

HOW TO INTERPRET NEW DEMOGRAPHIC INFORMATION IN
THE PRELIMINARY 2002 CENSUS OF AGRICULTURE RELEASE

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One major approach the National Agricultural Statistics Service (NASS) adopted to make the 2002 Census of Agriculture more relevant for all data users was to provide more complete information for the data items that have traditionally been included in the census of agriculture. Thus, the preliminary releases of demographic information on February 3, 2004, and the final summaries to come, present an interpretation of all farm operations in the Country—not just operations on the census mail list.

The goals for this paper are to clarify the basic underlying definitions used for the census of agriculture, provide a working understanding of the new summary procedure used, and review some historical relationships in light of the 2002 procedure. More detailed information will be provided in narrative explanations accompanying the data releases and the updated census history publication that will be issued later.

Since there are many aspects to the issues to be covered, the paper has been written in a rhetorical question and response format. Hopefully, this will help the reader to more easily locate topics of interest.

Why Have a Census of Agriculture?

It might be best to start with a review of the purposes of a United States census of agriculture. The census, currently conducted every five years, is the only attempt to collect uniform information on all U.S. farming operations and those individuals involved in production agriculture. One advantage of such a census is to measure changes in production areas and farming practices. The census also measures trends in the numbers and sizes of operations and characteristics of those individuals involved in farming.

The census is not designed to present detailed analyses of production practices or any other aspect of agriculture. For example, the 2002 Census of Agriculture report form added new questions on production contracts and organic production. Exhaustive data on those topics were not collected but it will now be possible to examine what types of commodities are being produced through production contracts and what types of farms are using organic production methods.

The census of agriculture will never answer all inquiries about agriculture and the people in agriculture. For example, NASS was contacted by a major city newspaper just before

the release of the 1997 Census of Agriculture. The paper was writing a feature article about two bachelor brothers who had always lived in the same house and farmed together their entire lives. The newspaper wanted to know the number of male farmers in the country who had never been married. The article writer was disappointed, but not surprised, that such data did not exist. However, they were amazed to find that the census procedures defined each farming operation to have one primary operator and thus only one of the two brothers was included as a “farmer” in the census.

It is perhaps surprising that the USDA has not estimated the number of U.S. farmers, but to do so requires additional questions and detailed data review. Not having an estimate of total farmers often has led to the misstatement that there were only 2 million “farmers” in the country. In reality, it has always been known that the number of individuals actively involved in making farm operation decisions was much larger than the count of 2 million farms. NASS decided to collect information about all farm operators in the 2002 Census of Agriculture. We still will not know how many bachelor farmers there may be but will include both of the brothers in the newspaper story as farmers.

Another major demographic relationship not covered by past censuses is that many farming operations involve multiple households. Particularly in the case of “family farms,” there are often individuals from different generations or multiple siblings actively participating in the decision-making operations and receiving income from the same farm. Providing a measure of the number of households involved in farm operations should give a better picture of U.S. agriculture in the early 21st Century.

What is a Farm?

In order to interpret the information presented in census of agriculture publications, it is necessary to consider the ramifications of the present definition of a farm. That definition is any place that sold at least \$1,000 of agricultural products or had the potential of producing and selling \$1,000 of products. This provision for including potential sales is very important to avoid excluding operations that chose to not sell any products in the reference year for tax or other purposes. It also includes new operations, such as grape vineyards or Christmas tree farms, that have been established but from which no income will be realized for quite some time.

Since it is not possible, in a mail out-mail back data collection operation, to fully interpret the economic intentions of an operation, the definition might be thought of as including as farms operations which had the potential of \$1,000 in total value of product (TVP) in addition to those with \$1,000 or more in sales. A family that moves to a rural location with a sizable acreage may plant fruit trees or establish a large area of cane berries without intending to “farm” but might raise the equivalent of \$1,000 in products and may at some time sell produce through a roadside market or allow others to pick their produce. Another common example would be someone buying a considerable acreage that includes some pasture and deciding to buy a couple cattle to graze the pasture. The value of the cattle would exceed \$1,000 and would qualify the operation as a farm, even if the owner intends to have the cattle custom slaughtered for personal home consumption.

Has the Definition of a Farm Changed?

Between the first censuses of agriculture in the mid 1800's, that used a minimum of \$100 of total value of agricultural products sold, and 1978 there were 7 somewhat variable farm definitions used for the census of agriculture. Many definitions used some combination of acreage and TVP. For example, the definition used for the 1959 to 1974 censuses of agriculture defined operations of 10 acres or more and \$50 of TVP as farms, as well as places under 10 acres with at least \$250 in sales. The approach in 1900 was interesting since it did not have either acreage or minimum TVP requirements.

The number of farms (under the definition in place at the time) peaked during the Great Depression of the 1930's. The definition was a minimum of 3 acres and \$250 or more of TVP. It can be visualized that many families without other means of support did produce agricultural products for sale or to barter for other goods. The practice of sharecropping was also still common at that time. Land assigned to each sharecropper, or other tenants, was treated as a separate farm. Land retained by the landlord and worked by them or by hired laborers was considered as a separate farm.

The present \$1,000 definition for a farm has been in place since 1978 (6 censuses). There have been significant changes in the United States during that period. Population has increased more than 30 percent from July 1978 to July 2003—from 222,585,000 to 290,810,000 (source: U.S. Bureau of the Census). Much of the increase has come from immigration. Many immigrants had an agrarian background and were used to different agricultural products than traditionally grown in the U.S. This has led to a substantial increase in small, efficient operations meeting the new demand.

Even though the definition of a farm has not changed since 1978, outside factors have influenced how many operations are considered as farms. New farm legislation created the Conservation Reserve Program (CRP), that was intended to take highly erodible land out of production by establishing a bidding process for long term (10 years or more) contracts to remove areas of land from cultivation while requiring specific land maintenance. In many cases, a portion of an operating farm was bid into the CRP but some landowners leased out land still in cultivation to others while retaining the CRP land as being operated by themselves. NASS considers these "CRP only operations" as farms since the land was originally in production and the operators are receiving specific government farm program payments for the length of the contracted arrangement. (There is also a similar Wetlands Reserve Program that is treated the same way.)

