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Agricultural Resource Management Survey (ARMS)

Phase 2 – Field Crop Chemical
Usage and Production Practices

*Interviewer's Manual – Barley
(PPR) – Version 14*

**This manual was written for both the paper
questionnaire and the Computer Assisted Personal
Interview (CAPI) instrument.**

Agricultural Resource Management Survey for 2023 Phase 2 – Production Practices Interviewer's Manual

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Chapter 1 - ARMS Purpose

The ARMS is normally conducted in three phases. The initial screening phase, conducted from June through July 2023, collects general farm data such as crops grown and the gross value of sales. Screening survey data are used to identify in-business operations, multiple operating arrangements, and operations having the targeted commodities. With screening data, we can choose respondents for subsequent phases based on whether they have commodities of interest.

The second phase (Phase 2) is conducted from October through December 2023. This phase focuses on chemical use and other production practices for target commodities. The target commodity for the 2023 ARMS Phase 2 Production Practices Report (PPR) is Barley. Data collection will begin October 1.

Phase 3, conducted from January through April (2024), collects data to examine farm sector financial conditions, including income, assets, and debt.

Uses of ARMS Data

Generally, farmers benefit from ARMS data indirectly. They see the information through contact with extension advisors, in reports issued by State colleges and universities, in farm magazines, newspapers, and on radio or TV spots. Most respondents probably do not realize that the data comes from this survey.

Farm organizations, commodity groups, agribusiness, Congress, and the USDA use information from ARMS to evaluate the financial performance of farm/ranch businesses and to make policy decisions affecting agriculture. Producer associations and the USDA's Farm Service Agency (FSA) use for ARMS data is on the costs of production, particularly when developing proposals for commodity programs.

Specifically, the ARMS:

- gathers information about the relationships among agricultural production, resources, and the environment. ARMS data provides the necessary background information to support evaluations of these relationships. The data are used to understand the relevant factors in producing high quality food and fiber products while maintaining the long-term viability of the natural resource base.
- determines what it costs to produce various crop and livestock commodities, and the relative importance of various production expense items.
- helps determine net farm income and provides data on the financial situation of farm and ranch businesses, including the amount of debt. ARMS data provides the only national perspective on the annual changes in the financial conditions of production agriculture.
- provides the farm sector portion of the Gross Domestic Product (GDP) for the Nation. If ARMS data were not available, the Bureau of Economic Analysis (BEA) would have to conduct their own survey of farm operators to collect this data.
- helps determine the characteristics and financial situation of agricultural producers and their households, including information on management strategies and off-farm income.

Pesticide Data Program

The National Agricultural Statistics Service (NASS) has collected agricultural fertilizer and pesticide use data for major field crops and selected fruit, vegetables, melons, and strawberries for several years. This data has been used in building a database for the USDA Pesticide Data Program (PDP). The PDP is used by USDA to evaluate the safety of the Nation's food supply.

In 2002, the Food Quality Protection Act (FQPA) was signed to reform the nation's food safety laws. FQPA was first implemented in 1996, to increase the need for actual, reliable chemical use data. FQPA requires the Environment Protection Agency (EPA) to conduct an accelerated review of tolerance levels for re-registration of pesticide products.

Part of the EPA review includes using actual chemical usage data. **Only the grower can provide these data.** If these data are not available, EPA could assume maximum label rates are being applied on all crop acreage. This would likely over count the true amount of pesticides being used to produce field crops. The result could be cancellation of the product registrations for chemicals farmers rely on.

Other USDA agencies are closely involved in the PDP and the FQPA with NASS. The other agencies are the Agricultural Marketing Service (AMS), Economic Research Service (ERS), and Agricultural Research Service (ARS). These agencies collect and analyze agricultural chemical use and residue data to estimate potential human exposure to pesticide residues in the U.S. food supply. The results of their analysis will be used to help make decisions concerning product registration issues, risk assessments, benefit assessments, and for marketing commodities at the State, National and international level.

Field crop growers have a vested interest in the risk analysis because many pesticides they rely on are classified as "minor use". Growers often have no alternatives to these chemicals. If re-registration is not allowed on products used on specialty crops, such an action could have serious consequences for both farmers and consumers.

The important benefits gained from responding to the survey are:

- Growers have a chance to tell how they use chemicals responsibly to maintain a safe and abundant food supply.

- The survey results are official USDA estimates and help to establish the facts about chemical use. Accurate data can be used to lessen concern relating to marketing and exports to other countries.
- Accurate and timely information on actual usage can be used in the decision-making process for product registration, re-registration, and product alternatives.

Natural Resource Data and Farm Practices

The 2008 Farm Bill (official title: The Food, Conservation, and Energy Act of 2008) emphasized conservation on “working land” (i.e., conservation programs that protect and enhance natural resources while keeping farmland in production) by increasing funding for the Environmental Quality Incentives Program (EQIP) and establishing a new Conservation Stewardship Program (CSP). These two working-land conservation programs provide financial and technical assistance to improve conservation effort on lands in production. These programs are estimated to receive 17 percent increase in funding. This increased funding reduces Conservation Reserve Program acreage cap to 32 million acres beginning October 2009.

The EQIP was established by the 1996 Farm Act as a new program to consolidate and better target the functions of the Agricultural Conservation Program (ACP), Water Quality Incentives Program (WQIP), Great Plains Conservation Program (GPCP), and Colorado River Basin Salinity Program. The objective of EQIP, like its predecessor programs, is to encourage farmers and ranchers to adopt practices that reduce environmental and resource problems through 1 to 10-year contracts providing education, technical assistance, and financial assistance targeted to watersheds, regions, or areas of special environmental sensitivity identified as priority areas. The 2008 Farm Act added forest management as activity eligible for grant funds.

The CSP replaced the Conservation Security Program but is similar to the past program. This program provides payments to producers for adopting or maintaining a wide range of conservation management and land-based structural practices that address 1 or more resources of concern such as soil, water, or wildlife habitat. As with EQIP, a wide range of practices can be subsidized. But CSP will focus on land-based practices and specifically excludes livestock waste handling facilities. Please note: Because contracts are 5-10 years in length, there will be some farmers who still have Conservation Security Program contracts.

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To guide policy makers in the decision-making process, it is necessary to have reliable information about production practices used and the relationship of the practices to changes in the quality of our soil and water resources. Decisions affecting agricultural policy and producers will be made with or without data. It is much better to have factual information to guide the decision process. Farm production covers a major share of the natural resources of the country and, its' policy about how to manage production is formed; a better understanding of the production process can prevent uninformed choices.

The agricultural community is currently faced with many complex issues concerning the environment, such as fertilizer and pesticide use, soil erosion, and pesticide residue and restriction. ARMS data is useful in addressing some of these concerns. For instance, fertilizer and pesticide data are used to study water quality. Data on production practices such as machinery use, and crop rotation help to identify tillage systems and crop residue levels affecting soil erosion. Pesticide data help measure the economic impact on agricultural production from restricting use or cancellation of a pesticide product or to determine the human and environmental risk of continued use. Data measuring the extent and intensity of pesticide use will aid in the development of residue monitoring programs to improve food safety.

Publication of ARMS Data

Most Regional Field Offices (RFO) use information from several NASS reports in preparing publications for their State.

- NASS reports are available on the Internet at: <http://www.nass.usda.gov/>

The NASS publication, Agricultural Chemical Usage - Field Crops, provides estimates of acreage treated with fertilizer and chemicals and total amounts applied, using data from the ARMS Phase 2. The results of the 2023 Phase 2 will be released in July 2024.

NASS publishes Farm Production Expenditures using data from Phase 3. This report shows expenditures for 17 expense categories in the U.S., 5 farm production regions, 7 U.S. economic size groups, and U.S. crop and livestock farms. The 2023 survey results will be released in September 2024.

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Chapter 2 - Terms and Definitions

Enumerators working on the ARMS should be familiar with the definitions of the terms listed below. Descriptions of irrigation systems have been described in Chapter 5 of this manual.

