, we handle net pay as household spending,

importing IMPLAN's household spending vector for households with $75,000 to $100,000 (the household income level can be changed with local information). Net pay represents a direct economic impact since it is payment for labor services. This amount needs to be added into the labor income and total value added results. The nonpayroll TA expenditures like office equipment, travel, and vehicles are mostly handled automatically with the NRCS IMPLAN database and do not need to have any adjustments made to the IMPLAN results.

Reimbursable Assistance Expenditures

The NRCS IMPLAN database includes reimbursable assistance (RA) expenditures, outside funding to reimburse NRCS for technical assistance (soils and conservation operations) and programs contracts (Great Lakes and Chesapeake Bay Restoration Initiatives funding). This funding is handled similarly to FA and TA, but the funding sources should be made clear and the economic impacts should be attributed to the funding source, not NRCS.

Conservation Reserve Program

Conservation Reserve Program (CRP) is administered by Farm Services Agency (FSA) but is often considered in the estimation of the impacts of USDA conservation programs. Information on payments to producers can be obtained from the FSA CRP website. CRP rental payments should be treated as proprietor income (6001) or household income (10007), as outside region funds are making rental payments to landowners and existing farms. Researchers might consider including negative impacts of decreasing prior cropping enterprises if analysis is focused on impacts of expanding or decreasing CRP acreage. Some of the CRP and other rental payments may be paid to retired owners living outside the county or State. That will vary by type of CRP contract and region. The State FSA office can provide details.

CRP TA expenditures should be handled like other TA. NRCS TA for CRP is should be included in an assessment of the economic impacts of NRCS programs since the 2014 Farm Bill directed NRCS to fund this assistance. FSA also has their own TA for CRP and their other programs.

Running IMPLAN

Economists must define a study area in the IMPLAN model to represent the county, State, congressional district, or region to be analyzed. The study area can be any grouping of counties, congressional districts, ZIP codes, States, or a combination of these. The study area should be large enough to include work, homes, and shopping areas, even if it involves merging multiple counties into the study area. The IMPLAN model overview and data should be reviewed to understand the economic structure of the study area.
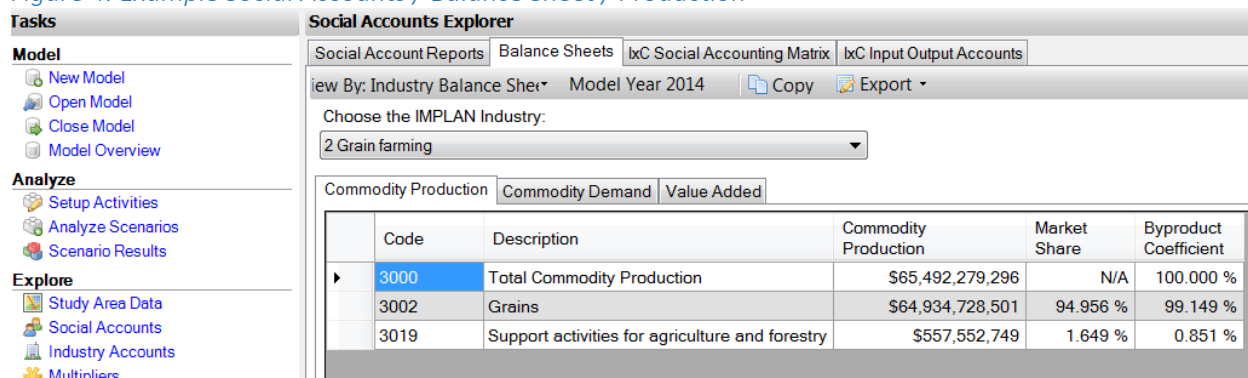
The analyst works with datasets that show fiscal year, program and division expenditures. All BOC and practice codes are translated annually into IMPLAN sector codes. IMPLAN events are then defined as these NRCS expenditures by IMPLAN sector. IMPLAN activities and scenarios can group events by program or other administrative category.

Balance Sheets

The balance sheets (under "Social Accounts," "Balance Sheets") should be reviewed for the major sectors being used in the analysis (see the examples in figures 4, 5, and 6 below). When validating the IMPLAN analysis, look at the balance sheet to verify that the local production functions are similar to what you were looking for. For agriculture commodities, the value added sections (profits and losses) will vary greatly from year to year, and there is confusion on the agriculture sectors between the wages, profits, and rental income accounts. For other industries and commodities, the production function you were expecting may be better estimated using a different industry.

