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A STRATEGY FOR IMPLEMENTING WEB-BASED AGRICULTURAL SURVEYS

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Contributed paper

ABSTRACT

Implementing an Internet Web-based mode of collecting agricultural data presents both challenges and opportunities for the National Agricultural Statistics Service (NASS) of the United States Department of Agriculture (USDA). Within the Federal Government, NASS is the primary collector of agricultural data. Other than the Census of Agriculture, response to NASS surveys are voluntary making the cooperation and willingness of farmers and agribusinesses to respond to surveys essential to NASS's existence. While NASS is eager to offer respondents with Internet access the opportunity and convenience to use the Web, it is critical that NASS provide a secure and confidential environment to maintain respondent trust. The United States Congress has enacted laws setting goals and time-lines to ensure that Federal agencies move forward with e-Government. This paper addresses NASS's Electronic Data Reporting (EDR) implementation plan which provides a strategy for converting the many existing Agency surveys to Web collections, provides a time table, and identifies necessary resources. Additionally, it addresses the current adoption and usage of the Internet within the agricultural sector.

I. INTRODUCTION

1. Adoption of an e-Government strategy to improve customer service and government efficiencies through the use of information technology includes addressing electronic reporting and transmissions of data and electronic dissemination of data. While NASS published data are already electronically available, only two of more than 400 surveys conducted by NASS offer an electronic reporting option. Certainly NASS will continue to improve dissemination products, but the Agency's e-Government priorities, given limited funding and staff, will be creating an equally strong EDR presence.

2. The Office of the President, in both the Clinton and Bush Administrations, and the U.S. Congress have stressed the importance of moving toward an e-Government. Congress enacted the Government Paperwork Elimination Act (GPEA) in 1998 to establish the framework for all federal agencies. The Office of Management and Budget (OMB) was empowered to manage and oversee progress and implementation of this mandate throughout the Federal Government. No additional funds were designated for this effort within GPEA. President Bush, within the President's Management Agenda, has specifically named e-Government as one of five government-wide priorities for his Administration in 2002.

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3.   While anxious to develop e-Government technologies, NASS must be creative in not just developing an EDR process, but in developing an efficient "collection system" that integrates or re-engineers survey processes for multiple modes of collection. These challenges could be overcome if the necessary funding and staff resources are available.

4.   This paper discusses the NASS mission and structure, Congressional mandates through GPEA, the NASS strategy, challenges and enlightenments, and a review of agriculture producers' current Internet usage. Closing comments focus on NASS and NASS stakeholders' vision of the changing dynamics of agriculture in the next decade. NASS's future depends upon envisioning and acting upon opportunities presented with these advancements in electronic technology.

II.   NATIONAL AGRICULTURAL STATISTICS SERVICE

II.1   NASS Mission

5.   The United States has 2.1 million farmers and ranchers and tens of thousands of agribusinesses. Within the agriculture sector, more than 14 percent of the U.S. gross domestic product is generated and more than one out of every six workers is employed. The highly efficient agricultural sector is fuelled by timely, accurate, and reliable information which support market activities and guides policy decisions. A critical source of much of this information is the voluntary responses of farmers, ranchers, and agribusinesses to the statistical surveys and inquiries of NASS. NASS was authorized by Congress in the 1946 Agricultural Marketing Act, Title 7 U.S. Code by Congress to collect and disseminate United States agricultural statistics. To consolidate the collection of agricultural information for the agricultural sector, responsibility for the quinquennial Census of Agriculture was transferred from the Department of Commerce to NASS in 1996. The Census of Agriculture was first conducted by NASS in 1997.

6.   The hundreds of nationwide surveys conducted annually by NASS cover crops, livestock, economics, and other agricultural activities. Of the information collected, response is voluntary and not required by law with the exception of the Census of Agriculture. Individually reported data are confidential and protected from disclosure by federal law. NASS survey data are supplemented by field observations, objective yield measurements, and administrative data. Annually, approximately 425 reports are published by NASS. The reports are free and are accessible through multiple forms including the Agency's web site at www.nass.usda.gov.

7.   When it serves the interest and well-being of the agricultural sector, NASS services other organizations with consulting, training, and statistical assistance in the design, sampling, and administration of surveys. NASS conducts reimbursable surveys for federal and state governmental bodies and universities. Through the Agency's International Programs Office, survey expertise and assistance is provided to foreign countries.