Abandoned Acres – Acres that were not (will not be) harvested for any purpose.

Abnormal Farms – See institutional farms.

Actual Nutrients – The reporting primary plant nutrients expressed in terms of active ingredients or units of nitrogen, phosphorus, potassium, and sulfur applied. A unit equals 1 pound.

Active Ingredients – The ingredients in fertilizer or pesticides which chemically react with soil, plant, animal, or pest to give the desired effect.

Adjuvant – Chemical added to a pesticide to increase its effectiveness or safety.

Beneficial Insects – Any of a number of species of insects that perform valued services like pollination and pest control. Also, any insect that improves the soil, pollinates plants, or controls harmful pests.

Biocontrol – A method of controlling pests that relies on predation, parasitism, herbivory, or other natural mechanisms.

Biological Pesticide – A naturally occurring substance that controls pests.

Carryover – [Pesticides] Chemical pesticide residuals remaining in the soil a year or more after being applied. Residual levels are influenced by chemical type, amount or rainfall, and soil type. The carryover from some chemicals may affect the growth of certain crops planted in later years.

Commodity – Any agricultural or agricultural by-product available for sale.

Confidentiality – The assurance for NASS to survey respondents, backed by federal law, is that individual information collected on authorized USDA surveys will not be released to any person, organization, or institution, including court subpoenas. See the “NASDA Employee Handbook” for regulations.

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Conservation Tillage – Any of several tillage and planting methods that leave a minimum of 30 percent of the soil surface covered by crop residue following planting. The method should provide for seed germination, plant growth, and weed control yet maintain effective ground cover throughout the year and disturb the soil as little as possible. It reduces soil loss and energy use while maintaining crop yields and quality. Weeds are controlled primarily with herbicides.

Contour Farming – Field operations such as plowing, planting, cultivating, and harvesting at right angles to the ground's natural slope to reduce soil erosion, protect soil fertility, and use water more efficiently. Furrows, crop rows, and wheel tracks across the slope act as miniature terraces.

Cost of Production – The average amount in dollars per unit used in growing or raising a farm product, including all purchased inputs, and sometimes including allowances for management and the use of owned land. The cost may be expressed in units of a bushel, pound, ton, or per-acre, depending on the product involved.

Cropland – Land which can produce a crop for harvest (pasture and timber are not considered crops). Cropland includes land cropped, idle land suitable for cropping, land in orchards, etc. Do not include woodland, marshes, or land suitable only for pasture.

Crop Insurance – Any Federal, state, or private insurance (multipurpose or specific).

Crop Rotation – The growing of different crops in a repeating sequence on the same land.

CWT (Hundredweight) – A common unit of measure in agriculture. This marketing term referring to 100 pounds of a commodity (i.e., milk, small grain, meat). Abbreviated "CWT."

Date, Due – [Enumerators] The date assigned materials must be received in the Regional Field Office. [Regional Field Office] The date assigned materials must be received in Headquarters.

Date, Reference – The date used as a reference point for asking respondents survey questions. For example, the reference date for the Agricultural Surveys is the first day of the month, for ARMS it's a specific year.

Date, Release – The date the survey results are published and released. See the NASDA EMPLOYEE HANDBOOK for a calendar of the various report release dates.

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Defoliant – A chemical agent that causes the leaves to drop from a plant. Often used with some crops to facilitate harvest.

Double Crop – The growing of two crops for harvest in one year from the same field.

Editing – Reviewing entries for reasonableness and validity on completed questionnaires. Unusual but correct responses should be flagged and explained with notes indicating it was verified with the respondent. With impossible data relationships, probe for the correct response.

Fallow – Cropland left uncropped during one growing season to conserve moisture in the soil, control weeds and allow the decomposition of crop residue.

Farm – Land under one operating arrangement on which there were or could be sales of a least \$1,000 worth of crops, livestock, poultry, or other agricultural products during the year.

Fertilizer – Any material put on or in the soil or on plant leaves to improve the quality or quantity of plant growth. See “Micronutrients,” “Nitrogen,” “Phosphate,” “Potash,” “Sulfur,” and “Trace Element.”

Fertilizer Analysis – The percentage of nitrogen, phosphate, potash, and sulfur (N, P₂O₅, K₂O, S), specified in that order, contained in a blend of fertilizer. Fertilizer may also be blended with various micronutrients or trace elements.

Field – A continuous area of land devoted to one crop or land use. Farmstead, pastureland, woods, wasteland, etc. are considered fields.

Filter Strip – An area of permanent herbaceous vegetation used to reduce sediment, organics, nutrients, pesticides, and other contaminant loadings in runoff.

Fungicide – A chemical used to kill fungi.

Gallons per Minute – Measure of water flow-rate. The quantity of water flow (or pumped) during one continuous minute measured in gallon units.

Grassed Waterways – A natural drainage way within a field which is kept in grass to prevent soil erosion. Includes channels used as outlets for terraces and for the disposal of runoff from diversion channels, stabilization structures, contoured rows, and natural depressions.

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Green Chop – An alternative to pasture. The crop is cut in the field and brought to the animal. Suitable crops are corn, grass, whole crop grain, and legumes.

Harvested Acres – Acres of a crop actually harvested. It may be smaller than planted acres if there is abandonment brought on by weather, pest damage, other disasters, or market prices too low to cover harvesting costs.

Hay – A crop which has been cut and cured by drying for storage; principally legumes, grasses, or grain crops.

Highly Erodible Land (HEL) – Soil erosion can be caused by rainfall or wind. Rainfall erodibility is a function of rainfall intensity, soil properties, slope, and slope length. Wind erosion is a function of prevail winds, soil texture, and topography. NRCS uses these characteristics and a measure of soil loss tolerance to construct an erodibility index. If the index is greater than 8, the field is highly erodible.

Herbicide – Any chemical used to control, suppress, or kill plants, or to severely interrupt their normal growth processes. Some kill essentially all plants, but others are selective.

Hundredweight (CWT) – A common unit of measure in agriculture. This marketing term referring to 100 pounds of a commodity (i.e., milk, small grain, meat). Abbreviated “CWT.”

Idle Land – Farmland that is tillable and capable of producing a crop without major clearing of trees and stones or drainage of water but is not being cropped, pastured, or fallowed.

Implement – Any farm machine used to perform various field operations when raising crops.

Improvements – Houses or other buildings, fences, clearing of rocks, wells or other related capital assets that increase land’s productivity or value.

Inaccessible – A sample unit which cannot be contacted, interviewed, etc., during the survey period.

Input – Items such as seed, fertilizer, chemicals, feed, machinery, fuel, labor, and/or land used in the production of an agricultural product.

Input Provider – The company or individual that sells or contributes products used in the production of agricultural commodities.

Insecticide – A chemical used to kill insects.

Institutional Farms – Farm operations such as Indian Reservations, prison farms, private or university research farms, not-for-profit farms operated by religious organizations, and high school FFA farms. These types of farms do not have the same expenses or income patterns as traditional farms.

Integrated Pest Management (IPM) – The control of one or more pests by a broad spectrum of techniques ranging from biological means to pesticides. The goal is to keep damage below certain economic levels without eliminating the pest completely.

Irrigation Set – The area of the field irrigated by an irrigation system as it moves across a field while not ceasing operation.

Landlord – The owner of land or buildings which are rented to another person for cash, a portion of the crop or livestock, other proceeds, or for free.

Landplaster – A pure, natural gypsum ideal for a wide range of agricultural uses and has proven to be an excellent source of calcium and sulfur to benefit peanut production.

Lime – Ground limestone (calcium carbonate) that helps correct an acidic soil condition.

Military Time – A system of time as a unit of a 24-hour day rather than as a time within AM or PM. See the NASDA Employee Handbook, Appendix A. Clock Hour Conservation, for a Military timetable.

Minimum Tillage – A practice used to manage the amount, orientation, and distribution of crop and other plant residue on the soil surface year-round while limiting soil-disturbing activities used to grow and harvest crops in systems where the field surface is tilled prior to planting.