The first tab, "Commodity Production" (figure 4) shows the production of Sector 2, Grain Farming. The "Byproduct Coefficient" column indicates that the output from this industry is 99 percent grain and 1 percent support activities (like custom harvesting). The "Market Share" column shows that the U.S. grain industry produces 95 percent of total grain produced in the United States (the other 5 percent of U.S. grain production comes from other U.S. industries). Overall the sector produced $65.5 billion in goods and services: $64.9 billion in grain production and $557 million in byproducts. The primary data source for these balance sheets are the 2012 Economic Census filled out by every business in the United States. The Agricultural Census is part of the U.S. Economic Census[12] conducted every 5 years.

Figure 4. Example Social Accounts / Balance Sheet / Production

Next, the "Commodity Demand" tab (figure 5) shows the grain sectors expenditures on inputs needed to produce its output (Gross Inputs). This represents the sector's national (average) production function. The sector's production function will differ significantly by State or local regions. For Iowa, this sector is primarily dryland corn; for Nebraska, primarily irrigated corn; for Arkansas, rice; and for Oklahoma mostly wheat, with differing local production functions. Gross absorption shows the percentage of total industry output which goes towards the purchase of inputs (intermediate products). Gross absorption of total commodity demand can be no greater than 100 percent. The remainder of total commodity production value (also called "output" or "sales") after subtracting input purchases represents value added. RPC represents the percentage of each input supplied by local production. The "Regional Absorption" column shows percentage of total industry output that goes toward the purchase of locally produced inputs. This will always be less than or equal to gross absorption. Finally, the "Regional Inputs" column represents the value spent on inputs produced locally.

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[12] https://www.census.gov/programs-surveys/economic-census.html

Figure 5. Example Social Accounts / Balance Sheet / Commodity Demand

2 Grain farming ▼

| Commodity Production | Commodity Demand | Value Added |

	Code	Description	Gross Absorption	Gross Inputs	RPC	Regional Absorption	Regional Inputs
▶	3000	Total Commodity Demand	84.472 %	$55,322,759,025	93.633 %	79.094 %	$51,800,297,339
	3019	Support activities for agriculture and forestry	23.567 %	$15,434,239,979	100.000 %	23.567 %	$15,434,239,979
	3172	Pesticides and other agricultural chemicals	8.116 %	$5,315,359,494	98.954 %	8.031 %	$5,259,740,683
	3440	Real estate buying and selling, leasing, managing...	7.457 %	$4,883,772,596	100.000 %	7.457 %	$4,883,772,596
	3170	Phosphatic fertilizer	5.962 %	$3,904,396,097	89.368 %	5.328 %	$3,489,269,489
	3156	Refined petroleum products	5.277 %	$3,455,874,214	85.145 %	4.493 %	$2,942,510,473
	3395	Wholesale trade distribution services	5.171 %	$3,386,510,605	100.000 %	5.171 %	$3,386,510,605
	3169	Nitrogenous fertilizer	4.423 %	$2,897,002,899	65.951 %	2.917 %	$1,910,602,910
	3002	Grains	3.270 %	$2,141,549,432	92.608 %	3.028 %	$1,983,249,544
	3437	Insurance	3.203 %	$2,097,813,734	86.961 %	2.785 %	$1,824,281,416
	3262	Farm machinery and equipment	2.023 %	$1,325,147,270	85.144 %	1.723 %	$1,128,285,558
	3433	Monetary authorities and depository credit interm...	1.441 %	$943,881,273	100.000 %	1.441 %	$943,881,273
	3062	Maintained and repaired nonresidential structures	1.275 %	$835,303,973	100.000 %	1.275 %	$835,303,973

Finally, the "Value Added" tab (figure 6) shows the $10.2 billion in value added components: "Employee Compensation" (wages), "Proprietor Income" (profits), "Other Property Type Income" (rent), and T"ax on Production and Imports." This represents the difference between the amount the sector earned from production ($65.5 billion) and the amount the sector spent on inputs ($55.3 billion). For grain production, most labor is provided by the proprietor (owner-operator), not by hired labor. For agricultural producers, "Other Property Type Income" consists primarily of the rental value or opportunity cost land. This represents what the producer could potentially earn from renting the land. For owner-operators, employee compensation, proprietor income, and other property type income are very interchangeable. The -$8 billion in net taxes includes Federal subsidies received by grain producers in 2014, including crop insurance subsidies.