II.2   NASS Structure & Surveys

8.   While NASS is headquartered in Washington, D.C., it has 46 State Statistical Offices (SSOs) servicing all 50 States and Puerto Rico. The Agency staff includes about 1,350 full-time federal and state employees. Since 1917, the SSOs have operated under cooperative funding arrangements with State Departments of Agriculture and/or Land-Grant Universities. These arrangements efficiently serve the agricultural data collection and dissemination needs at both the state and federal levels. It is through these cooperative agreements that NASS is able to collect detailed data on commodities important to local economies not covered by federal funds and to work closely with agriculture producer organizations.

9.   NASS surveys cover a wide range of survey designs and data collection modes. Most surveys are probability-based samples of the farm population. Data collection methods traditionally employed by NASS include mail, telephone, personal face-to-face interviews, and field observations. Most surveys use multi-mode collection strategies. Telephone interviewing, primarily computer-assisted enumeration,

accounts for over two-thirds of the Agency's data collection activities. Determining which modes of collection are appropriate for a survey is based on many factors. These factors include: complexity of subject matter or questionnaire, length of survey period, site observation requirements, availability of staff and budget resources, quality of response needed, response rate requirements, and reporting preference of respondents. Integration of Web-based collections into the mix, allows NASS to incorporate the low cost and 24 hours a day, 7 days a week (24-7) accessibility of a self-administered questionnaire, while providing many of the quality edit features of computer-assisted telephone interviewing. While Web collections offer a real service to respondents, NASS must be careful not to lower survey participation due to lack of technical skills to negotiate a Web questionnaire or insufficient equipment (browser capabilities) or support. Security architecture must be in place and quality of data cannot be compromised.

10.   The official definition of a farm is an operation that normally produces at least one thousand dollars in gross value of agricultural sales annually. This population of 2.1 million farms is declining in numbers and changing in demographics. The trend is to fewer and larger operations, a decline in medium size farms with $100,000-250,000 in sales, and an increase in small niche product farms and large commercial farms. Agribusinesses are also experiencing change with increased numbers of mergers and more vertical integration. These dynamics impact current and future business activities that are important considerations in the effective use and adoption of Web-based surveys.

III.   ELECTRONIC DATA REPORTING (EDR) POLICY ISSUES AND CHALLENGES

III.1   Government Policies and Collaborative Efforts

11.   The President and Congress are challenging the Federal Government agencies to fundamentally change their view of customer service. While many customers contact government offices during traditional business hours, the demand for anytime, anywhere access (24 - 7) is growing. US Government customers deserve, and increasingly expect, service levels equal to the private sector. Under a "citizen-centered" government, citizens should have the ability to interact with their government in a manner which stresses citizen services are coordinated across Departments and Agencies. As stated by Alan Balutis, former co-chairperson of the federal Chief Information Officer Council's e-Government Committee, the transforming of government to EDR should result in a seamless service to citizens. Rapid changes in information technology (IT), exponential growth of the Internet, the quest for greater program efficiencies and lower transaction costs, are also driving the transformation of traditional government business into e-business.

12.   Congress has mandated through the *Government Paperwork Elimination Act (GPEA)* of 1998, that all Federal agencies are required, by October 21, 2003, to allow individuals or entities the option to submit information or transact business with the agency electronically, when "practicable", and to maintain records electronically, when "practicable". OMB requires that all federal survey collections must specify a GPEA adoption strategy. The Act specifically states that electronic records and their related electronic signatures are not to be denied legal effect, validity or enforceability merely because they are in electronic form. Public confidence in the security of the Government electronic transmission processes is essential for a successful transition to occur.

13.   Additionally, *Section 508 of the Rehabilitation Act Amendments of 1998* requires Federal Agencies to provide their staff and the public with disabilities access to information, computers, and networks comparable to the access enjoyed by people without disabilities, assuming such action does not cause an undue burden on an agency.

14.   The collaboration of EDR across the Federal Government is also a significant element of GPEA. OMB is charged with overseeing the implementation of GPEA. Each Department and Agency must submit an annual GPEA Compliance Report beginning October 2000. Within USDA, the Office of the Chief Information Officer (OCIO) coordinates and facilitates implementation planning. Individual

agencies within Department Mission areas have two persons assigned to an e-Government USDA Working Group. This Group facilitates information sharing and reports quarterly to the USDA Deputy Secretary on the compliance plan progress, successes, and barriers. It is each Agency's challenge to further ensure that all GPEA plans are integrated with their Government Performance Review strategic plan, IT plans, and annual budget requests.

