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# IPUMS Training and Development: Requesting Terra Data as Microdata

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## Microdata Exercise

**Objective:** Use IPUMS Terra to obtain a customized dataset that can be used to answer research questions. This exercise will use microdata and aggregate data for the United States spanning two decades to explore trends in education and employment.

# IPUMS Terra: Microdata Extract Overview

## RESEARCH QUESTION

Examine the interoperable (microdata and area-level) datasets for United States over three decennial censuses. What trends exist over time in education and unemployment?

## OBJECTIVES

- **Create a IPUMS Terra account**
- **Create and download a IPUMS Terra microdata extract**
- **Use IPUMS Terra to attach area-level data to microdata records**

## IPUMS TERRA VARIABLES

### Microdata variables

* COUNTRY:	Country
EDUCUS:	Educational attainment, United States
EMPSTAT:	Activity status (employment status)
GEOLEV2:	2nd subnational geographic level, world
HHWT:	Household weight
* PERNUM:	Person number
PERSONS:	Number of person records in household
* PERWT:	Person weight
* SAMPLE:	IPUMS sample identifier
SCHOOL:	School attendance
* SERIAL:	Household serial number
* YEAR:	Year
* Denotes preselected variables	

### Area-level variables

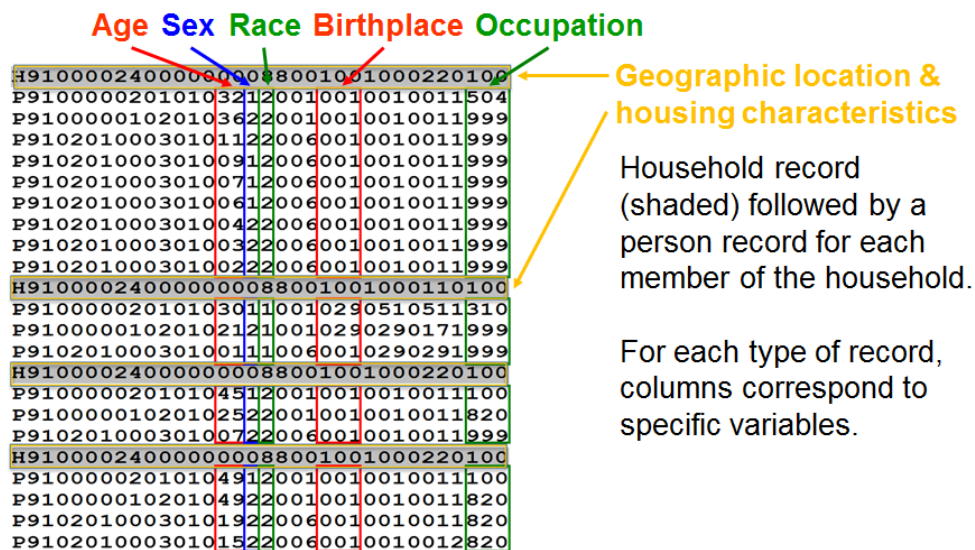
UNEMP:	Percent of population unemployed in each census area
PROF:	Percent of population in professional or technical occupation
EDATTAIN:	Percent of population with a specific educational attainment in each census area