The North American Industry Classification System (NAICS) adopted by Canada, Mexico, and the U.S. in 1997 changed some definitions of what is considered agriculture. For example, an operation engaged only in the growing of Christmas trees is now defined as agricultural instead of forestry. Growing other short rotation woody crops is also considered as agricultural under NAICS, as is maple sap gathering.

There has also been a broad expansion of aquaculture enterprises of many different types since 1978. All operations engaged in the farm raising of finfish, shellfish, or any other kind of animal aquaculture are defined as agriculture. This often means the creation of farm ponds with aeration and feeding mechanisms in place but also extends to the propagation of tropical fish for sale.

How has Census of Agriculture data collection changed?

The censuses of agriculture, which started in 1840, were originally conducted every 10 years in conjunction with the censuses of population. This approach worked well since the population censuses were collected by personal interviews and a large portion of the United States was rural. Some 70 percent of the population in 1840 reported that they were engaged in agriculture and over 60 percent of the total population in 1900 was still located in rural areas.

When mid decade censuses of agriculture started in 1925, the approach was still personal interviews starting with the list of farms from the previous census of agriculture. If operations had changed since the previous collection, an effort was made to determine the new operators and collect current information from them.

The personal interview approach had potential for errors of omission but less possibility of duplication. Duplication could exist for individuals farming in more than one county, if they were interviewed twice and reported total information each time instead of separate totals by county.

Personal interviews are costly and the Bureau of the Census introduced a modified procedure for the 1950 Census of Agriculture. A new report form, organized as if the questions were being asked by an interviewer, was dropped off at rural residences with a request to fill out the information and hold the forms until an interviewer stopped to collect and review the forms. The 1950 Census of Agriculture was also the first collection decoupled from the census of population. This “mail out-collect later” approach was used through the 1964 Census of Agriculture.

From 1969 on, the census of agriculture has been conducted as a “mail out-mail back” type of collection. This approach saved considerable funds by avoiding the hiring of enumerators. It was hoped that respondents would take more time to refer to records in filling out forms and would review their responses carefully before returning the form by mail. To ensure maximum response, multiple follow-up mailings were used and telephone calls placed to large operations that had not responded. Telephone calls were also used to increase response in counties with the lowest rates of response.

The biggest problem with the census of agriculture collection process since 1969 is the creation of an adequate mail list. There is no registry of all farms and many operations that qualify as a farm do not appear on any list of agricultural producers or farm program participants. There are also complications with lists that are available for compiling the census mail list. Many landowners, who are not active farm operators, do qualify for

farm program payments and will be found on such lists. Often, the administrative data are coded to clarify that they are not operators but many do receive forms and some might misinterpret the instructions and provide information as if they were operating. This potential for duplicate reports is relatively small compared to the incompleteness in the mail list but the operations that might be duplicated will often be larger than those not on the list and have different characteristics.

The major statistical approach for estimating the incompleteness in the census of agriculture mail list is to match that list against operations found in an independent area frame survey. The National Agricultural Statistics Service (NASS) has had an operational area frame survey since the early 1960's as a main underpinning of the U.S. current agricultural statistic system. Information from the NASS area frame collection has been used to evaluate most agricultural censuses since 1987, usually with some additions to the NASS area frame sample size in the census reference year to provide improved incompleteness measures.

The Bureau of the Census invested in an enlarged area frame collection effort for the 1978 Census of Agriculture. The coverage was extensive enough that the Bureau released coverage adjusted totals for individual States in the 1978 publications. County data were left unadjusted and an extra "county" was added to each State in order to show the additional information needed to add to the adjusted State totals. The 1978 Census of Agriculture serves as an important reference point for examining later agricultural censuses and should be helpful in evaluating the 2002 Census of Agriculture adjusted results at the National and State level.

The Bureau could not allocate any funding to an area frame approach in the 1982 Census of Agriculture. This led to enough uncertainty in how to interpret apparent changes from 1978 that a greater priority has been placed on funding the independent area sample approach in all subsequent agricultural censuses.

When did the Census of Agriculture shift to NASS?

All censuses of agriculture through the 1992 Census of Agriculture were conducted by the Bureau of the Census or its predecessor organizations. Plans for the 1997 Census of Agriculture collection were well underway when actions were taken by the Office of Management and Budget, in concert with Congress, to shift responsibility to NASS. One main reason for the shift was improving government efficiency by having one statistical organization responsible for both current survey and census data collections and not having to create a new mail list for the census of agriculture every 5 years.

NASS had always worked closely with the Bureau of the Census on questions to be asked for each census, farm definition interpretations, mail list development, and review of preliminary State level results before publication. NASS and the Bureau were specifically working to resolve any differences in farm definitions before the 1997 collection because of the new North American Industry Classification System.

When NASS received the responsibility for the 1997 collection, its goal was to make the 1997 information as “comparable” as possible with previous censuses. It wanted to avoid any impression that the 1997 results had been altered by the responsibility shift. NASS used the reporting forms that had been prepared by the Bureau and processing systems in place, including contracting to the Bureau for mailing, receipt, and data entry of all returned census forms. NASS utilized the advantage of its Field Offices across the country to devote more individuals to the data edit, review, and analysis steps. NASS also implemented a very successful free telephone service to handle and resolve questions from respondents. NASS did depart from the previous practice of releasing State publications on a flow basis and electronically released all U.S., State, and county results in early February 1999, more than 6 months earlier than the original schedule.

What were the new NASS approaches for 2002?

NASS implemented a number of changes and improvements in the handling and processing of the 2002 Census of Agriculture. To avoid past bottlenecks of locating questionnaires for editing specific reports and needing all editors for a State on site, NASS had all returned forms scanned and the images electronically captured. The report image could be easily accessed for editing and individuals in other locations could assist in the editing of a specific State. NASS also chose to have the original data captured through optical character recognition (OCR) processing. In order to use OCR, the report form was converted to a new format with considerable white space and exacting dimensions. Some creative forms design efforts were needed in order to allow for reporting of demographic information for multiple operators.