N-P-K and S – Chemical symbols for nitrogen, phosphorus, potassium, and sulfur. Chief ingredients of fertilizer.

National Institute of Food and Agriculture (NIFA) – A USDA agency providing farmers and rural people leadership, evaluation, and coordination in support of state and county educational programs. It also provides access to agricultural research and information on federal regulations and policy, food safety, agricultural marketing, disaster awareness, sustainable agriculture, waste management, water quality, and youth at risk. The former Extension Service is now a part of this Agency. This Agency

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was formerly known as Cooperative State Research, Education, & Extension Service (CSREES).

Natural Resources Conservation Service (NRCS) – A USDA agency charged with national soil and water conservation program in cooperation with landowners, operators, developers, community planning agencies, and other local, state, and federal agencies. Soil Conservation Service is now part of NRCS.

Nitrogen (N) – A chemical element essential to life and one of the primary plant nutrients. Animals get nitrogen from protein feeds, plants get it from soil, and some bacteria get it directly from air. Nitrogen is one of the three primary ingredients in complete fertilizers. Nitrogen content in a fertilizer's analysis is indicated as the XX's in XX-0-0.

Non-response – Failure of a respondent to reply to a survey questionnaire; may be item non-response (refuse to answer one or more questions), survey non-response (refuse to answer any or most of the questions), or inability of enumerator to locate respondent during the survey period.

No-till – Method of planting crops without seedbed preparation. Seeds are planted directly into the previous crops stubble. Soil disturbance is limited to small slits in the soil needed for seeding. There is usually no cultivation during crop production with chemicals used for weed control.

Nutrient – A substance that provides nourishment for growth.

Operator – The person responsible for all or most of the day-to-day decisions such as planting, harvesting, feeding, or marketing for the tract or total land operated. The operator could be the owner, hired manager, cash tenant, share tenant or a partner. If land is rented or worked on shares, the tenant or renter is the operator.

Organic – A production system that is managed in accordance with regulations governing organics to respond to site-specific conditions by integrating cultural, biological, and mechanical practices that foster cycling of resources, promote ecological balance, and conserve biodiversity. Note that no genetically modified seed or synthetic pesticides can be used in an organic production system.

Out-of-business – A previous farm or ranch operator who no longer makes the day-to-day decisions on land suitable for agriculture; raises no crops, livestock, or poultry; has no on-farm grain storage facilities. They may own farmland which is being operated by someone else. See “Retired”, and “Sold-out.”

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Partner – An individual that shares day-to-day decision making with someone else.

Pesticide – A substance or mixture of substance to control insects, rodents, fungi, weeds, and other forms of plant or animal life considered to be pests. Pesticides include insecticides, fungicides, herbicides, and nematicides.

Phosphate (P_2O_5) – A term indicating a fertilizer which supplies phosphorus, one of the three primary ingredients in a complete fertilizer. The phosphate content in a fertilizer's analysis is indicated as the XX's in 0-XX-0.

Plant Tissue Test – Plant tissue analysis provides information on how the plant is using particular nutrients and gives clues for deciphering nutrient deficiency or excess problems.

Potash (K_2O) – A term used to indicate fertilizers which supply high levels of potassium. The potash content in a fertilizer's analysis is indicated as the XX's in 0-0-XX.

Questionnaire – A form or computer program (CATI, CAPI) used to ask specific questions from and to record the response given by selected sample units to the survey questions.

Refusal – A person representing a sample unit who will not cooperate in the survey and who refuses to provide sufficient information to satisfactorily complete the questionnaire, or who will not give an enumerator permission to complete field counts or measurements.

Rent – Reimbursement to the owner (landlord) from the user (tenant) for land, buildings, equipment, livestock, etc., used in production.

Rent, Cash - Fixed – predetermined dollar amount paid for the use of land, buildings, equipment, livestock, etc.

Rent, Share – Method of paying rent, where the owner receives a share of the crop, livestock (or product, such as milk or wool) as payment for use of land, buildings, equipment, livestock, etc. and usually shares in some of the costs.

Respondent – The person who provides the information necessary to complete a survey interview.

Retired – A previous farm or ranch operator who is now out-of-business because he/she has reached an age to retire from farming or ranching. He/she may still own farmland, which is being operated by someone else. See "Out-of-Business."

Sample, List – A sample of potential farm operators or agribusinesses selected from a List Sampling Frame (LSF).

Sample, Probability – A sample where every sampling unit of the sampling frame (area or list) has a known, nonzero chance of being selected.

Sampling Frame – A population or list of all possible units which meet a specified criteria to draw a sample.

Sampling Unit – An identifiable unit of a sampling frame that may be selected when drawing a sample. For an area frame sample, it may be a segment, tract or field and for a list frame sample it is a name.

Scouting – A process of checking a field for the presence of weeds, insects, or disease and gathering information about pest population levels, activity, size, and/or density.

Seed – An embryonic plant with sufficient nutrients required during germination and early growth until the plant is able to produce its own food.

Sold-out – A previous farm or ranch operator or operation that is now out-of-business due to selling the entire farming or ranching operation; no longer owning any farmland; crop, livestock, or poultry facilities or grain storage facilities. See “Out-of-Business.”

Strip Cropping – Growing crops in a systematic arrangement of strips or bands to serve as barriers to wind and water erosion.

Sub-irrigation – Water supplied through underground tile or perforated pipe in sufficient amounts to maintain a water table close to the soil surface to supply water for crop needs.

Sulfur (S) – Sulfur is a macronutrient which can be found in commercially produced fertilizers.

Surface Water Sources – Water stored in natural ponds or lakes, flowing in streams and rivers, and water stored in man-made reservoirs.

Surfactant – A chemical added to a pesticide which improves the emulsifying, dispersing, spreading, and/or wetting properties of the pesticide.

Survey – The collection of data pertaining to specific sample units. A sample is selected, and information collected from individual sampling units. Data reported by

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the selected sampling units, when summarized (weighted), provides an indication of what the total would be for the whole population (all US farms).

Survey Period – The time period during which survey data collection can occur. Primarily determined by the survey's reference date and due date. See "Data Collection", "Date, Due", and "Date, Reference."

Tank Mix – Two or more pesticide products mixed in the spray tank by the applicator immediately before application and applied to the field as a single treatment.

Terrace – Raised level areas of a field supported on one or more sides by a wall or bank of turf. Terraces are usually classified by the method of runoff disposal, the shape of the terrace cross section, or by the alignment between terraces.

Underground Outlets – Systems of water runoff control carrying water through and underground pipe to disposal areas. The underground outlet consists of vertical intake risers carrying water to an underground outlet such as tile drainage.

Wetlands – Land characterized by an abundance of moisture and is inundated by surface or ground water often enough to support a prevalence of vegetation adapted for saturated conditions.

Wetting Agent – Some soils, known as hydrophobic soils, are difficult to wet because they repel water. The infiltration of water into these soils can often be improved by applying a nonionic surfactant, more commonly called a wetting agent. Wetting agents are detergent-like substances that reduce the surface tension of water, allowing it to penetrate and wet the soil more easily.

Worker – [Labor] Person doing work.

Yield Goal – The yield that the operator uses in planning input application (seeding rate, fertilizer/pesticide use, etc.). This is often the historic average.

Yield Map – A map prepared from data collected by a yield monitor attached to harvesting equipment. A yield map shows the variation in yields for small areas within a field and is a key component in the detailed planning inherent in precision farming.

Yield Monitor – A monitor mounted on harvesting equipment that measures yield continuously as the harvester moves through a field. These yield measures can be tied to specific locations in the field through GIS and converted into yield maps. Such yield maps can then be compared with the fertilizer or pesticide application map of the next season.

Chapter 3 - Survey Procedures

This chapter provides an overview of the questionnaire and other materials for ARMS, and general guidelines for collecting data. The NASDA Enumerator Handbook covers administrative matters.