# IPUMS Terra: Microdata Extract Overview

## DATA TYPE DESCRIPTIONS

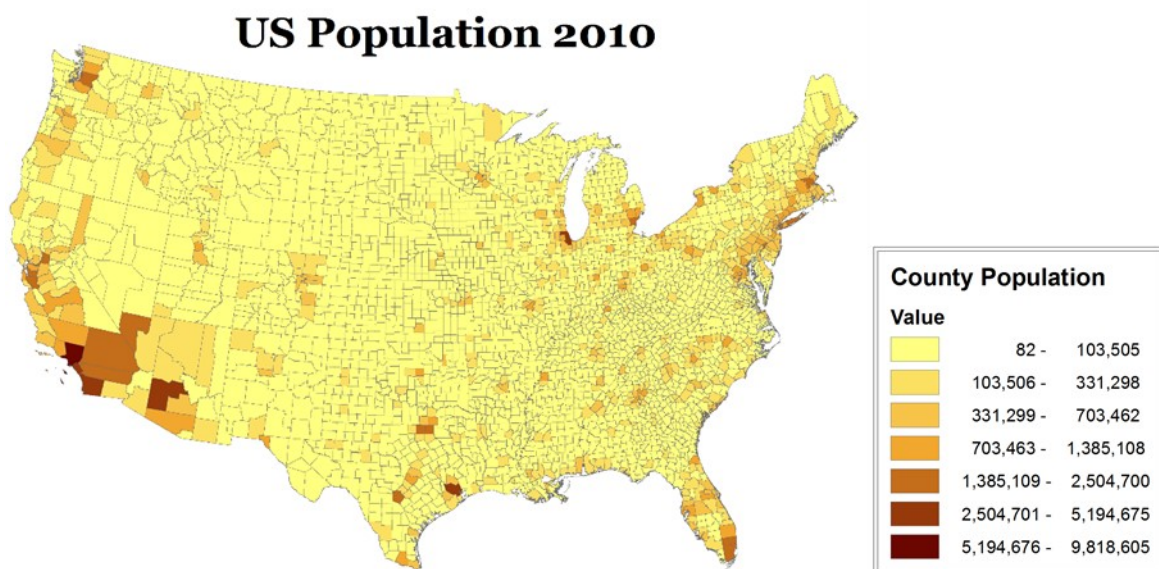
### Microdata

Microdata provide individual-level information describing characteristics such as age, sex, and occupation. Each microdata record includes the responses to all questions asked in a census or survey for a specific individual. Individual records are nested within households, with full information about the interrelationships of the members of each household. Each dataset is a sample of households from a particular census or survey.



### Area-level

Area-level data describe geographic units defined by boundaries. Geographic units are grouped in sets, such as the counties of the United States or the states of Brazil. In IPUMS Terra, these sets of units are referred to as geographic levels. The data are structured as tables, with a row for each unit and a column for each variable. For example, you may have a table with a row for each county in the United States and columns containing the number of males and the number of females in each county.



## Step 1 Sign up

IPUMS uses a common user management system covering all IPUMS products. If you have an existing account with any IPUMS product, you will use the same account for IPUMS Terra.

- Go to <https://data.terrapop.org/>
- If you have an existing IPUMS account, click **Login**. After logging in, you will be directed to the registration page for IPUMS Terra.
- If you do not have an IPUMS account, click on **Sign up** to register for access.



### What is IPUMS Terra?

IPUMS Terra integrates the world's population and environmental data including...

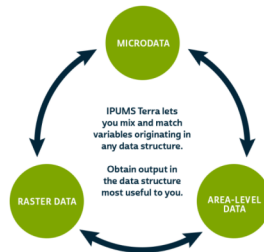
- Population censuses and surveys
- Land cover data classified from satellite imagery
- Temperature, precipitation, and related climate data
- Land use data derived from censuses and surveys in combination with remotely sensed data

#### Available Datasets

- Microdata Datasets
- Area-level Datasets
- Raster Datasets

#### Tutorials

- Microdata Output
- Area-level Output



<b>Microdata Output</b> characteristics of individual people with attached contextual variables derived from area-level and/or raster data <a href="#">Read more</a>	<a href="#">Start Extract</a>
<b>Area-level Output</b> characteristics of geographic units including aggregate population data and/or summaries from raster data <a href="#">Read more</a>	<a href="#">Continue Extract</a>
<b>Raster Data Output</b> data in spatial grids potentially derived from area-level data <a href="#">Read more</a>	<a href="#">Start Extract</a>

*Note: All registered IPUMS Terra users have access to U.S. microdata, since IPUMS Terra provides the public version of the microdata made available by the U.S. Census Bureau.*

*To access microdata for other countries, you must submit an application to IPUMS International. You can do so by clicking the box next to “Check here if you would like access to Microdata” on the IPUMS Terra registration form, and filling out the additional fields that appear.*

Check here if you would like access to Microdata

*Approval by IPUMS International may take one or two days. If you already have an IPUMS International account, your IPUMS Terra account will automatically be linked to it, and you will be able to access international microdata through IPUMS Terra. For more help see page 16.*

## Step 2

Email confirmation and log in

After you have registered with IPUMS Terra, an e-mail will be sent to your account notifying you of approval.