It had been difficult to find individuals who could make changes or corrections to the old Bureau of the Census computer code during the 1997 Census of Agriculture processing. Since NASS changed a number of questions for 2002, the editing system was rewritten. The system still performs a complete edit of each returned form but was broken into modules so a number of statisticians could assist in preparation and testing.

Capturing the images of each record meant that many Headquarters staff members could be trained to assist with the edit and review steps. A specific Headquarters work area was established in order to provide the best work environment and proper sized monitors for examining report images on screen.

The most apparent new 2002 approach was deciding to create coverage adjusted totals at the U.S., State, and county level. Area frame data were used to identify operators not on the census mail list and to form estimates for how many farm operations were missed and the characteristics of those operations. (It should be pointed out that no area frame surveys are conducted for Alaska and Hawaii so those States do not receive any coverage adjustments.) Once the data from the census respondents had gone through a detailed edit and preliminary analysis, those data were adjusted both for mail list non-response and for mail list incompleteness. The technique used is referred to as calibration. State level estimates (including operations not on the mail list) are formed for key variables such as total numbers of farms and land in farms using information from the area frame

survey for the characteristics of operations missed by the census mail list. The statistical routine that is then run accounts for the types of missed operations by “re-weighting” the records received. The process identifies existing records that best meets the combined characteristics of the operations not on the list.

How did the new 2002 approaches work?

NASS contracted with the Bureau of the Census National Processing Center for the OCR and imaging operations as well as mailing and receiving the forms. The Center was able to meet or exceed throughput estimates and allowed NASS to get an early start reviewing the data. The NASS toll free telephone service for respondent questions worked very efficiently and nearly all calls could be answered immediately, except for the highest volume days following the initial mail out and the second request mailing.

Some data problems occurred due to the OCR process. For instance, some respondents tried to “help,” when a particular section or page did not apply to them, by drawing a line through all answer cells. If that was not detected and corrected during the image review step, each answer cell on the page(s) would likely be recorded as 1 and created errors that had to be corrected in the later edit stages.

The edit process was designed to be interactive but the edit files were so large that editors could not process corrections as quickly as hoped. Similarly, since the original input file was to be kept along with the current edit file, handling of multiple large files sometimes stressed the processing system. NASS contracted for assistance from processing experts in order to improve the file handling efficiency.

The calibration process was successful in creating State level totals as shown by the preliminary release. Since the area frame sample sizes were relatively small it was necessary to review the National and regional not on the mail list indications as well as those at the State level. A “smoothing” routine was then used to avoid having atypical results for list incompleteness in small States. It was also found that target values were needed for the calibration variables. A preliminary data summary was created of the edited data, adjusted for non response, and the smoothed not on the mail list data. Once that summary was reviewed, a “hard” target was set for the numbers of farms in each State and a “soft” target (allowing a certain percentage variation) was set for land in farms and other calibration variables.

While the new approaches were mostly successful, forms design limitations on collecting demographic information for multiple operators may cause some confusion. Without adding additional pages to the report form, it was only feasible to allow space for providing detailed demographic data (gender, age, ethnicity, race, etc.) for the principal operator and two other operators. The introductory questions to that section of the form did ask for the total number of individuals who were involved in the day-to-day decisions and qualified as operators and how many of those were women. The 2,129,226 farms each had one principal operator and identified a total of 3,119,573 operators, shown as

Total operators in the Preliminary Release. There are demographic data available for 3,055,114 operators (shown as “All operators” in the Preliminary Release tables).

How preliminary are the preliminary data?

NASS staff members were continuing to review and edit detailed records when the preliminary data summaries were created. That review mainly involved data items not included in the preliminary summaries and edit actions should not affect the results which have been released. However, if the additional review determines that duplication has occurred or uncovers a reporting error in some of the demographic variables on a record, those corrections will be made during final processing. At the State level, only small changes in the total numbers of farms or the size group and economic sales class data should be expected.

There might be a few cases in which the preliminary totals could rise slightly in a State. If an error was determined in one of the demographic variables after the preliminary calibration was run, a record or records could be corrected and a State re-summary would make the desired change. However, if the record had received an improper weight during the calibration process it normally was not possible to assign the proper weight to the corrected record and that record might have been removed from the preliminary publication. The result would be a lower total in the preliminary summary, similar to a missing data situation. An example would be if it was determined that a Native Hawaiian or Pacific Islander record was valid but that record received a weight of 3 during calibration. If it was felt that there should be only one such record in the State, that record might have been held in abeyance during the re-summary but should be included in the final summary with the proper weight. Those situations were rare but explain how some counts might rise slightly in the final data summary.

Are the published results perfect?

The preliminary data and the data to be released in final census publications are the result of a consistent statistical process. As such, those data will present a more complete and representative picture of the agriculture and the farming operations in each State and county than has been possible in past census publications based only on mail list operations. Since it is primarily smaller operations that are missed on the census mail list, the new summaries will be extremely valuable for portraying the characteristics and impacts of those operations at the State level.

The census summaries should be extremely close to official numbers of farms and land in farm estimates at the State level that will be issued soon. Many of the key commodity totals should also be very close to official estimates at the State level. However, there will be some exceptions depending in part which variables were included in the calibration process. For example, NASS has extremely tight administrative data on the acreage of cotton in the United States from the farm program as well as special Boll Weevil and Pink Bollworm eradication efforts. All cotton produced is ginned and the ginnings totals are used for the official estimates of cotton production. Nearly all cotton

producers were on the census mail list and NASS State offices accounted for those operations. Thus, the cotton totals would have been essentially complete if only the mail list was summarized. If cotton was not used as a calibration variable in a State and any cotton producing operations received extra weight during the calibration process, the new total for cotton would now exceed the known amount in the State. The official cotton estimate will not change in that State but knowledge of the calibration approach will explain where the “extra cotton” came from.

It is hoped that the distribution of farms by size and farm income size classes will be reasonable for most counties and provide an improved indication of the importance of farm operations at the county level. However, the rarer the characteristic included in the summary tables, the more chance there will be for statistical variation in the final results at the county level. For example, if 30 Black farm operators are on the census mail list for a State and the not on the mail list information indicates that the correct total should be 40, some existing Black operator records will receive additional weight to create a total of 40. If some missing operators are truly in counties for which there are no reporting Black operators there is no way to show Black operators in those counties.