At a minimum, the NASS Regional Field Office will provide the following:

- Copies of pre-survey publicity materials mailed to each respondent
- Extra questionnaires without labels
- Respondent Booklets containing code tables and a burden statement
- Screener Supplement
- Maps for marking field locations (optional)
- Envelopes for mailing completed questionnaires if a paper questionnaire was completed

You should already have these items on hand:

- Interviewer's Manual
- Black lead pencils

Questionnaire

For 2023, The PPR commodity is Barley. This version is used to obtain chemical use and production practices.

Sections of the questionnaire are identified by letter and title. For example, Section D is "Pesticide Applications -- Selected Field." Chapter 5 discusses these sections.

Respondent Booklet

You will use one Respondent Booklet for each interview. The Respondent Booklet provides information respondents need to reference when answering some survey questions, such as Code Lists. Often, this information does not appear in the questionnaire. Using the Respondent Booklet can prevent confusion and save interview time.

Occasionally, the respondent may need help in becoming familiar with how to use the booklet. This is especially important when using the longer Code Lists, such as the Chemicals and Pesticides list. While conducting the interview, take a moment when

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first turning to a questionnaire section to inform respondents how to reference the appropriate code lists in the booklet. This should help the interview go more quickly.

Some lists in the Respondent Booklet are there to let the respondent know what type of response we are looking for to certain questions. For example, in Section C or D, when asking the respondent “How was this (fertilizer or pesticide) product applied?” show the respondent the Fertilizer/Pesticide Application Method Code List printed in the Respondent Booklet. Otherwise, the respondent may take additional time explaining in detail how he applied the material, when all you really wanted to know was that the material was “broadcast by aircraft” (method code 3).

The Respondent Booklet will also be available in the CAPI instrument as a “**help**” tool for the enumerators.

Respondent Burden

You will reduce the burden on the respondent if you are thoroughly familiar with the questionnaire and instructions. Pay close attention to skip instructions in the questionnaire to avoid asking questions needlessly. When skip instructions are not printed or shown within the CAPI instrument after an item, you will continue with the next item.

Also, be aware of the estimate of average completion time in the Burden Statement. The estimated average completion time is based on experience with previous ARMS Phase 2 surveys and the judgment of NASS and the Office of Management and Budget (OMB). OMB is an agency that approves all surveys conducted by the federal government. The expected average interview length for the Barley PPR is 35 minutes. Burden statements are printed on the front cover of the Respondent Booklet.

Questionnaire Format

The following formatting conventions apply to the ARMS Phase 2 questionnaire:

Interviewer Instructions

Interviewer instructions are enclosed in square brackets. These instructions will provide important directions you will need to pay attention to when completing the questionnaire.

Figure 1 Example of interviewer instructions

	Code	Office Use Edit Table
1. Were any herbicides, insecticides, fungicides or other biocontrols or pesticides used on this potato field for the 2022 crop?.....	0302	0300
	Yes=1	
	No=3	

[Probe for applications made in the fall of 2021 and those made earlier if the selected field was fallow.]

Include Statements and Check Lists

Include statements and check lists are used to ensure that items sometimes forgotten are not missed. These include statements and check lists should **NOT** be considered complete lists of items to be included in the response.

Instructions for Respondents

Prompts, "includes" and "excludes," and other instructions for respondents are Capitalized. These prompts are to help you and the respondent when a question arises as to the intent or meaning of the question. Read these when needed to clarify the meaning of the question.

Figure 2 Example of instructions to read to respondents

	Code	Office Use Edit Table
1. Were commercial nutrients or fertilizers applied to the selected field for the 2022 potato crop? INCLUDE those from operators, landlords, and contractors.....	0202	0200
	Yes=1	
	No=3	

Item Code Boxes with Decimal Points

Some code boxes have a printed decimal point followed by one or two marked spaces. They show that you should record data to the tenth or hundredth place. When entering data into these cells, place the number correctly in relation to the decimal points, and fill every space printed after them. Fill in zeros when

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the respondent does not give answers to the number of decimal places needed, or when he gives answers in whole numbers.

For example, if a cell has a decimal point followed by two underlined spaces, you should record responses in HUNDRETHS. Record an answer of “18” as “18.00.”

Figure 3 Example of code boxes for recording data to one or more decimal places.

Chemical Product Name	L I N E	2 What products were applied to the selected field? [Show product codes from Respondent Booklet.]	3 Was this product bought in liquid or dry form? [Enter L or D]	4 If this was part of a tank mix, enter line number of first product in mix.	5 When was this applied? 1 Before planting 3 At planting 4 After planting 5 Defoliation prior to harvest	6 OR 7 How much was applied per acre per application? What was the total amount applied per application in the selected field?	8 [Enter unit code] 1 Pounds 12 Gallons 13 Quarts 14 Pints 15 Liquid Ounces 28 Dry Ounces 30 Grams
	01	61	62	63	64	65 73	74

Item Code Boxes for Recording Dates

Some item code boxes are set up for recording dates in MM DD YY format. These cells have six preprinted underlines. MM stands for the two digits that refer to the month, DD is for the two-digit date for the day, and YY is for the two digits for the year.

For example, October 1, 2023, should be entered as 1 0 0 1 2 3

Figure 4 Example of a code box for recording a date value.

Respondent Name:		Respondent Phone (if different from above)			
9912	9911	check if cell phone	9910	MM	DD YY
	() -	<input type="checkbox"/>	Date:		

Office Use Boxes

Office Use boxes are labeled throughout the questionnaire. You will not make entries in office use boxes.

Figure 5 Example of an ‘office use’ box.

1. Were any herbicides, insecticides, fungicides or other biocontrols or pesticides used on this potato field for the 2022 crop?.....	Yes=1	Code	Office Use Edit Table
	No=3	0302	0300

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Yes/No Questions

Questions that can be answered YES or NO are of one of the following two formats. If the respondent doesn't know if the answer is YES or NO, then record DK next to the code box. If the respondent refuses to answer, then record "REFUSED" in notes outside the box.

YES=1 / NO=3 Boxes

The format for YES/NO questions is the response code YES=1 and NO=3 printed next to the code box. If the answer to a YES/NO question is YES, enter code 1. If the answer is NO, then enter a 3 in the box to show the question was asked and the respondent answered NO.

Figure 6 Example of a 'YES=1' and "No=3" question.

Were any beneficial organisms, such as insects, nematodes, or fungi, applied or released in the selected field to manage pests?.....	Yes=1 No=3	Code 0853
--	---------------	--------------

Multiple Choice Questions with Coded Response Categories

Multiple choice questions allow the respondent to choose only ONE answer from several possible answer choices offered. Each response category is given a code number and the group of answer choices is enclosed in a box with a solid outline. You will enter the respondent's answer as a code number.

Figure 7 Example of a question with coded response categories.

1	2	3	4
9. Was this potato field scouted for--		[If column 2 = 1, ask--] What was the infestation level for [column 1]? 1 Higher than normal 2 Normal 3 Lower than normal	[If column 2 = 1, ask--] Who did the majority of the scouting for [column 1]? 1 Operator, partner or family member 2 An employee 3 Farm supply or chemical dealer 4 Independent crop consultant or commercial scout
	Yes=1 No=3	Code	Code
a. weeds?.....	0812	0813	0814

Questions with More than One Sub-part

Questions with more than one sub-part are separate questions. The main question (the "stem") has an item number. Sub-parts to the question are identified with a lower-case letter. Each sub-part is a separate question and

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must be asked separately. You should read the question stem followed by the ending sub-part associated with the letter. If there are lots of sub-parts, you will probably only need to read the stem for the first two or three sub-parts. Once the respondent understands that the stem is repeated, though unspoken, then continue reading only the sub-parts.

Figure 8 Example of a question with multiple subparts.

11. Did you do any of the following other types of pest management for the specific purpose of managing or reducing the spread of pests in the selected field?		Code
a. Use the services of a diagnostic laboratory for pest identification or soil plant tissue pest analysis for the selected field?.....	Yes=1 No=3	0841
b. Plow down crop residue using conventional tillage?.....	Yes=1 No=3	0842

Entering Data

Use a black lead pencil to record data and notes; never use ink on a questionnaire. Make all entries clear, and easy to read. Entries in check boxes and item code boxes must be entirely inside the boxes.