*Note: Please be sure to check your trash/spam folders*

- Open the e-mail and click on the confirmation link. You will then be logged into IPUMS Terra

## Step 3

Start a microdata extract

The extract builder website guides researchers through the workflows for building data extracts. Choose the type of data structure you would like to receive as output for further analysis. In this tutorial, we will be creating a microdata extract with attached area-level variables.

- **Click on the *Start Extract* button for Microdata Output**

**Microdata Output**  
characteristics of individual people with attached contextual variables derived from area-level and/or raster data  
[Read more](#)

**Start Extract**

**Area-level Output**  
characteristics of geographic units including aggregate population data and/or summaries from raster data  
[Read more](#)

**Start Extract**

**Raster Data Output**  
data in spatial grids potentially derived from area-level data  
[Read more](#)

**Start Extract**

## Step 4

Examine the IPUMS Terra interface

The IPUMS Terra interface for the first step of the workflow consists of the following elements:

**Navigation Bar:** Shows the major steps in the workflow, the sub-steps of the current step, and your progress through the workflow. The navigation bar steps will reflect the workflow you select. The step and sub-step you are currently on are highlighted in green.

**Data Cart:** Provides a summary of the data you have selected to include in your extract. The data cart is updated as you make selections throughout the workflow.

**Availability Grid:** Shows the availability of variables by dataset and enables selection of variables and datasets.

**Variables Panel:** Lists topics for which microdata variables are available. Clicking on a topic will populate the rows of the availability grid with the variables in that topic.

**Datasets Panel:** Lists countries in the IPUMS Terra system, and provides options to filter by time and hide countries without microdata. Clicking on a continent will list the countries in the continent. Clicking on a country will populate the columns of the availability grid with the datasets available for that country. You may add all countries in a continent to the grid by clicking the “Browse All” line.

The screenshot displays the IPUMS Terra interface. At the top, the IPUMS Terra logo is visible, along with navigation links for 'EXTRACT BUILDER | TERRASCOPE | TERRACLIP'. A 'Navigation Bar' is highlighted, showing four steps: '1 Select Microdata', '2 Attach Area-Level Data', '3 Attach Raster Data', and '4 Submit'. The 'Data Cart' is highlighted in the top right corner, showing a 'Microdata Extract' section with a 'Cancel' button and a list of selected items: '1 Select Microdata', '2 Attach Area-level Data', and '3 Attach Raster Data'. The main interface is divided into several panels. On the left, the 'Browse Variables' panel is highlighted, showing a list of variables under 'Household' and 'Person' categories. The 'Variables' panel is also highlighted. In the center, the 'Select Microdata' panel is highlighted, showing a 'Select Data' section with a 'What is this?' link, and a 'Datasets' section with a 'Browsing None' message. The 'Availability Grid' is highlighted, showing a grid of variables and datasets. On the right, the 'Browse Datasets' panel is highlighted, showing a list of countries under 'Continents' categories: Africa, Asia, Europe, North America, Oceania, and South America. The footer of the interface contains funding information: 'FUNDING PROVIDED BY: NATIONAL SCIENCE FOUNDATION © 2002 - 2017 REGENTS OF THE UNIVERSITY OF MINNESOTA ALL RIGHTS RESERVED Source Code Finger Print: 3b7f3b4 | Build 74-2009-g3b7f3b4'.