What do the new data show about farm numbers over time?

The preliminary data release presents comparable 1997 and 2002 demographic data at the U.S and State levels, along with the earlier published, unadjusted 1997 data. Those data indicate a drop of 86,650 total farms (3.9 percent) from 1997 at the U.S. level. All but 8 States had fewer total farms in 2002 than 1997. The number of farms decreased by more than 8,000 in California and more that 6,000 in Illinois, Indiana, and Iowa. The fact that Texas, with 10.7 percent of the total farms in the country, increased slightly helped to minimize the percentage loss in total U.S. farms. The other States that held steady or increased the number of farms were Alaska, Colorado, Minnesota, Mississippi, Montana, Oregon, and Wyoming.

Table 1 of this report constructs a set of census adjusted figures at the U.S. level back to the 1978 Census of Agriculture. Many assumptions had to be made to create this data table. The 1978 data were adjusted to the State level based on the special area frame work and reported in publications from that Census. Most other censuses had a data table in the appendices which estimated how many farms were not on the mail list and that information was used for Table 1. However, there was no area frame component in the 1982 so the Table 1 figure was calculated by averaging the adjustment factors from 1978 and 1987. No attempt was made to further adjust the Table 1 totals for other known changes such as the census not including CRP only or Christmas tree farms before 1997.

The Census “Adjusted” figures show a drop of 349,416 farms from 1978 to 2002. The biggest declines were between 1982 to 1987 and 1987 to 1992. The adjusted number for 1997 was 35,221 higher than 1992 (due in part to including some types of farms excluded in earlier censuses). Note that the official NASS Farm Numbers series has always tracked the Census Adjusted levels fairly closely. This is because NASS did consider the adjustment factors in setting its official Farm Numbers. NASS official numbers have not

tracked the Census Adjusted perfectly since NASS did consider the effects of any differences between the Bureau of the Census farm definition and the interpretation that NASS was using at the time. Another source of difference is that NASS official numbers are rounded at the State level. (The Table 1 Official NASS Estimate shown for 2002 is the current estimate, before the 2002 Census preliminary data were available. The next Official *Farms and Land in Farms* report will be issued on February 27, 2004.)

What do the new data show about economic classes of farms over time?

The same adjustment approach in Table 1 was also used to expand the numbers of farms by the economic classes of under \$2,500 in sales, \$2,500 to \$9,999, and \$10,000 and above. The \$10,000 and above sales class, which represented nearly half of the Census Adjusted farms in 1978, has shown a steady decline in each subsequent census of agriculture. Between 1978 and 2002, the total number of farms in this sales class declined 337,132 or 28.0 percent (see Table 4 and Figure 1). Over a third (122,667) of that drop came between 1997 and 2002.

The numbers of farms between \$2,500 and \$9,999 (Table 3) showed declines in 4 of the last 5 census periods and the indicated increase of 1,356 farms between 1992 and 1997 was less than a one percent change. Between 1978 and 2002, the total number of farms in this sales class declined 228,135 or 34.4 percent.

The numbers of farms in the under \$2,500 sales class (Table 2) has shown the largest fluctuations over time, both in Census Published and Census Adjusted levels. There was a large increase (114,782 farms or 18.8 percent) between 1978 and 1982. The numbers of farms in this sales class declined by 1987 and again by 1992. However, the number of farms in this sales class increased by 91,483 between 1992 and 1997 and increased another 134,478 by 2002. For the entire 24-year period the count is up 215,851 or 35.3 percent.

While it would be difficult to create an adjusted data set for more detailed economic class totals for all agricultural censuses between 1978 and 2002, a few additional comparisons can be made for 1978, 1997, and 2002. Table 5 breaks the \$10,000 and over sales class into \$10,000 to \$99,999 and \$100,000 and over for the three years. Those data show that the numbers of farms in the \$10,000 to \$99,999 declined by 423,656 (43.3 percent) from 1978 to 2002, with 81,345 farms of that decline (19.2 percent) occurring between 1997 and 2002. The numbers of farms with \$100,000 or more in sales did increase 86,524 (38.5 percent) between 1978 and 2002 even though the numbers of farms in that sales class declined 41,322 between 1997 and 2002. Table 5 also breaks the \$100,000 plus class for 1997 and 2002 into \$100,000 to \$499,999 and \$500,000 or more. Those comparisons illustrate that the number of farms in the top sales class increased by 404 (0.6 percent) during the last 5 years while the numbers in the \$100,000 to \$499,999 sales class declined by 41,726 (14.8 percent).

What do the new data show about minority and Hispanic operated farms over time?

There has been considerable interest in the past 10 years or so in tracking and analyzing the numbers of farms operated by racial minority and Hispanic operators. In many cases, the need to adjust for the not on the mail list portion of these operations in previous censuses of agriculture was called to the attention of researchers and other individuals looking for comparable figures. Most individuals chose to instead use Census Published numbers since those could be tracked at the county level, as well as State and U.S. levels. The analyses below construct a data set which allows comparison of racial minority and Hispanic principal operator data for agricultural censuses back to 1978.

It is a bit more problematic to adjust the past minority and ethnicity data than for all farms or farms by economic classes. For the most part, the only incompleteness figure that was published was for "Black and other races," instead of separate evaluations for the individual minority groups. For the censuses between 1978 and 1992, only one census report was entered for many American Indian reservations, rather than trying to collect demographic data for each operator on the reservation. Agricultural census collections up to 2002 asked the Hispanic ethnicity question after the race questions and an "Other Race" category was available. Many responses in that category, when specifically reviewed, turned out to be individuals writing in something like "Chicano" or "Mexican" and thus should have been included under the Hispanic ethnicity question and one of the existing race categories. There was another complication in 1997 since blank answers were accepted for the Hispanic question so the totals may be underreported. The 2002 collection asked the Hispanic ethnicity question ahead of the racial classification questions. There was no longer an Other Race question but individuals could now indicate that they consider themselves as being of more than one race. That number was relatively small (7,913 nationally) and will be analyzed in more detail once the 2002 final publications are released.