Responses should be recorded in the unit shown in the questionnaire (such as acres, bushels, or dollars). If a respondent gives an answer in a different unit, write the answer outside the printed box, convert it to the required unit, and record the converted data in the box.

If the respondent answers "none" to a question, enter a dash (-----) in the box, and not a zero.

For questions answered with a code number, enter the number that goes with the respondent's answer. If the respondent answers using only the code number, verify that the code is correct by repeating the answer in words.

For YES/NO questions, enter code 1 if the answer to the question is "YES". If the answer is "NO", enter code 3. Where noted, enter 99 for Don't Know or code 4 for N/A.

- Yes = 1
- No = 3
- N/A = 4
- Don't know = DK or 99 if the code is present
- Refused = RF

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The Regional Field Office must be able to tell the difference between questions asked and the answer was NO or ZERO, and questions asked, but the respondent could not answer (DK) or did not answer (REFUSED). For any question, if the respondent doesn't know the answer, then record DK or "DON'T KNOW" next to the question. If the respondent refuses to answer, write "REFUSED" next to the question.

Record data to the nearest whole number, unless a decimal point is in the box. Place numbers correctly in relation to decimal points, and fill in every space printed after them. Use zeros as fill when answers are not given to as many decimal places as required by the data cell.

If answers appear unusual, but really are correct, make notes in the margins to explain. Do not write notes or make unnecessary entries in answer boxes.

Planning Your Work

The operator or operation name, mailing address, and ID number are on the questionnaire label. The Regional Field Office may provide other information, either on the label or on separate forms that might be helpful to you in finding the selected operation. However, since we are implementing the CAPI instrument, the field cardinal will be located on the label also (north, south, east, west, northeast, northwest, southeast and southwest).

Interviewing

Interview the farm operator, if possible, because information collected from other people is often less accurate. If the operator says someone else is more knowledgeable, interview that person. Make a note of who that person is and what their job title or position is.

If the operator is too busy to be interviewed at that time, set up an appointment at his or her convenience. Be sure to keep the appointment and be on time! If an emergency prevents you from keeping the appointment, inform the operator beforehand and reschedule the interview. Remember, in-person face-to-face interviews are allowed for 2023 unless otherwise informed from HQ, NASDA Coordinator and/or CDC guidelines.

If the operator will not be available before the survey is over, try to interview someone who is well informed about the operation. A partner, family member or an employee may know enough about the aspects of the farm operation covered in the questionnaire to give you the information needed.

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Respondents often ask how long the interview will take. Never contradict the Burden Statement printed on the Respondent Booklet; however, adding to it is okay. For example, you might say something like this: “The official nationwide average for this survey is 35 minutes, however, the interviews I have done averaged about xx minutes.” Be honest about the average time, even if your interviews average longer than the time estimated in the Burden Statement.

Encourage respondents to have farm records at hand. Using records encourages accurate information and completing the interview will take less time.

The first time you ask a question, always read the question exactly as worded in the questionnaire or CAPI instrument. If the respondent did not hear or did not understand the question, repeat it using the same wording. Use any optional wording or explanations printed with the question in the questionnaire. If the respondent still doesn't understand, or asks you to explain, use what you learned in training and information from this manual to explain what we need.

Ask questions in the order they appear in the questionnaire or the CAPI instrument. Do not skip any questions unless skip instructions printed in the questionnaire or CAPI instrument allow inform you to do so. Sometimes, a respondent will volunteer information before you ask a question. When you get to a question the respondent already answered, take the opportunity to verify the information. Say something like, “I think you told me this earlier, but let me just be sure I got it right.” Then, ask the question exactly as worded. This doesn't make you look like you weren't listening. On the contrary, it emphasizes to the respondent the need to get things right.

Sometimes you will need to probe to get an adequate answer to a question. You should probe when the respondent cannot answer the question, when the answer isn't exact enough to record, when you think the answer may be incorrect because it doesn't fit with information you've already obtained, or when you think the respondent didn't understand the question.

The purpose of probing is to verify unusual data or to correct misreported data. You must be careful when you phrase your probing questions that you do not influence the respondent's answers. Probes should be “neutral,” that is, they should not suggest one answer over another.

For example, don't say things like, “Use beneficial organisms in this field, you didn't do any of that, did you?” Instead, say, “Did you use any beneficial organisms to control pests in this field?” If the respondent asks for more information, explain that “Beneficial organisms include insects like green lacewings or ladybugs that are natural enemies of crop pests.”

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As another example, if a respondent tells you that a value is between two amounts, such as, “Oh, I used a seeding rate of between 1 and 2 bushels per acre,” you should ask, “Would you say it was closer to 1 bushel per acre or 2 bushels per acre, or what amount exactly?”

Probes should also be “nonthreatening.” Be careful that you don’t appear to be questioning or challenging the respondent’s answers. Don’t say, “That can’t be right, three bushels of seed per acre is way too much!” Instead, say, “Does that three bushels include replanting? I only want the seeding rate for the first time the field was planted.” Make corrections to data items if necessary or make notes of the respondent’s answer if it is correct.

Be sure to make good notes on the paper questionnaire if you need too. This is especially important when you find unusual situations, or the respondent explains why information that seems incorrect is correct. Also, write down any complicated calculations you may have to assist you in coming up with an answer.

The notes you record in the questionnaire will help the survey statistician understand this operation when reviewing the questionnaire. Clear notes will also help the enumerator if they need to go back and re-read what they wrote down. Make sure the notes are clear and can be read. Notes can be the single most valuable editing tool available to the office statistician.

Never erase a note unless it is wrong!

After completing each interview, be sure to review the paper questionnaire or the CAPI instrument while the interview is still fresh in your mind. Make sure you recorded all answers correctly and the questionnaire is complete. Check your calculations. Make sure all notes are clear if you used the paper first, then capture the data into CAPI.

Framework and Reference Period for Reporting Data

The ARMS questionnaire is designed to collect information about production practices used and expense items associated with the 2023 crop of the randomly selected field or block.

Fertilizer and pesticide data cover a period of immediately after harvest of the most recent crop (before this year’s target crop) and continue through all applications made for this target crop. Post-harvest pesticide applications to the harvested crop are excluded.

Non-response

If you are unable to conduct an interview, note the reason on the questionnaire or in the CAPI instruments. Also, make a note about whether the operation is a farm, whether it appears to have the target crop commodity was grown, and any other information you think might be helpful to the RFO.

Most farmers are willing to furnish the information asked for in NASS surveys, but in every survey, some will refuse to do so.

The key to reducing the chances of getting refusals is to be courteous and friendly, but persistent. Try to get cooperation by explaining the purpose of the survey, the need for accurate agricultural statistics, and the confidentiality of the data. Make use of materials explaining the survey purpose provided by your RFO.

Above all, do not become discouraged when you get a refusal. Continue to meet farm operators with ease, friendliness, and optimism as you contact other assigned operators.

Supervision

Your supervisor will set up an appointment to meet with you early in the survey. This visit will help you get off to a good start by spending time reviewing a few of your completed interviews.

Your supervisor or someone from the RFO will contact a few of your respondents to conduct a quality check. The quality check will verify that you spoke with the person named in the questionnaire and that the respondent understood the survey procedures.

Completed Questionnaires

Turn in your completed questionnaires according to the instructions you receive from your supervisor if you've captured the data via paper. If you think the last few questionnaires, you complete, might not reach the RFO before the final due date, call your supervisor.

Keep a record of when you complete each questionnaire and when you passed it on to your supervisor or mailed it to the RFO. This will help the RFO find survey materials if they are delayed.

Chapter 4 – Screening

Face Page

Introduction

Before beginning data collection, develop an introduction you are comfortable using. In the introduction include who you are, whom you represent, and the purpose of the visit. You should be familiar with the information in Chapter One of this manual.