III. Challenges for NASS

15. Congress mandated the implementation of e-Government through GPEA, but provided no new funding to agencies for this effort. During the transition of the Bush Administration into office, the number of new initiatives, including e-Government, was limited. For NASS and many other agencies, new funding for 2003 and beyond is imperative for developing and building the infrastructure needed to support Web collections and to address the mandate of GPEA.

16. NASS currently has a very demanding workload with a major re-engineering effort underway in preparation for the 2002 Census of Agriculture. The resources required to support this effort, while maintaining the high quality of the Agency's ongoing survey program, leave a limited staff available for e-Government. Resources are essential to plan and develop the e-Government infrastructure. The NASS goal is to develop and build a systems design and architecture that are more flexible and efficient to accommodate "any" collection method including survey instrument construction. In the short term, however, NASS expects increases in data collection costs and those cost increases may continue beyond the initial phases. Longer term, the Agency is hopeful that efficiencies gained in the new process may offset the resources needed to design, administer, and maintain an additional mode of collection.
A.C. Hyde states, in a recently released study by the Brooking Institution for Public Policy, that e-Government will save government agencies potentially $12 billion a year primarily for procurement and customer service.

17. NASS must be scrupulous also in the evaluation and adoption of security procedures for any new system for Web-based surveys. NASS adheres to strict rules of confidentiality and security that are enforced by law (7 U.S.C. Section 2276). Maintaining the trust and confidence of the Agency's agricultural producers, who are our respondents and customers, must be ensured and not compromised.

18. NASS is intent on exploring and adopting appropriate technologies to optimize the EDR plan. With adequate funding, the outsourcing of certain development to a private entity is likely due to time and staff constraints. Current Agency data systems, software and hardware, and data warehousing must be integrated with any new tools. Potential vendors with proprietary products and vendors that design customized systems using commercial software are being evaluated.

IV. THE AGENCY EDR PLANS

IV.1 NASS 2000 GPEA Compliance Report

19. OMB requests each agency submit an annual GPEA Compliance Report that outlines their GPEA goals. Quarterly reports are to be submitted to explain progress and barriers perceived in achieving these goals. To address the EDR plans of individual surveys, more information was needed. Considering various "types" of NASS surveys assuming similar modes of EDR, six categories of surveys were defined. These categories were prioritized by relative difficulty and risk in converting to EDR. Data collections more easily converted to an electronic process are listed first and the most difficult data collections are listed last.

20.   **Expert opinion surveys that are repetitive and not sensitive**

The target population is typically agribusinesses and government agencies with Internet access and EDR expertise. NASS's first EDR offering included a survey of Agricultural experts reporting on general crop conditions. The respondents were EDR literate and the data was not sensitive. A secure site was not imperative.

21.   **Inventory Surveys that are repetitive**

The target population is typically agribusinesses and large farms with Internet access and computer expertise. Inventory files, regardless of format, may be transferred electronically without data entry of individual items. The data are security sensitive.

22.   **Five year mandatory Census of Agriculture scheduled for 2002 collection**

The EDR infrastructure will not be in place at this time.

23.   **Repetitive surveys that are not complex**

The target population is general farm operations which are developing access and business use of the Internet with limited EDR expertise. Data are easily collected on a single questionnaire page with only simple relationships reported. Surveys that are repetitive were given priority as they would provide overall gains in EDR usage.

24.   **Complex surveys**

The target population is general farm operations who are developing access and business use of the Internet with limited EDR expertise. These surveys will include one time and repetitive surveys that have multiple pages, inter-relationships of data and variables, and skip patterns that impact quality and ease of reporting.

25.   **Five year mandatory Census of Agriculture for 2007 collection**

This is an example of a complex survey. The EDR system will be in place with a potential to have EDR instruments customized to the respondents operation.

26.   To facilitate the implementation of GPEA, an EDR team was formed within NASS to investigate current EDR "best practices", to develop specifications for a NASS EDR system, and to implement a plan. NASS will be able to offer EDR as an option for many surveys once the system is constructed.

IV.2   EDR Strategy and Business Plan

27.   The EDR team established guidelines and standards for different forms of EDR for NASS data collection activities and created a framework for developing the infrastructure needed to support these technologies.