The racial and Hispanic ethnicity data for the 1978 through 1992 Censuses of Agriculture were adjusted using the same type of approach as for all farms and farms by economic classes. Only one factor was used for each census to adjust the published data for all categories. That adjustment process showed that the numbers of Black and other races farms declined for each census from 1982 to 1992. (See Table 6.) The total number did increase 5,495 from 1992 to 1997 and another 243 from 1997 to 2002. (A good share of the 1997 increase was due to efforts to collect more demographic data for American Indian operators.) The number of Spanish, Hispanic, or Latino operators declined from 1978 to 1982, but has increased steadily since that time, advancing 1,373 in 1987, 4,197 in 1992, 5,952 in 1997, and 16,993 in 2002. (See Table 11.) The increase in 2002 is likely in part due to asking the Hispanic ethnicity question separately before the racial category questions, not including an Other Race choice, and the fact that 1997 may have been artificially low.

The Census Adjusted number of Black or African American farm operators (Table 7) declined for each census collection between 1982 and 1992, but increased 2,095 (8.5 percent) from 1992 to 1997 and another 2,360 (8.8 percent) between 1997 and 2002. For

the 24-year period, the number of Census Adjusted principal operators has declined 22,303 to a 2002 total of 29,145.

As mentioned above, the numbers of American Indian or Alaska Native principal operators has increased in the 1997 and 2002 Censuses of Agriculture because of the emphasis on trying to obtain demographic information for individual residing on reservations who qualify as operators. There also was an increase of 1,439 principal operators between 1987 and 1992 (Table 8). NASS also included special 2002 data collection activities in the Northern Great Plains in an effort to determine if reservation level data could be collected. A specific analysis of those results will be issued later.

Up until 2002, the censuses of agriculture included a combination Asian/Pacific Islander race category. Using the standard "Blacks and other races" adjustment factor would overestimate the number of Asian/Pacific Islander principal operators since Hawaii did not have an area frame and should not be adjusted. Thus, Hawaii was subtracted out before the adjustment and then added back in. The resulting totals (Table 9) show that Census Adjusted primary operator counts have wavered around 9,500 between 1978 and 1997, with a high of 9,658 in 1992 and a low of 9,360 in 2002. For the 2002 Census of Agriculture, two questions were asked: "Asian" and "Native Hawaiian or Pacific Islander." The total of those two categories turned out to be 260 lower than reported in the combined category in 1997. The later analysis of individuals reporting more than one race may help interpret this apparent drop, since 693 principal operators in Hawaii classified themselves as being of more than one race and are not now included in the individual race totals.

What do the new data show about Women operated farms over time?

Table 12 illustrates that the number of Women principal operators has increased by at least 10 percent over each previous census since 1978. In total, the number of women principal operators has almost doubled between 1978 and 2002, rising from 128,170 to 239,239. Women operators as a percent of all primary operators has increased from 5.2 percent in 1978 to 11.2 percent in 2002.

What do the new numbers of household data show?

Another new question in the 2002 Census of Agriculture was the number of households

sharing in the net farm income of the operation. The Preliminary Release shows that 427,289 operations, 20.6 percent of the farms reporting, indicated that two or more families were sharing in the net farm income. (This question did not apply to operations being operated by hired managers.)

What happens next?

The data tables in the 2002 Preliminary Release present a first snapshot of some demographic information from the preliminary release. The biggest advantage of the census of agriculture data collection approach is that a small amount of information is collected about a wide variety of topics. Since data collection is consistent across the country, data tables are created which present a wide variety of informative cross tabulations. Data tables in the Final 2002 Census of Agriculture publication (expected to be released June 3, 2004) will provide detailed summary information for sizes of farms, types of commodities raised, economic sales classes, and a myriad of other comparisons.

The June release will also include adjusted summary data down to the county level for each State. These data will present the most complete picture of American agriculture at the local level that has been possible in many years and will surely lead to a wide variety of uses.

Data Tables

Table 1: Comparisons of U.S. Farm Numbers, 1978 to 2002

Census Year	Census Published	Census Adjusted	Official NASS Estimates	Change in Adjusted	Change in Official
1978	2,257,775	2,478,642	2,436,250		
1982	2,240,976	2,484,452	2,406,550	5,810	-29,700
1987	2,087,759	2,337,393	2,212,960	-147,059	-193,590
1992	1,925,300	2,180,655	2,107,840	-156,738	-105,120
1997	1,911,859	2,215,876	2,190,510	35,221	82,670
2002	N.A.	2,129,226	2,158,090	-86,650	-32,420

Table 2: Comparisons of U.S. Farms under \$2,500 in sales, 1978 to 2002

Census Year	Census Published	Census Adjusted	Change in Adjusted
1978	460,535	611,653	
1982	536,327	726,435	114,782
1987	490,296	677,392	-49,043
1992	422,767	601,543	-75,849
1997	496,514	693,026	91,483
2002	N.A.	827,504	134,478

Table 3: Comparisons of U.S. Farms between \$2,500 and \$9,999 in sales, 1978 to 2002

Census Year	Census Published	Census Adjusted	Change in Adjusted
1978	614,787	662,916	
1982	560,010	605,547	-57,369
1987	537,890	583,332	-22,215
1992	483,750	531,886	-51,446
1997	466,452	533,242	1,356
2002	N.A.	434,781	-98,461

Table 4: Comparisons of U.S. Farms with \$10,000 and over in sales, 1978 to 2002

Census Year	Census Published	Census Adjusted	Change in Adjusted
1978	1,182,453	1,204,073	
1982	1,142,963	1,162,611	-41,462
1987	1,049,573	1,066,422	-96,189
1992	1,018,783	1,047,592	-18,830
1997	948,893	989,608	-57,984
2002	N.A.	866,941	-122,667

Table 5: Changes in U.S. Farm Numbers by Economic Sales Class, 1978, 1997, and 2002

Sales Class	1978	1997	2002	Change 1978-2002	Change 1997-2002
less than \$2,500	611,653	693,026	827,504	215,851	134,478
\$2,500 to \$9,999	662,916	533,242	434,781	-228,135	-98,461
\$10,000 to \$99,999	979,089	636,778	555,433	-423,656	-81,345
\$100,000 or more	224,984	352,830	311,508	86,524	-41,322
\$100,000 to \$499,999	N.A.	282,422	240,696	N.A.	-41,726
\$500,000 or more	N.A.	70,408	70,812	N.A.	404