## Step 5

Browse datasets for the United States

IPUMS TERRA EXTRACT BUILDER | TERRASCOPE | TERRACLIP

IPUMS.ORG | HOME | LOGOUT | ACCOUNT | ADMIN | ABOUT | CONTACT US | USER FORUM | PROVIDE FEEDBACK

Change Output Type 1 Select Microdata 2 Attach Area-Level Data 3 Attach Raster Data 4 Submit NEXT

**Browse Variables**

Household 5 Person 3

Technical Household 5

Group Quarters

Geography: Global

Geography: A-E

Geography: F-N

Geography: O-Z

Geography: IPUMS-L, IPUMS-DHS

**Select Microdata**

Select Data [What is this?](#)

Show only selected variables ⓘ

Show only selected datasets ⓘ

Display unavailable variables ⓘ

Variables

Browsing None

Datasets

Browsing None

**Browse Datasets**

Countries

Browsing Options ▶

Africa

Asia

Europe

North America

Oceania

South America

- Click on *North America* in the Browse Datasets panel.

The listing 'United States (8)' indicates that 8 years of data are available for the US.

**Browse Datasets**

Countries

Browsing Options ▶

United States (8)

- Click on *United States*.

## Step 6

Select datasets

The available datasets for United States appear as columns in the availability grid.

- Check the boxes to select years: 2000, 2010.

### Select Microdata

Select Data [What is this?](#)

Show only selected variables ⓘ

Show only selected datasets ⓘ

#### Variables

Display unavailable variables ⓘ

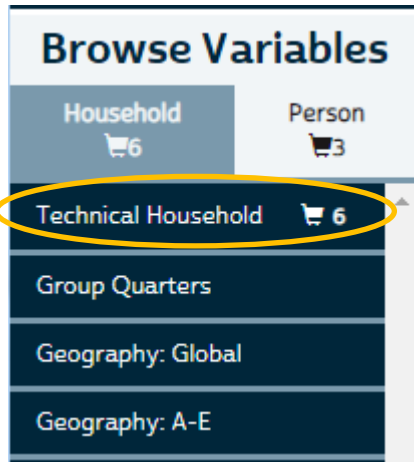
Browsing None

#### Datasets

United States							
1960	1970	1980	1990	2000	2005	2010	2015
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

## Step 7

Select microdata variables



To see available variables, choose a topic in the Browse Variables panel. Topics are organized into two categories, Household and Person, accessible via the tabs in the Browse Variables panel.

- Under the Household tab, choose the variable topic **Technical Household**.

The availability grid will be updated with

Six of the technical household variables are preselected, as indicated by the cart icon on the topic name and check marks in the availability grid. These variables are usually important for analysis and are preselected for convenience. These variables can be removed if you deem they are unnecessary.

## Step 8

Select household variables

- Remove the variable **FORMTYPE** since it is not available for our selected datasets.

### Select Microdata

Select Data [What is this?](#)

Show only selected variables ⓘ

Show only selected datasets ⓘ

#### Technical Household Variables

Display unavailable variables ⓘ

		Datasets							
		United States							
		1960	1970	1980	1990	2000	2005	2010	2015
<input type="checkbox"/>	RECTYPE	Record type	•	•	•	•	•	•	•
<input checked="" type="checkbox"/>	COUNTRY <i>Preselected</i>	Country	•	•	•	•	✓	•	•
<input checked="" type="checkbox"/>	YEAR <i>Preselected</i>	Year	•	•	•	•	✓	•	•
<input checked="" type="checkbox"/>	SAMPLE <i>Preselected</i>	IPUMS sample identifier	•	•	•	•	✓	•	•
<input checked="" type="checkbox"/>	SERIAL <i>Preselected</i>	Household serial number	•	•	•	•	✓	•	•
<input type="checkbox"/>	PERSONS	Number of person records in the household	•	•	•	•	•	•	•
<input checked="" type="checkbox"/>	HHWT <i>Preselected</i>	Household weight	•	•	•	•	✓	•	•
<input type="checkbox"/>	SUBSAMP	Subsample number	•	•	•	•	•	•	•
<input type="checkbox"/>	HHDONATE	Donated household							
<input checked="" type="checkbox"/>	FORMTYPE <i>Preselected</i>	Questionnaire type received by household							
<input type="checkbox"/>	STRATA	Strata identifier				•			

The green dots for unselected variables indicate they are available in the indicated samples.