Some operators may have already heard about the ARMS on radio or television farm show broadcasts or short spots. They may also have read about the survey in a pre-survey letter from your Regional Field Office or in newspaper or farm magazine articles.

When making your introduction, remind the respondent that data they report will be kept strictly confidential. All information they provide will only be used to make state, regional, and national estimates. Mention that some farm records, particularly records of fertilizer or pesticide applications, will be useful along with any notes or records of when field operations took place. Also, you can mention that they will receive pesticide credits if they complete the survey. (Only if the state participates-Not all states participate).

Be prepared to answer questions the respondent may have about the purpose of the survey and uses of the data.

Target Name, Address, and Partners Verification

For 2023, the labels will be printed on the paper questionnaire that will be mailed from NPC to the RFOs. The Regional Field Offices (RFOs) will not have to create any labels.

All questionnaires will have one or more labels. If an individual's name (IMA FARMER) appears under the ID line and the first line is blank, this is the Target Name (unless the opDomStatus is 99 –the operation is target and it is a large/specialty operation). If the first line contains a combination of individual names (IMA AND YOUREA FARMER) or an operation name (NASS FARMS), then the individual's name on the next line down is the Target Name.

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If the opDomStatus is 99, then the name of the operation shown below the ID line is the target name.

Remember: The Target Name for OpDomStatus 99 NEVER CHANGES. The person operating the farm (the farm operator) may change, but the Target Name is always the Operation identified on the label.

The first thing you will do is verify the name and address for the target name. If there are partner labels, be sure that partner names and addresses are correct, and that all partners are listed. Mark through the names of any partners no longer involved in the operation. Record the names and addresses of any partners who are not listed.

Examples of common corrections are:

You R. Farmer
~~RK 1~~ → *5 Elm Drive*
Anytown, YS 12345

Middle Name is Agreat
Shes Farmer
RR 1 Box 50
Anytown, YS 56789

Beta isn't a Partner
Alpha & ~~Beta~~ Sanders
Tom Sanders
9295 Old Hwy 22
Anytown, YS 01234

New Manager: Echo Foxtrot
NASS Ranch
~~Charlie Delta~~, Mgr
RR 2 Box 99
Anytown, YS 43212

Screening Survey Information Form

Operations sampled for ARMS Phase 2 were interviewed during the Screening Survey. The Regional Field Office will insert a Screening Survey Information Form inside the questionnaire with information collected during the Screening Survey interview only if a paper questionnaire is used.

The Screening Survey Information Form shows:

- type of operation reported (individual, partnership, managed).
- who reported on the Screening Survey?
- how the screening data was obtained.
- the ID for the enumerator who conducted the screening interview.
- the sequence (sample) number. This number also appears on the ID label. This sequence (sample) number is used in marking field locations on maps.

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Verify the type of operation listed on the Screening Survey Information Form is still correct, particularly if you made corrections to the name, address, or partners on the Face Page.

Beginning Time

Record the beginning time (military) of the interview when the respondent agrees to cooperate on the survey, and you actually start the interview. We use interview times to find out how much respondent time we are using (as a measure of respondent burden) in collecting data. We are trying to reduce interview times as much as possible and still collect the high-quality data that we need.

Screening Box on Face Page

The Regional Field Office may want you to re-screen the target operation by asking the screening questions again. This may be because the respondent to the Screening Survey may have been someone other than the operator, or incomplete information was obtained on the Screening Survey (for example, partner information was not collected). If the Screening Box (cell 0006) on the Face Page is coded with a "1", the RFO will include a Screening Supplement for you to complete. Complete this supplement after verifying the name and address labels on the questionnaire, but before you begin asking questions in Section A of the questionnaire.

Back Page

Response Codes

Upon completion of the interview, enter the response code in cell 9901 on the Back Page of the questionnaire. Response codes are:

Code 1 - Complete	<ul style="list-style-type: none">• The questionnaire is complete, including questionnaires for respondents that are no longer in business.• Use Response Code 1 for operations that you have determined DID NOT grow the target commodity this year. Complete means you have obtained all the data needed for the questionnaire.• Use Response Code 1 for institutional farms, such as prison farms, private or university research farms, high school FFA farms, not-for-profit farms operated by religious organizations, and Indian reservations produce agricultural commodities, but
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	do not meet the ARMS definition of a farm or ranch. Production practices, costs, and income characteristics of these operations are not representative of the general farm population. Assign Response Code 1 to these types of operations and describe the specific type of operation on the face page with a note. A screening supplement must be complete for institutional farms, assigning 9921=14.
Code 2 - Refusal	The respondent refused to cooperate or grant an interview.
Code 3 - Inaccessible / Incomplete	The operator was not available throughout the survey period (inaccessible). You will also use code 3 if the respondent gave an interview but could not or would not answer a lot of the questions (incomplete questionnaire). If you determine that the target operation does not produce the selected commodity, code the questionnaire complete (code 1) and indicate the source of your information with a note.

Completing the Screening Supplement

Farm operations in each State are sampled for the phase 2 of the ARMS based on list frame information about crop acreage and gross value of farm sales. Agribusiness firms and agricultural services that do not produce crops or livestock of their own should have been excluded from the sample, but it is possible some names were mis-classified. Screening questions help determine if the selected name is eligible for this survey.

Abnormal (Institutional) farms such as prison farms, private or university research farms, high school FFA farms, not-for-profit farms operated by religious organizations, and Indian reservations are excluded from the survey. Production practices, costs, and income characteristics of these operations are not representative of the general farm population. If your assignment includes any of these farms, notify your supervisor or the survey statistician.

If an operation was in business during part of 2023, but went out of business during the year, complete a questionnaire for the part of the year during which the operation did business. If the operation was taken over by another operator or operation when it went out of business, make a note of this. This note should include a name, address, phone

number, and any other pertinent information about the new operation.

There is one version of the Screening Supplement. The supplement is used for opDomStatus 99 records and for the NON opDomStatus 99 operations. The supplement determines if the selected operation is in-business for 2023 and obtains additional information about other operations the target name is involved in. The RFO will insert the supplement into the paper questionnaire (if used), for you to use if the operation requires re-screening in Phase 2.

Item 1: Other Operation Name

Even though you have already verified the label, you need to ask this item to avoid duplication and to make sure the Regional Field Office sampling list is up to date.

Item 2: Crops, Livestock or Poultry

Check YES if the operation grew any crop (field crops, fruit/nut crops, vegetables, oilseeds, specialty crops, hay) or had cattle, hogs, sheep, poultry, or other livestock during 2023 on the total land operated. If YES, go to Item 7. If NO, continue with Item 3.

For an operation to qualify as growing a crop, it must have made the decisions on planting, caring for and harvesting the crop.

Include: field crops, fruit and nut crops, vegetables, mushrooms, flowers, nursery stock, greenhouse crops, hay, Christmas trees, etc.

Exclude: home gardens, crops received in the 2023 crop year as payment for land rented to someone else, and crops grown by anyone other than the target name on land this operation rents to others.

This screening question would also be checked YES if the target name had any livestock or poultry, regardless of ownership, on the total acres operated at any time during 2023.

Include: All cattle, hogs, sheep, mules, goats, chickens, turkeys, ducks, geese, bees, rabbits, mink, or other fur bearing animals, and fish that are raised commercially or for home consumption. FFA and 4-H livestock projects should also be included.

Exclude: Horse boarding operations, riding stables, or race horse training operations that do not have other agricultural items. Also exclude slaughter or packing houses, auction barns, stockyards or order buyers. These operations have livestock which are committed for slaughter. The presence of these livestock alone does not qualify an operation for the survey.

Item 3: Sales of Agricultural Products or Receipt of Government Agricultural Payments

Include sales of crops, livestock, fish, and other products from the total land in the operation. Include any government payments received under the 7-year market transition program, conservation programs, etc.

This item should be answered NO when the respondent is a landlord who only sells agricultural products from, or only receives government farm payments for, land which was rented out.