Table 6: Changes in U.S. Black and other races principal operators, 1978-2002 1/

Census Year	Census Published	Census Adjusted	Change in Adjusted
1978	57,988	78,361	
1982	54,367	72,324	-6,037
1987	44,640	58,386	-13,938
1992	43,487	56,097	-2,289
1997	47,658	61,592	5,495
2002	N.A.	61,835	243

1/ No adjustment for Hawaii

Table 7: Changes in U.S. Black or African American principal operators, 1978-2002

Census Year	Census Published	Census Adjusted	Change in Adjusted
1978	37,351	51,448	
1982	33,250	45,054	-6,394
1987	22,954	30,605	-14,449
1992	18,816	24,690	-5,915
1997	18,451	26,785	2,095
2002	N.A.	29,145	2,360

Table 8: Changes in U.S. American Indian or Alaska Native principal operators, 1978-2002

Census Year	Census Published	Census Adjusted	Change in Adjusted
1978	6,889	9,489	
1982	7,211	9,771	282
1987	7,134	9,512	-259
1992	8,346	10,951	1,439
1997	10,638	12,911	1,960
2002	N.A.	15,417	2,506

Table 9: Changes in U.S. Asian, Native Hawaiian or Pacific Islander principal operators, 1978-2002 1/

Census Year	Census Published	Census Adjusted	Change in Adjusted
1978	7,942	9,427	
1982	8,000	9,496	69
1987	7,900	9,400	-96
1992	8,096	9,658	258
1997	8,731	9,620	-38
2002 /2	N.A.	9,360	-260

1/ No adjustment for Hawaii

2/Two separate questions were asked in 2002

Table 10: Changes in U.S. Other Race principal operators, 1978-2002

Census Year	Census Published	Census Adjusted	Change in Adjusted
1978	5,806	7,997	
1982	5,906	8,003	6
1987	6,652	8,869	866
1992	8,229	10,798	1,929
1997	9,838	12,276	1,478
2002	N.A.	N.A.	N.A.

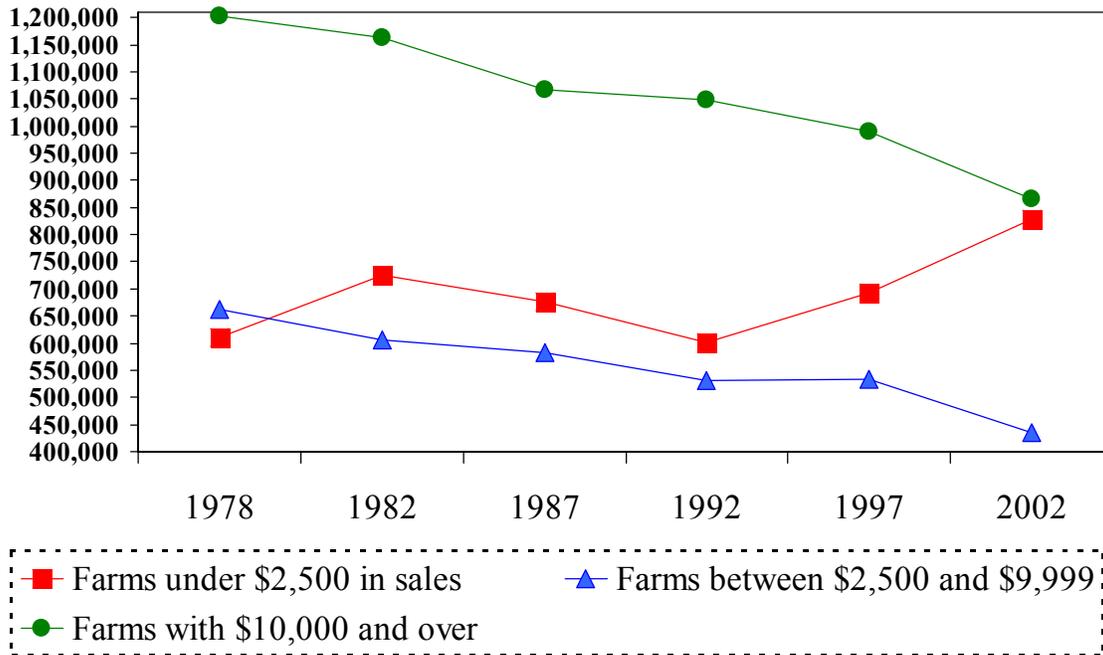
Table 11: Changes in U.S. Spanish, Hispanic or Latino Origin principal operators, 1978-2002

Census Year	Census Published	Census Adjusted	Change in Adjusted
1978	17,572	24,204	
1982	16,183	21,928	-2,276
1987	17,476	23,301	1,373
1992	20,956	27,498	4,197
1997	27,717	33,450	5,952
2002	N.A.	50,443	16,993

Table 12: Changes in U.S. Women principal operators, 1978-2002

Census Year	Census Published	Census Adjusted	Change in Adjusted
1978	112,799	128,170	
1982	121,599	141,345	13,175
1987	131,641	156,585	15,240
1992	145,156	176,739	20,154
1997	165,102	209,784	33,045
2002	N.A.	239,269	29,485

Figure 1: Changes in U.S. Farm Numbers, by Sales Class, 1978 to 2002



***HOW TO INTERPRET NEW
DEMOGRAPHIC INFORMATION IN
THE PRELIMINARY 2002 CENSUS OF
AGRICULTURE RELEASE***



Agricultural Outlook Forum 2004

Rich Allen

**National Agricultural
Statistics Service**

February 19, 2004

Goals for Today



- Clarify underlying census of agriculture definitions
- Provide working understanding of new summary procedures
- Present some historic relationships in light of the new 2002 results

Why have a Census of Agriculture?



- Only uniform collection of U.S. agriculture information
- Only measurement of farm operator demographic information
- Only National measure of changes in farms and farming practices

Farm Definition

(Since 1978)



Any place from which \$1,000 or more of agricultural products were produced and sold, or normally would have been sold, during the census year.



How has Census of Agriculture data collection changed?