- Choose the additional variable **PERSONS**

PERSONS will be added to your Data Cart.



## Step 9

Select household variables

- Select the Household topic **Geography Global**

You can simplify the availability grid to show only the variables available in the datasets you are browsing.

- Uncheck "**Display unavailable variables**"
- Select **GEOLEV2**

### Select Microdata

Select Data [What is this?](#)

Show only selected variables ⓘ

Show only selected datasets ⓘ

#### Geography, Global Variables

Display unavailable variables ⓘ

		United States							
		1960	1970	1980	1990	2000	2005	2010	2015
<input type="checkbox"/> URBAN	Urban-rural status	●			●				
<input type="checkbox"/> REGIONW	Continent and region of country	●	●	●	●	●	●	●	
<input type="checkbox"/> GEOLEV1	1st subnational geographic level, world [consistent boundaries over time]	●	●	●	●	●	●	●	●
<input checked="" type="checkbox"/> GEOLEV2	2nd subnational geographic level, world [consistent boundaries over time]					✓	●	✓	●

## Step 10

Select person variables

**Browse Variables**

Household 6

Person 3

**Technical Person** 3

Constructed Family Interrelationship

Demographic

Fertility and Mortality

- Under the Person tab, select the variable topic **Technical Person**.

Three variables in this category are preselected.

- Unselect the variable **RESIDENT** as the data is unavailable (no green dots) for selected datasets. (You may need to check "Display unavailable variables")

Continue adding variables to your extract by selecting the following Person variables:

- Education → **EDUCUS**
- Education → **SCHOOL**
- Work → **EMPSTAT**

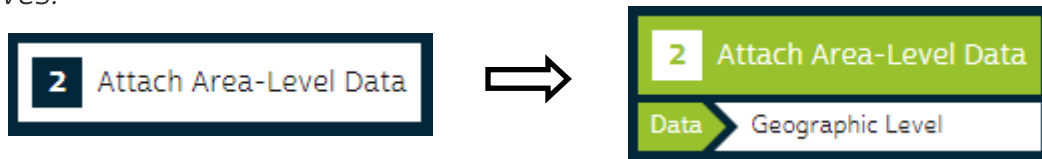
**Step 11**  
Attach  
area-level  
data

When you have selected both datasets and variables, the NEXT button will become active and turn green, allowing you to move on to the next step.  
The navigation bar indicates that the next step will be to Attach Area-Level Data.



- Click **NEXT** to move to the Area-Level data screen.

*Note: Attaching area-level data will add contextual variables to your microdata records. The contextual variables contain information about the geographic unit in which the individual lives.*



**Step 12**  
Select  
area-level  
variables

The datasets for which you selected microdata are pre-selected for area-level data.

- In the Browse Variables panel, click on **Education**. The availability grid will be updated with available education variables.

*Note: Area-level variables are organized in variable groups, which are similar to the columns in aggregate data tables. To see the individual variables within a group and access their metadata, use the arrow to expand the group.*

- Choose the variable group **EDATTAIN**, by checking the multi-select box. EDATTAIN is available for both selected datasets.

*Note: All four variables within the EDATTAIN group will be added to your Data Cart.*

The screenshot shows two panels. On the left is the 'Browse Variables' panel with a list of topics: Birthplace and Nativity, Demographic, Education (highlighted with a yellow oval), Employment, and Household Amenities. On the right is the 'Attach Area-level Data' panel. It has a 'Select Data' section with a 'What is this?' link and two toggle switches: 'Show only selected variables' (off) and 'Show only selected datasets' (on). Below is a table of 'Education Variables' with columns for '2000' and '2010' under the 'United States' dataset. The 'EDATTAIN (4 of 4)' group is selected with a checkmark and a yellow oval. Its four sub-variables are also checked: EDUCLESSPRIM, EDUCPRIMARY, EDUCSECOND, and EDUCTERTIARY. The EDYEARS (1) variable is not checked.