If this item is checked YES, go to Item 7.

If Items 2 and 3 are both NO, continue with Item 4.

Item 4: Idle cropland or more than 99 acres of pastureland

If the operation will have more than 19 acres of idle cropland or more than 99 acres of pastureland check YES, go to Item 7.

If NO, go to Item 5.

Item 5: Who is Operating the land

If items 2, 3, and 4 are NO, then the selected operation is considered to be out-of-business for 2023.

Determine if anyone else is now operating the land formerly operated by the target name on the Face Page. Ask this item only if the respondent answered NO to questions 2, 3, and 4. If another operation has taken over from the target name on the label, record the name of the operator or operation now operating the land.

This item gives us the information we need to update the List Frame when operations have gone out of business. Record the name, address, and phone number (if available) of the individual or operation now operating land that used to be operated by the target name. If the respondent answers NO to this item, probe to determine what happened to the land, and make notes.

Item 6: Enumerator Action

These instructions only apply in rare cases and the interview will not be conducted based on information recorded on the screening supplement.

If the operation is out-of-business, any data obtained in the questionnaire would be excluded from the summary process. Therefore, the interview should be ended before burdening the respondent to complete the questionnaire.

1. On the Screening Supplement, enter code "9" for the reporting unit in item 7.
2. Go to the bottom of the Back Page and complete the following administrative items: Response code, Respondent code, Mode code, Ending Time, Date, and Enumerator ID.

Item 7: Decision-Maker for This Operation

This item is only completed if the operation is in-business for 2023 (item 2, 3 or 4 is checked 'YES').

We are interested in how the operation was managed on a day-to-day basis. We do not care what the LEGAL definition of the operation is.

Definitions of individual, partnership, and managed land are printed in the Interviewer's Manual. Landlord-tenant, cash-rent and share crop arrangements should not be considered partnerships.

When an individual operation is reported, enter code 1.

When a partnership is reported, enter the number of partners. Include the person listed on the Face Page and all the other partners.

When a manager is reported, enter code 8.

Item 8: Other Operations

This item is only completed for non-opDomStatus 99 operations that are in-business during 2023.

If the RFO already knows about additional operations associated with the target name, there should be labels for Operation 2 on the Screening Supplement. There will be an additional Screening Supplement for Operation 3, if there is a third operation.

This question determines if the target name made day-to-day decisions for any other operations in 2023. Each additional operation must be listed or verified on the back side of the Screening Supplement. Additional copies of the Screening Supplement should be used if there is more than one additional operation. The information collected on the Screening Supplement will be used to update your state's list sampling frame and to adjust the data collected in the questionnaire to represent multiple operations.

If the Operator Does Not Have Other Operations

If there were not any other operations, enter '1' in cell 0923, then go to Section A of the questionnaire and begin the interview.

If the Operator Has Other Operations

Item 8a - Total Number of Operating Arrangements

Enter the TOTAL number of operating arrangements, including the sampled operation labeled on the face page of the questionnaire in cell 0923.

Entering a "2" for this item indicates the operator makes day-to-day decisions for two operations (the one labeled on the Face Page of the questionnaire and one additional operation).

Item 8b - Identifying Additional Operating Arrangements

Complete or verify the names and addresses, including partners, for each additional operation. If the operator had a third operation, complete or verify the information on an additional Screening Supplement for this operation.

Mark out any operations the target name was not associated with

in 2023. If any partner names are not listed, add them.

If the target name is involved (either as individual operator or as a partner) with any other operations which are not listed on a Screening Supplement, record these. In the partner space record the names of all the partners other than the target name associated with each additional operation.

Item 8c - Day-to-day Decisions for Additional Operations

For each of the additional operations, check the appropriate box to explain how the day-to-day decisions were made in 2023.

We are interested in how day-to-day decisions were made for this additional operation, not the legal definition of the operation.

After obtaining names and addresses for all individuals involved in all additional operating arrangements, begin the interview with Section A.

Special Situations

Do not include operations not already listed for which the target name is a hired manager.

A special situation exists if the operation on the Face Page of the questionnaire is a managed operation. If the target name is still the hired manager, there is no problem; handle it as you would normally.

If the label for the operation on the Face Page is a managed operation and was still in business in 2023 under a new hired manager, you will contact the new hired manager and collect data for the operation named on the Face Page. You will also need to contact the original target name to verify any other operations listed, and if that originally selected target individual has additional operations you will list them on one or more Screening Supplement(s).

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Chapter 5 - Completing the Questionnaire

Overview

This section provides an overview of how Chapter 5 is organized. It also describes notations used in the chapter for guidance.

Chapter 5 contains question-by-question instructions for every item in every section of the questionnaires for Phase 2. There is only one questionnaire version, Barley (V14). The ARMS Phase 2 questionnaire sections are listed in Exhibit 5.1 below at the end of this overview.

Questions will be numbered with instructions that match the numbering. As you read the manual, refer to your copy of the questionnaire.

Exhibit 5.1: Questionnaire Sections

<u>Section</u>	<u>Section Title</u>
A	Target Commodity Field Selection
C	Nutrient or Fertilizer Applications
D	Biocontrol or Pesticide Applications
E	Pest Management Practices (NASS)
H	Conclusion

Section A - Target Commodity Field Selection

Section A Purpose

Field level samples supply the specific details needed for the economic and chemical use analysis for field crops. Each field must be randomly selected from all the operation's fields of the target crop for the sampled field to be representative of all fields of the commodity of interest. Simple random sampling procedures are used for field selection.

As a reminder, questions in the questionnaire refer *only* to the field selected in Section A.

Screening Survey Information

Your Regional Office should have inserted a **Screening Survey Information Form** into the questionnaire only if a paper questionnaire will be used to collect data. This form will provide you with information reported during the ARMS Phase 1. Information contained on the Screening Survey Information Form includes operation characteristics, total acres operated, and total target crop acres. The form is intended to assist you (and the respondent) in making sure the correct operation is reporting for Phase 2. You should review this form prior to conducting the Phase 2 interview.

Item 1: Total Acreage of Target Commodity

The target commodity is the commodity whose name is indicated on the questionnaire cover page, and the commodity to which the questions in each section refer. Enter the total number of acres of the target commodity that this operation planted for any purpose for the 2023 crop year. The total acreage of the crop is listed in item 1. The target commodity for the crop interview is indicated on the cover page.

Acres should be recorded in tenths (1/10) of acres. For example, 180 acres should be entered as 180.0.

INCLUDE:

1. All acres planted to the target crop, even if they were abandoned, grazed off, or cut for forage. We include these acres because the operator usually has expenses and chemical applications associated with them.
2. Acres planted to the target crop and later replanted to the same crop. If

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the operator had to replant some of the acres (poor seed germination and weather are common causes of replanting), count these acres only one time.

3. Target crop acres which were later plowed down and planted to some other crop for harvest.

EXCLUDE:

1. Acres planted on land operated by someone else. For instance, exclude acres planted by someone else who rents cropland from this operator.

Each sampled operator was screened for inclusion in ARMS Phase 2 based on data reported in a screening interview in May, June, or July. The number of target commodity acres reported in the ARMS Phase 1 was very important in determining which strata the operator would be sampled for Phase 2 and how estimates of production practices are ultimately made. If there are big differences between the target commodity acres reported during the Phase 1 and the Phase 2 target commodity acres, make notes on the Screening Survey Information Form to assist the survey statistician in editing the questionnaire.

There are many good, logical reasons why the Item 1 acreage may be different from the screened acreage. The information on the Screening Survey Information Form is useful for determining likely reasons for any differences. For example, the respondent to the Screening Survey may have been a different person from the respondent you are interviewing, or the acreage reported in the Screening Survey may have represented intentions to plant, and not acreage already planted.

Don’t assume that something is wrong if the Screening Survey acreage differs from the acreage reported in Item 1. It may not be wrong, just different. You may tell the operator your notes from the Screening Survey conducted in May, June and July show the operation with “X” acres, and ask the operator to explain the difference. Make a note of the explanation on the questionnaire, or make corrections to Item 1 acreage, if necessary.