28.   Three general types of EDR were reviewed: e-mail, electronic data interchange (EDI), and Web-based. E-mail was being used to collect data from large operations for a Cold Storage inventory survey in headquarters and states were finding it a convenient method to collect data from willing respondents. However, there were issues with security and with standardization of the design instrument that could not be controlled. This made it an inappropriate EDR technique for NASS. EDI is promising as an alternative to e-mail for inventory file transfers. The method could actually reduce burden hours for respondents as they would be e-mailing their own business files of information regardless of format as opposed to capturing individual data values. Although effective, its use is limited to only a few surveys. Web-based EDR will be the most effective method for NASS surveys as it can be used appropriately for most NASS surveys and it is considered technically superior to the other methods. A well-designed Web-based system would be a better option than e-mail as it would incorporate all the advantages of e-mail without the disadvantages. The team decided to first concentrate on developing a plan for Web-based data collection, but will continue to investigate EDI. Once a secure browser for Web-based collection is

available, it can also be used for EDI. E-mail EDR currently used by a limited number of respondents will continue until an EDI option is available. No new surveys will be collected via e-mail.

29.   Web instruments can function not only as a self administered questionnaire, but also as a data capture tool for telephone enumerators. Therefore, "one-time" surveys will be practicable for NASS as it can be used for both the web and telephone respondents. If Web instruments can be produced as easily as instruments for other modes of collection and with the same data quality, then Web-EDR may well be the "instrument of choice" for non-repetitive surveys.

30.   Mixed mode data collections will continue within the NASS survey processes. Web-based EDR will compliment not replace existing methods. NASS cannot maintain additional new modes unless it effectively integrates the support processes for most, if not all, collection modes. Having an architecture that is flexible and efficient to accommodate "any" collection method will promote standardization, data handling efficiencies, data quality, and the efficient use of staff.

31.   The scope of NASS's EDR project is outlined below. The team's EDR business plan includes a general discussion and specific actions to address the building of the infrastructure in Step 2.

V.   SCOPE OF PROJECT

STEP 1:   PREPARATION

- ?? Build a business plan.
- ?? Prioritize surveys on which to implement Web-based data collection options.
- ?? Identify resources.

STEP 2:   BUILD INFRASTRUCTURE

- ?? Re-engineer the process of creating paper (self-administered) questionnaires so that the new process can support both paper and web versions of these questionnaires.
- ?? Establish a secure processing environment.
- ?? Evaluate existing software systems that generate web-based and paper questionnaires.

- ?? Explore and evaluate the cognitive aspects of web data collection and screen display.
- ?? Develop an effective architecture for Web-based and paper data collection system for use on NASS surveys.

STEP 3:   TEST

- ?? Pilot test the above system on several small, repetitive surveys requiring moderate amounts of branching and editing. The initial pilot is expected to be simple with little or no customization for individual reports. The pilot testing will begin by October 15, 2001.

32.   The team created a framework or "big picture" for investigating a NASS EDR infrastructure that would support both paper and electronic data collections. Blaise would eventually be added to the framework. Sub-teams were formed to investigate various components of the infrastructure. Individual software products for components of the infrastructure or for an entire EDR system were evaluated through demonstrations (both hands on and vendors), through classes, and by researching and networking for "best practices". Companies were evaluated for potential outsourcing.

33.   Several features of the EDR system were recognized as having potential enterprise level or USDA solutions particularly in the area of security and Portal. There is a lot to be gained from this collaboration with agencies within USDA to potentially share technology and resources in the future.

34.   A prototype of the infrastructure was built for a Cotton Ginnings Survey. The purpose of the study was to gain understanding in various components: security, infrastructure, data flow, administration including browser compatibility, screen help, written instructions, and usability studies. The primary reason for this pilot is to gain knowledge.

35.   To integrate processes and build an efficient system, Advanced Data Tools is under contract to facilitate a Discovery Workshop in November 2001. The specific goals of the session are to understand the business process in detail, to identify the resources necessary to provide required information, to define the long term vision of functionality required, to provide details on existing system interfaces, to clearly articulate possible solutions to the problem, and to define the scope for a project build phase. As a result of the workshop, NASS expects to begin developing a plan for building the actual components of an EDR system including what existing systems within NASS can be leveraged, what should be outsourced, and what needs to be developed.

VI.   EXPECTED EDR ACTIVITIES 2001-2007

36.   2001 - Investigate components of an EDR system. Review software packages and integration companies for potential outsourcing. Develop a prototype survey (Cotton Ginnings) including as much of the process as possible: data flow, security, usability testing, EDR instrument, administrative processes, instructions, architecture, etc. Conduct a workshop to maximize efficiencies in developing a "collection" system. Request funding to purchase, build, or outsource the infrastructure.