- 1840-1945: Personal interviews, tied to the Census of Population
- 1950-1964: Mail Out/Collect Later, still using enumerators
- 1969-2002: Mail Out/Mail Back, very little face to face interviewing

What were the new NASS approaches for 2002?



- Create a scanned image of each returned form
- Capture reported data by Optical Character Recognition equipment
- Rewrite the comprehensive edit routines used for every farm operation
- Create coverage adjusted results down to the county level.

Adjustment Depended on the Area Frame



- A list frame is always incomplete and may contain duplication
- NASS has a complete area frame (for the 48 contiguous States)
- Area frame used for interpreting Ag Census coverage since 1978
- New statistical methodology needed to create the National/State/County adjustments

Important Clarification



- NASS did not create “new” farms to account for the mail list incompleteness
- The statistical methodology assigns additional weight to farms which did report
- The methodology selects farms for additional weights to best fit the missing characteristics

Total Number of Farms

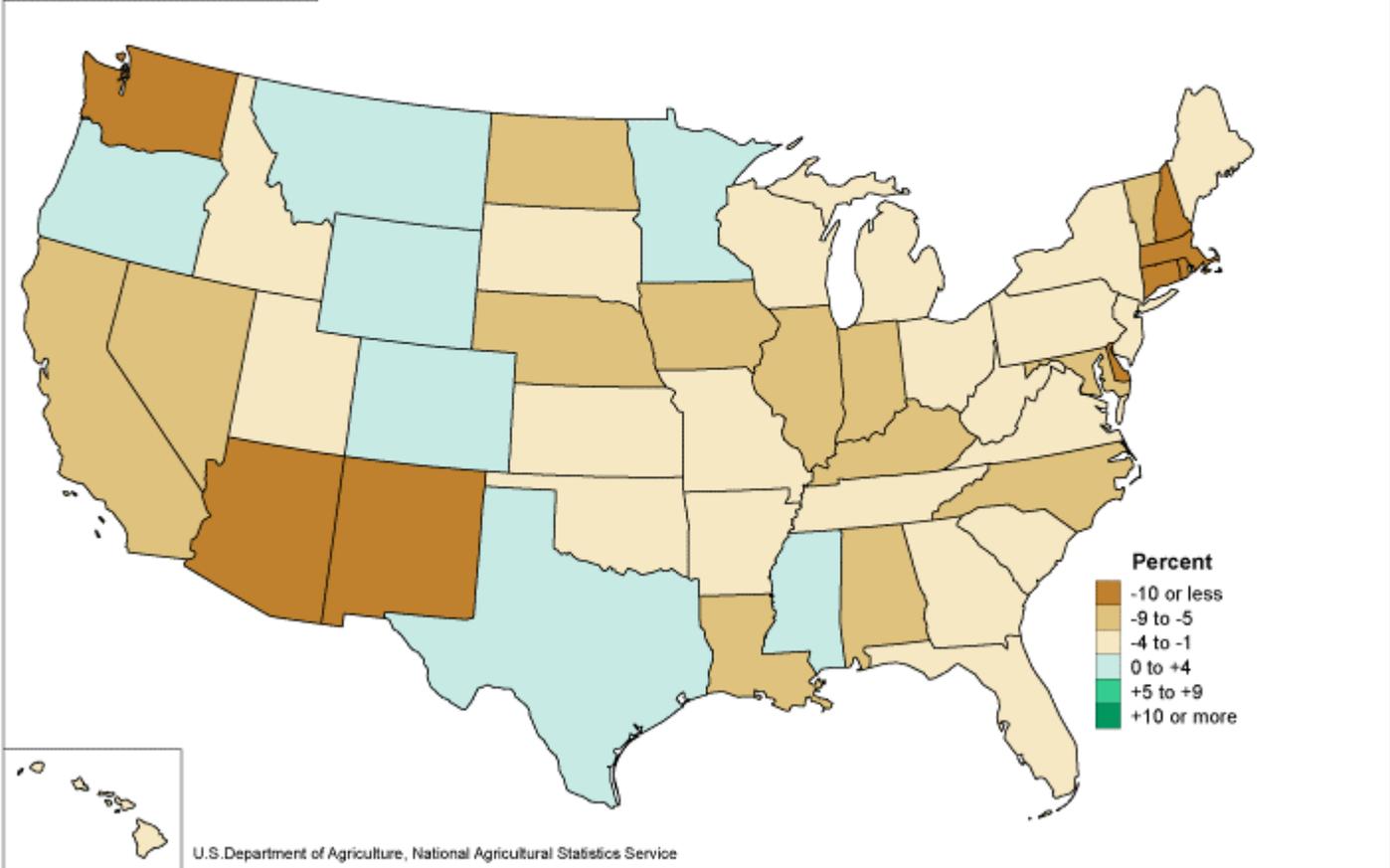


	<u>2002*</u>	<u>1997*</u>	<u>1997</u>
Farms	2,129,226	2,215,876	1,911,859
Land in Farms (million acres)	939.5	954.8	931.8

(*Adjusted for coverage)



Percent Change in Number of Farms: 1997 to 2002



What do the new data show about farm numbers over time?



- The 1978 Ag Census published coverage adjustments at the State level
- Most Ag Censuses between 1978 and 2002 published adjustments percentages for a few items
- This presentation has created coverage adjustments using the available data

Table 1: Comparisons of Adjusted U.S. Farm Numbers, 1978 to 2002



Census Year	Census Adjusted	Change in Adjusted
1978	2,478,642	
1982	2,484,452	5,810
1987	2,337,393	-147,059
1992	2,180,655	-156,738
1997	2,215,876	35,221
2002	2,129,226	-86,650