		United States		
		2000	2010	
<b>Education Variables</b>				
<input type="checkbox"/>	SCHOOLAGE (3)	School attendance by age	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	LITAGE (2)	Literacy by age	<input type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	EDATTAIN (4 of 4)	Educational attainment	<input type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	EDUCLESSPRIM	Percent of persons age 25+ with less than primary education	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	EDUCPRIMARY	Percent of persons age 25+ who completed primary education	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	EDUCSECOND	Percent of persons age 25+ who completed secondary education	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	EDUCTERTIARY	Percent of persons age 25+ who completed tertiary education	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<input type="checkbox"/>	EDYEARS (1)	Years of schooling	<input type="checkbox"/>	<input type="checkbox"/>

Select the following variables from the topic *Employment*

- **UNEMP**
- **PROF**

**Browse Variables**

Topics

- Birthplace and Nativity
- Demographic
- Education 🛒 4
- Employment 🛒 2**
- Household Amenities
- Household: Dwelling Characteristics
- Household Economic
- Household Utilities
- Urban

**Attach Area-level Data**

Select Data [What is this?](#)

Show only selected variables ⓘ

Show only selected datasets ⓘ

**Employment Variables**

			2000	2010
<input type="checkbox"/>	LABFORCE (3)	Labor force by sex	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	LFRATE (3)	Labor force participation rate by sex	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	CHILDEMP (1)	Employment rate of children	<input type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	UNEMP (1 of 1)	Unemployment rate	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	PROF (1 of 1)	Workers in professional occupations	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<input type="checkbox"/>	AGRIC (1)	Workers in agriculture	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	MANUF (1)	Workers in manufacturing	<input type="checkbox"/>	<input type="checkbox"/>

**Datasets**

[United States](#)

	2000	2010
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

- Click **NEXT** to move to geographic selection

### Step 13

Select a harmonized geographic level

Our research question involves examining how education and employment have changed between 2000 and 2010. In order to study change over time, it is important to use geographic units with boundaries that are consistent over the time frame under study. In IPUMS Terra, such units are referred to as harmonized. If harmonized units are not used, apparent changes may be due to changing boundaries rather than actual changes in population characteristics.

Time Frame ⓘ

Harmonized (Consistent)

Year-specific

Administrative Level ⓘ

Lowest Level Available

1<sup>st</sup> Administrative Level

National

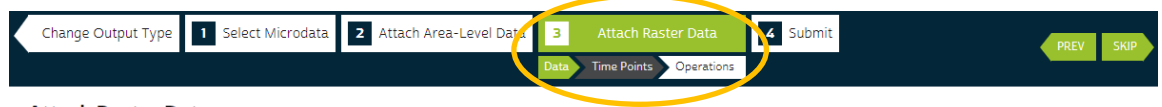
Show number of units ⓘ

Country	Selected Microdata	Attached Area-level Data	Harmonized (Consistent)	Lowest Level Available
United States	2000	2000	2000 - 2015	<a href="#">Consistent PUMAs</a>
		2010		
	2010	2000		
		2010		

- Leave **Harmonized (consistent)** selected
- Click **NEXT**

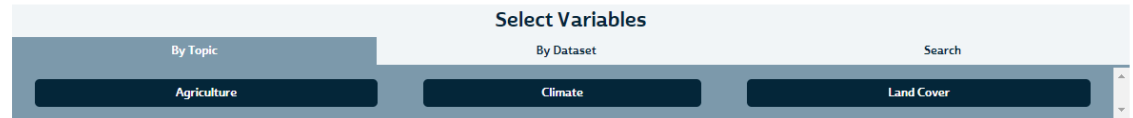
**Step 14**  
Skip  
attaching  
raster data

You have the option of selecting raster data to create additional contextual variables. The raster grid cells in each geographic unit are summarized to produce a value for the geographic unit, which is then attached to microdata records for the individuals in the unit.