37.   2002 - Plan for a system build and determine how this will be done on a limited budget with limited resources. Build and conduct 5 simple EDR surveys.

38.   2003 - Procure, develop, and begin implementation of a secure infrastructure. Develop Web and paper forms for simple repetitive surveys as category D. Usability testing will be done for each survey coming on line. Continue to work on methodology issues for creating complex surveys and for use of historical data to create customized questionnaires. Continue to review "best practices" around the world and new software options.

39.   2004 - Incorporate into the infrastructure what is needed to produce complex surveys. Develop Web and paper forms for complex repetitive surveys indicated in the GPEA compliance report as category E. Usability testing will be done for each survey coming on line. Continue to work on methodology issues for use of historical data to create customized questionnaires. Continue to review "best practices" around the world and new software and security options.

40.   2005 - Content and usability testing for the Census of Agriculture using paper and web collection instruments. Continue to work on methodology issues for use of historical data to create customized questionnaires. Continue to review "best practices" around the world and current and changing or new software and security options. Continue adding surveys to the system and begin developing customized questionnaires.

41.   2006 - With the new system, NASS will have approximately 75% of all surveys available for respondents to report via a Web instrument if desired. All self-administered questionnaires will be entered into the system. (Inclusion of Blaise will depend on changes in technology and not addresses; although it is expected to be part of the system). Continue to work on methodology issues and review "best practices" around the world and new software options. Replace hardware as needed.

42.   2007 - Conduct the Census of Agriculture using the new EDR options.

VII.   PRIORITIZING SURVEYS FOR EDR IMPLEMENTATION

43.   The GPEA October 2000 Compliance Report groups surveys by type of survey into one of six categories. These categories were prioritized by their survey's relative ease of conversion to EDR and thus in the order they would be developed. Individual surveys could immediately be assigned to all categories except the web-based EDR categories D (simple repetitive surveys) and E (complex surveys).

44.   With more than 400 surveys in these categories, NASS developed a model for determining the order of converting the Agency's surveys to web-based collection.   An EDR "practicability" score is calculated for each NASS survey. The lower the numeric score, the greater the survey likelihood for web-based data collection. Surveys are grouped with the lowest scores being most adaptable to this technology. A limited number of NASS surveys are defined as not practicable; these surveys currently require field measurements, photography and mapping materials, or other information that requires a different method of data collection.

45.   The EDR practicability model used to score each Agency survey consists of three components which are repetitiveness, complexity, and risk. The model considers variables such as length of the survey, complexity of the survey, repetitive nature of the survey, sensitivity of data collected, number of versions across states, and current mode of collection. Numerical scores were assigned to each model component. The model is defined as follows:

EDR Practicability = [Repetitiveness + Complexity + Risk], where

Repetitiveness = Survey frequency {score 1-5}; weekly/biweekly=1, monthly=2, quarterly =3, biannual or annual=4, and periodic or less=5.

Complexity = Interview length {score 1-5}; 9 minutes or less=1, 10-15 minutes=2, 16-30 minutes=3, 31-45 minutes=4, and 45+ minutes=5.
Instrument versions {score 1-5}; 1 questionnaire=1, 2-3 questionnaires=2, 4-9 questionnaires=3, 10-19 questionnaires=4, and 20+ questionnaires=5.
Data logic skips and branching {score 1-3, 5}; low=1, medium=2, high=3 and constrained by design=5.

Risk = Market Sensitivity {score 1, 3}; not market sensitive=1, and market sensitive=3.

46.   The composite score is the simple sum of the three components. The score for a survey ranges between 5 and 23. The model gives survey repetitiveness, survey complexity, and survey risk equal weight. The complexities of a survey are defined by interview length, the number of questionnaire versions, and the logic and question skips and relationships.

47.   Repetitive simple surveys (category D) are appropriate for early adoption of web-based data collection. These surveys have a composite score of 14 or less. Complex surveys (category F) are of lower priority for adoption with a composite score of 15 or higher.

48.   This information will be used in establishing survey priority in developing electronic data collection instruments. The pace of adoption will be influenced by the availability of new resources. NASS is dependent on a new funding initiative for fiscal year 2003 to implement the business plan successfully.