Figure 1: Changes in U.S. Farm Numbers, by Sales Class, 1978 to 2002

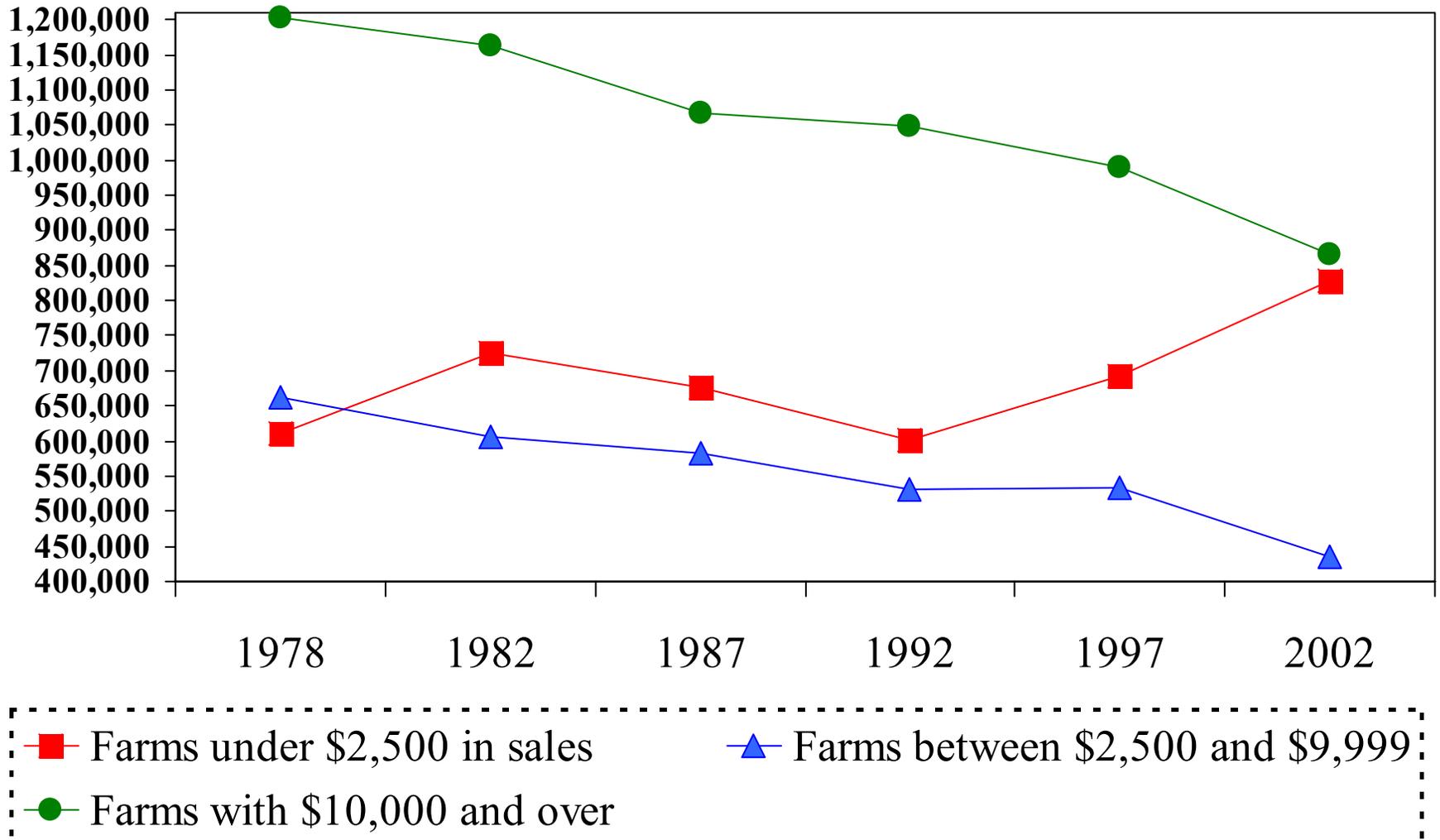


Table 11: Changes in U.S. Spanish, Hispanic or Latino Origin principal operators, 1978-2002



Census Year	Census Adjusted	Change in Adjusted
1978	24,204	
1982	21,928	-2,276
1987	23,301	1,373
1992	27,498	4,197
1997	33,450	5,952
2002	50,443	16,993

Table 7: Changes in U.S. Black or African American principal operators, 1978-2002



Census Year	Census Adjusted	Change in Adjusted
1978	51,448	
1982	45,054	-6,394
1987	30,605	-14,449
1992	24,690	-5,915
1997	26,785	2,095
2002	29,145	2,360

Table 8: Changes in U.S. American Indian or Alaska Native principal operators, 1978-2002



Census Year	Census Adjusted	Change in Adjusted
1978	9,489	
1982	9,771	282
1987	9,512	-259
1992	10,951	1,439
1997	12,911	1,960
2002	15,417	2,506

Table 9: Changes in U.S. Asian, Native Hawaiian or Pacific Islander principal operators, 1978-2002



Census Year	Census Adjusted	Change in Adjusted
1978	9,427	
1982	9,496	69
1987	9,400	-96
1992	9,658	258
1997	9,620	-38
2002 ^{1/2}	9,360	-260

1/ No adjustment for Hawaii

2/Two separate questions were asked in 2002

Table 12: Changes in U.S. Women principal operators, 1978-2002



Census Year	Census Adjusted	Change in Adjusted
1978	128,170	
1982	141,345	13,175
1987	156,585	15,240
1992	176,739	20,154
1997	209,784	33,045
2002	239,269	29,485

Farms by Number of Households Sharing in Net Income of Farm*



2002

1 household.....	1,646,543
2 households.....	314,043
3 households.....	63,182
4 households.....	28,704
5 households or more.....	21,360

* New in 2002

Number of Persons Living in Household of* -



2002

Principal operator.....	5,717,496
Second operator.....	712,245
Third operator.....	188,020
TOTAL.....	6,617,761

* New in 2002

Are the published data perfect?



- A consistent statistical methodology has been applied
- State level adjustments to types and sizes of farms will be very good
- County level farms numbers and farm sizes should be improved
- Some variables over- or under-stated due to limitations of the available data

How preliminary are the preliminary data?



- NASS is still reviewing the county level results for all variables
- A few records might not have been included in the Preliminary Release
- Some additional review was prompted by the Preliminary Release

What happens next?



- Full Ag Census release will be in June with many size of farm and income class cross tabulations
- More data for Minority and Spanish, Hispanic, or Latino Farm Operations
- “New” topics such as production contracts, organic operations, etc. will be included
- Some special analyses (such as multiple race operators) will be issued later