**Attach Raster Data**

Select Data [What is this?](#)



This exercise does not involve raster data so we can just skip this step.

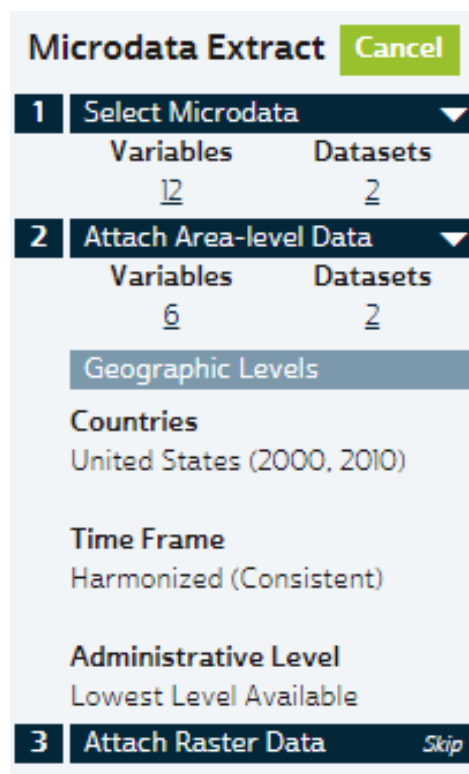
- Click **SKIP** to go to the Submit step



**Step 15**  
Check data  
Cart

Before submitting your extract request, you should check your data cart. Two sections of the cart should be populated.

- **Microdata should have 12 variables, 2 datasets**
- **Area-level type should have 6 variables, 2 datasets.**



You can click the number of variables or datasets for each data type to see detailed lists of your selections.

**Microdata Extract** Cancel

**1 Select Microdata** ▾

Variables	Datasets
<u>12</u>	<u>2</u>

**2 Attach Area-level Data** ▾

Variables	Datasets
<u>6</u>	<u>2</u>

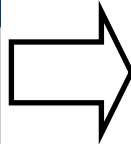
**Geographic Levels**

**Countries**  
United States (2000, 2010)

**Time Frame**  
Harmonized (Consistent)

**Administrative Level**  
Lowest Level Available

**3 Attach Raster Data** Skip



**Microdata**

Variables	
COUNTRY	Country
YEAR	Year
SAMPLE	IPUMS sample identifier
SERIAL	Household serial number
PERSONS	Number of person records in the household
HHWT	Household weight
GEOLEV2	2nd subnational geographic level, world [consistent boundaries over time]
PERNUM	Person number
PERWT	Person weight
SCHOOL	School attendance
EDUCUS	Educational attainment, United States
EMPSTAT	Activity status (employment status)
Datasets	
United States	2000
United States	2010