Figure 6. Example Social Accounts / Balance Sheet / Value Added

2 Grain farming ▼

| Commodity Production | Commodity Demand | Value Added |

	Description	Value Added Coefficient	Value Added
	Total Value Added	15.528 %	$10,169,522,176
	Employee Compensation	1.783 %	$1,167,717,651
	Proprietor Income	8.198 %	$5,368,730,469
	Other Property Type Income	17.734 %	$11,614,667,969
▶	Tax on Production and Imports	-12.187 %	($7,981,594,727)

Multipliers

IMPLAN multipliers are used to estimate the regional economic impacts resulting from a change in final demand and measure the direct, indirect, and induced effects of an economic impact. Once a study area is defined, the IMPLAN model calculates a set of multipliers for all the industrial and household sectors. A larger or more diversified economy supplies more inputs to production with less leakage from the region. This implies that multiplier effects are greater in larger regions with a number of vibrant economic sectors participating. Suppliers to primary industries are measured by indirect multipliers (the green area in figure 1), and household impacts are estimated by induced multipliers (the blue areas in figure 1). A ratio of jobs support to the level of impact is also calculated for each industrial or household sector in the study area. Once calculated by the IMPLAN model, these multipliers can be applied to any level of economic impact in each industrial or commodity sector. Care should be used in using these multipliers rather than running IMPLAN as their application is not straightforward.

The multipliers reported in typical NRCS analyses are calculated outside of IMPLAN. They reflect the change in economic activity and jobs per dollar of Federal expenditure. They represent the multipliers that most readers will be interested in.

Industrial vs. Commodity Basis

IMPLAN allows expenditures to be allocated on an industry or commodity basis. If the expenditures are on a commodity basis, IMPLAN will allocate funds to all industries producing that commodity based on the industry's share of production. If the expenditures are put in on an industry basis, IMPLAN will allocate all the expenditures to that specific industry. All expenditures should be put in on a commodity basis unless the analyst knows the specific industry from which the purchases will be made. Construction, most agricultural sectors, and service sectors are typically represented as industries in NRCS analysis. Specific guidance by practice and NRCS expenditure category is given in the READ data IMPLAN tool. The analysis should check that these national assignments to industries and commodities make sense in the local economy, and be able to substitute similar industries as needed (this is a common problem in small areas with specific construction sectors).

Local Purchase Percentage (LPP)

IMPLAN defines local purchase percentage (LPP) for all commodities and industries. These are used to determine how much of the purchases are made on items and services within the region. IMPLAN's regional purchase coefficients are derived from the available data and represent the typical allocation of expenditures for a commodity in the defined region. For this reason, IMPLAN's SAM-based LPPs should be used for all industries and commodities unless the analyst has information indicating that the proportion of expenditures staying in the region will be different.[13] For State analyses, expenditures on an industry basis may use 100-percent LPP if the amount purchases occurring outside the region is small. Purchases directly from industries for NRCS contracts are small scale and should have a higher LPP than the State average (small farmers tend to buy and hire local). For smaller area analyses, analysts should use the IMPLAN SAM amounts unless they have information indicating otherwise. The

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[13] IMPLAN defaults to 100-percent local purchase percentage. The analyst should make sure that the RPC or LPP is set to the SAM value for all commodities unless the analyst has better information.

smaller the area, the less likely it is that an industry will be located in that region.

Margins

Margins should be used for all commodities for which they exist in IMPLAN unless better local information is available. Margins represent the proportion of total cost above the cost of production that goes to making the product available for purchase. They are applied to items purchased from a retailer or wholesaler. Such items as automotive repair and medical services are purchased directly from the producer of these services and consequently require no margin to be applied. Margins for these items do not exist in IMPLAN. Other items like farm supplies, gasoline, and office supplies are typically purchased through a wholesaler or retailer and need to apply the margin.