VIII.   CURRENT COMPUTER AND INTERNET ACCESS BY U. S. FARMERS

49.   Biannually since 1997, NASS has published a report titled, Farm Computer Use and Ownership. These reports help define the readiness of NASS's farm operators for Internet access and potential use of EDR. Published computer use and Internet access by farmers information is based on questions added to the annual June Area Survey, a midyear probability survey that targets the general farm population within

48 contiguous states. Responses are tabulated from more than 30,000 agricultural operations representing farms of all sizes and types. Survey estimates are based on coefficients of variations at the national level of 1 percent or less. Table A shows a significant increase from 1997 to 2001 in the number of farms that have computer access and those who use the computer for business purposes. Understanding the farm population demographics helps determine the number of farmers that may benefit from an Internet EDR offering.

Table A:	Computer Access and Use		
	1997	**1999**	**2001**
Access on Farms	38 %	47 %	55 %
Use on Farms for Business	20 %	24 %	29 %

49.   Farms with Internet access increased from 13% in 1997 to 43% in 2001. Of the U.S. farms with Internet access in 2001, less than 10 percent used this technology for e-commerce and/or for information such as USDA reports and agricultural marketing activities.

Table B:	Internet Access and Use		
	1997	**1999**	**2001**
Access on Farm	13%	29%	43%
Use on Farm for Business	no info	no info	10%

50.   The 2001 study compared Internet access by region, farm type, and farm size. The highest percent of farms with Internet access are in the West where farms are larger. The South, with smaller average farm size, reported the lowest Internet access rate. The Internet access rate on large farms, with gross value of sales of at least $100,000 was 58 percent. The percent of Internet access of small and medium sized farms did not vary (39%-40%). There is little reported difference in farmers with primary income from crop versus livestock sales.

Table C: Characteristics of Farms with Internet Access as of June 2001		
Farm Location	**Regions of the Country**	**Percent**
	Western	54
	Northeast	48
	North Central	44
	South	37
Type of Farm	**Primary Commodity**	**Percent**
	Crop Farm	44
	Livestock Farm	42
Farm Size	**Gross Value of Sales**	**Percent**
	$100,000 and greater	58
	$10,000 to $99,999	39
	$1,000 to $9,999	40

51.   A 1999 USDA Economic Research Service (ERS) Agricultural Outlook Report provides Internet use comparisons for e-commerce activity. The report, based on a national Agricultural Resource Management Study (ARMS), states more than 600,000 U.S. farms and ranches accessed the Internet in 1999 with 15 percent conducting e-commerce transactions. Roughly one of every 25 farms and ranches in the country bought or sold agricultural products on the Net. Also, more than 70 percent of active e-commerce users were between 35 and 54 years old and 21 percent had completed college or graduate school, indicating both age and education level were strong predictors of e-commerce use. There is no available explanation, however, for the higher reporting of active use (15 percent versus 10 percent) compared to the 2001 NASS findings discussed earlier. A 2001 ARMS study, yet to be published by ERS, will provide further information on Internet use by farms and more specifically e-commerce activity.

52.   To summarize, farm computer usage and Internet access are continuing to increase with the primary users being large farms. Anecdotal information also suggests agribusinesses, not surveyed in the study unless they produced commodities for sale, are significant Internet users. While NASS expects larger farms and agribusinesses to be the first and predominant Internet reporters, NASS is dedicated to serving all of the agriculture sector and will offer EDR opportunities to all operations alike.

IX.   CONCLUSIONS

53.   NASS customers and stakeholders have identified key external factors with important implications for the Agency in the next decade. A partial list of these factors outlined in the USDA GPRA-Strategic Plan includes: i) Agricultural production will continue to evolve to fewer, larger, and more vertically integrated farms; ii) Voluntary cooperation to surveys will decline as requests for information increase; iii) Information technology changes will be explosive; iv) Public expectations will

rise for accuracy, timeliness, and relevancy of statistics; and v) The demand will also rise faster for new kinds of information and in different forms.

54.   NASS must use innovative data collection methods such as Web-based surveys to reduce respondent burden and improve voluntary cooperation. Advances in information technologies will also create the increased need for a highly technical, increasingly productive workforce to provide quality agricultural statistics and services. For the future, NASS must look to the customer and their business habits to define strategies to improve the likelihood of participation on NASS surveys. Certainly Web-based survey activity will open the door for customizing and tailoring information needs specific to the web respondent. Web portals customized to each respondent's operation should encourage respondents to visit the NASS site for current information relevant to their business. With technology rapidly changing, the possibilities and opportunities continue to emerge.

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