**Microdata Extract** Cancel

**1 Select Microdata** ▾

Variables	Datasets
<u>12</u>	<u>2</u>

**2 Attach Area-level Data** ▾

Variables	Datasets
<u>6</u>	<u>2</u>

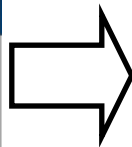
**Geographic Levels**

**Countries**  
United States (2000, 2010)

**Time Frame**  
Harmonized (Consistent)

**Administrative Level**  
Lowest Level Available

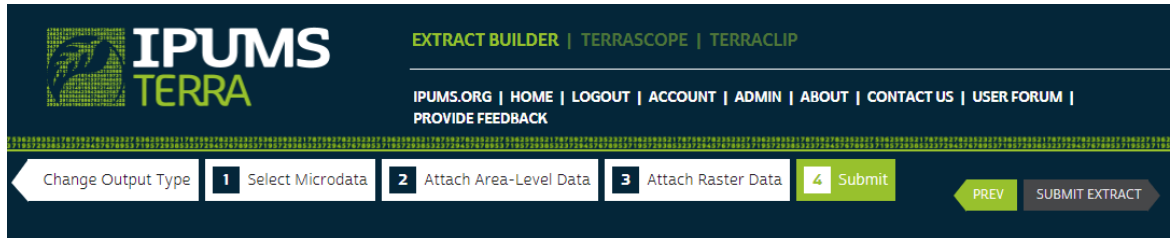
**3 Attach Raster Data** Skip



**Area-level Data**

Variables	
EDUCLESSPRIM	Percent of persons age 25+ with less than primary education
EDUCPRIMARY	Percent of persons age 25+ who completed primary education
EDUCSECOND	Percent of persons age 25+ who completed secondary education
EDUCTERTIARY	Percent of persons age 25+ who completed tertiary education
OCCPROF	Percent of workers in professional or technical occupations
UNEMPLOY	Unemployment rate
Datasets	
United States	2000
United States	2010

**Step 16**  
Submit  
your extract



**Submit Extract**

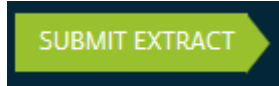
**Extract Details**

Extract Title

Extract Notes (Optional)

Include boundary files ⓘ

- Give your extract a short, descriptive Extract Title, maybe, “U.S. education and employment microdata.” The Extract Title will appear in your Extract History.
- If you want the GIS shapefiles for the geographic levels used in your extract, check the box to *Include boundary files*. (Not required for this exercise.)
- Click *Submit Extract*



You will receive an email when the extract is ready.

**Step 17**  
Download  
your extract

ipums@umn.edu

to me ▾

Your IPUMS Terra extract 'U.S. education and employment microdata' is ready.

To retrieve your data, codebook, and command files, for Extract #3518, go to the link below.

[https://data.terrapop.org/user/extract\\_requests](https://data.terrapop.org/user/extract_requests)

Thank you for your support.

Sincerely,  
The IPUMS Terra Team

- To download the data, follow the link in the e-mail, which will take you to your account's "Extract History" page as shown below.

This page can also be accessed by clicking *ACCOUNT* in the page header

The data will be delivered in a compressed format, make sure you have software available to extract the files.

The header features the IPUMS TERRA logo on the left. To the right, there are navigation links: EXTRACT BUILDER | TERRASCOPE | TERRACLIP. Below these, a secondary row of links includes IPUMS.ORG | HOME | LOGOUT | ACCOUNT (circled in yellow) | ADMIN | ABOUT | CONTACT US | USER FORUM | PROVIDE FEEDBACK. At the bottom of the header, there are two buttons: 'Extract History' (highlighted in green) and 'Account'.

### Extract History

Extract Request Number	Date Submitted	Title (click to edit)	Status	Resubmit	Download
3515	26 Oct 15:27	<a href="#">Task 14650 - A as A; US 2005, 2010, India 2004, 2009; HSLAD</a>	completed	resubmit	download (27.1 MB)
3516	26 Oct 15:35	<a href="#">MwA; US 2005 micro + 2000 area; HSLAD</a>	completed	resubmit	download (25.59 MB)
3517	26 Oct 15:51	<a href="#">AR as A; US 2005, 2010; SLAD</a>	completed	resubmit	download (41.04 MB)
3518	26 Oct 18:14	<a href="#">U.S. education and employment microdata</a>	completed	resubmit	download (170.44 MB)

# Optional IPUMS International Registration

IPUMS Terra users are able to access U.S. microdata without registering with IPUMS International. However, if you have international research interests the IPUMS International microdata collection will be of interest.

## USAGE LICENSES

### IPUMS TERRA USAGE LICENSE (AREA, RASTER AND BOUNDARY DATA)

By completing this registration, you agree to the following terms of use.

**Redistribution: You will not redistribute the data without permission.** (Required)

For IPUMS Terra area, raster and boundary data, you may publish a subset of the data to meet journal requirements for accessing data related to a particular publication. Contact us for permission for any other redistribution of this data.

**Citation: Cite the IPUMS Terra data appropriately** (Required)

For information on proper citation refer to [citation and use](#). Publications and research reports making use of IPUMS Terra should be added to our [Bibliography](#).

### IPUMS INTERNATIONAL USAGE LICENSE (MICRODATA)

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