Direct expenditures to industries do not apply margins so the analyst will need to estimate and apply the margin themselves where applicable. IMPLAN margins for commodities can be used as a guide. This is why analysts should specify expenditures as commodities rather than industry if at all possible.

Using and Interpreting IMPLAN Results

IMPLAN produces several indicators of economic activity. To represent changes in new economic activity, analysts should use "Total Value Added" (wages, profits, rental income, and local taxes) (Olson and Lindall, 2009). Conceptually, value added matches gross domestic product (GDP) at the national level and gross regional or State product at more local levels. Value added represents the broadest, most valid estimate of overall economic activity within a region and a sector's contribution to that activity. "Total Output" in IMPLAN represents total sales and includes both final demand and intermediate products. This is not the same as GDP or total final demand, which do not include the sales of intermediate products. Total output is useful for looking at impacts on specific industries, but less useful for their overall contribution to economic activity because it overstates the actual increase in economic activity (Olson and Lindall, 2009).

Results of the analysis, whether value added, output, or jobs, should not be reported as net, new, or additional. IMPLAN can only be used to calculate the amount of jobs and output changes needed to support a given level of expenditure. IMPLAN does not have the ability to determine whether the jobs or output are new or already existed and are simply being reallocated from other uses.

Input-output models, such as IMPLAN, assume limitless supply of the factors of production. Jobs supported should be reasonably consistent to the size of the relevant labor market. If the number of jobs is disproportionate to the labor market, then where these jobs are coming from will have to be explicitly addressed in the analysis using methodology from more complex IMPLAN modeling (see IMPLAN.com for examples). IMPLAN defines a "job year" as the amount of labor needed for 1 year's work. Job estimates coming directly out of IMPLAN represent both full and part-time jobs. It is possible to convert to full time equivalent jobs using a FTE conversion table from the IMPLAN website; typical conversions for NRCS analyses have ran around 0.91 FTE to IMPLAN job.

The estimated change in economic activity should be assessed relative to overall economic activity. Results should be reasonable and be able to assist the audience in understanding the contribution of the conservation expenditures to overall economic activity.

Documentation

It is important to document the version of IMPLAN being used, the model being used (national, State, county, regional, or multiregional), the defined study area, and the manner in which the scenarios were constructed. This includes the level of expenditures used, how the expenditures are allocated to IMPLAN sectors and the source reference for the data on expenditures. If using a regional or multiregional model, it is important to describe how the region or regions were assembled. Zip the IMPLAN.impdb database file for each model to be reviewed or archived. Screen shots of IMPLAN activities, events, and scenario results provide quick documentation for internal quality control and for reviewers. Documentation for reviews can be shared within NRCS at \\txfortworts601\Data2\DavidBuland\StateAnalysis.

Peer Review

As with any economic analysis, peer review of IMPLAN analyses is necessary. This review will ensure application of model is consistent and the results and conclusions drawn have been appropriately assessed and supported by the data used.

To reduce the misapplication of the model and ensure consistency in analyses across the agency, the following process should be followed by all NRCS economists when conducting economic impact studies:

(1) Develop scenarios (events) and provide an explanation for each of them. Follow the guidelines laid out in this technical note.
(2) Document assumptions and note where you have deviated from agency guidelines.
(3) As an initial review, vet scenarios and assumptions with at least one other economist.
(4) Run the scenarios through the model and review results in consultation with the initial reviewer.
(5) Submit a writeup of the analysis for final review (include documentation of the analysis and a zipped copy of the IMPLAN .impdb database file, as well as description of comments received as part of the initial review). Please provide a description of the audience or report for which the writeup is intended. Early submission of the IMPLAN database and spreadsheet analysis is recommended before finalizing the writeup.
(6) Obtain final review from at least two economists, one of whom is a national economist. The function of this review is to confirm that the scenarios and results are realistic, can be rationalized within the context of the area under study, and that the analysis follows the guidelines set forth in this technical note.   Final reviewers will be given 2 weeks to provide comments on the submitted analysis. Part of the reviewer response may include a request for more time to complete the review, granted at the discretion of the analyst.
(7) Revise and resubmit analysis as needed in consultation with the final reviewers.
(8) After final review is completed, the document may be released to the requestor.

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