If no target crop acres are reported in Item 1, review the information on the Screening Survey Information Form. Make explicit notes about the reason why the current report of zero acres is different from the information reported on the Screening Survey Information Form. If the operator has no target crop acres, then go to the Conclusion, and conclude the interview. As a reminder, a screening supplement is also required for this situation. This is considered a

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‘complete’ interview. A screening supplement must be completed.

Item 2: Total Number of Fields

Item 2 asks for the number of fields planted to the target commodity on the total acres operated for the 2023 crop. Do not skip this question, rush through it, or accept vague estimates of the number of fields. It is absolutely essential that this question be enumerated correctly. The accuracy with which statisticians can make estimates from the one selected field to represent the whole commodity enterprise is seriously jeopardized if this item is incorrect. This total number of fields will be used to expand the field level data collected in this questionnaire.

If the operator had only 1 field of the target commodity, enter a “1” in Item 2 (“1” in Item Code box 0020). Input the field names/ number/description in Item 4 then go to Item 5 and explain to the respondent that the remainder of the questions will be about this specific field.

If the operator has more than 1 field of the target commodity, enter the number of fields in Item 2 and continue with Item 3.

Item 3: Identification of Fields

Item 3 uniquely identifies the target commodity field. The cardinal direction for the selected cotton field is on the questionnaire label that was sent to the respondent. Meaning, the barley field was pre-selected. It is also in SMS when the RFOs make their assignments to the enumerators. It is a stand-alone column (X2) in the other field.

To map the numerical value of the cardinal direction, use the following:

- 1 = northern-most barley field
- 2 = southern-most barley field
- 3 = eastern-most barley field
- 4 = western-most barley field
- 5 = northeastern-most barley field
- 6 = southeastern-most barley field
- 7 = northwestern-most barley field
- 8 = southwestern-most barley field

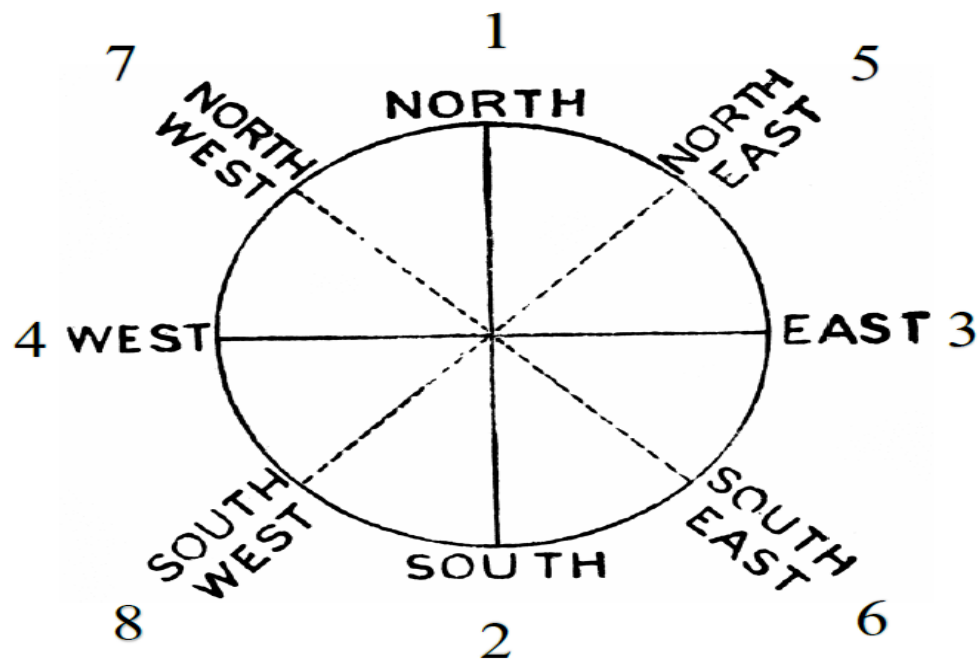
RFOs can run the DETAILED ASSIGNMENT LISTING and provide this information to the enumerator.

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Below is an example of how to select a barley field:

- If a “1” is assigned to the operation, then the “northern most barley field” is selection for enumeration.
- If the selected field does not exist for a given cardinal or inter-cardinal selection, then the next cardinal or inter-cardinal selection is the cardinal or inter-cardinal direction going in a clockwise direction. The process will continue until a barley field is selected for the interview.
- In this example, if the respondent did not have a northern most field, continue clockwise until you find one that they do have. First, you would try northeast, then east, and so on. (See the chart below)



Enumeration Action: Random Number Selection

If there is only ONE target commodity field (Item 2 is 1), enter “1” in Item Code box 0020 [Enumerator Action] and go to Item 4.

Mapping Fields on the Field Selection Grid Supplement

Beginning with the target commodity field closest to the operator's residence:

1: Random Field Selection Label

This has been removed from the questionnaire.

Item 4: Informing Respondent of Field Selection

Tell the respondent which target commodity field is selected, and be certain that both of you can agree with that field.

For the remainder of the interview, the respondent must be able to focus on the selected field, and provide you with information for only that field.

Item 5: Barley Acres Planted

Enter the number of acres **planted** in the selected target commodity field in Item Code box 1301. Round to nearest tenth (1/10) of an acre. Exclude areas of waste, roads, and ditches that are not planted to the target commodity crop.

Section C – Nutrient or Fertilizer Applications

Section C Purpose

The purpose of this section is to identify nutrients or fertilizers used to produce the 2023 target commodity crops on the selected field.

USDA is responsible for publishing estimates of the amount of nutrient or fertilizer used in crop production. Accurate data on nutrient or fertilizer application rates are needed for conducting sound economic analyses to address many complex issues concerning water quality. These analyses enable policy makers to make informed decisions.

Specifically, nutrient or fertilizer application data are used to analyze water quality and agricultural productivity issues and policies. Nutrient or fertilizer data enable a determination of the geographic extent and intensity of use.

Nutrient management practices help farmers adjust fertilizer application to crop needs, and reduce losses to the environment. Legume production, storage and use of livestock and poultry manure, soil, plant, and tissue testing are all methods for computing nutrient balances that establish the basis of sound nutrient management.

Use of Supplements

You will use a NUTRIENT OR FERTILIZER SUPPLEMENT if more lines are needed to record fertilizer applications than the number of lines available in the table. (For paper questionnaire ONLY). For the CAPI instrument, extra lines have been added for needed data.

Copy the identification as it appears on the questionnaire to the identification box on the supplement. **Assign the next Table number (002, 003, 004, etc.) to each additional supplement used.** You should begin numbering the supplements with Table 002 because Table 001 appears in the questionnaire. Use as many supplements as you need. The supplements will not be printed but will be available on the ARMS 2 landing page on NASSportal.

Item 1: Screening for Nutrient or Fertilizer Applications

Determine if COMMERCIAL nutrients or fertilizers (nitrogen, phosphate, potash, sulfur and/or type of nitrogen) were applied to the selected field.

If any commercial nutrients or fertilizers were applied, enter code “1” for YES.

Include:

- all chemical nutrient or fertilizer materials applied specifically for the 2023 crop,
- nutrient or fertilizers applied by custom applicators,
- nitrogen products applied with herbicides to make the herbicide more effective,
- rock phosphate,
- mixed organic nutrient or fertilizer blends,
- commercially prepared manure or compost products.

Exclude:

- micro-nutrients, such as iron, zinc, and boron,
- lime and gypsum/landplaster,
- non-purchased manure and manure produced and used on the operation (unprocessed), on-farm produced composts,
- nutrients or fertilizers applied to previous crops planted in this field (even if the carryover was beneficial to the crop currently in the field).

If commercial nutrients or fertilizers were applied to the field for the 2023 crop, continue. If no commercial nutrients or fertilizers were applied to the selected field, skip to Section D, Biocontrol or Pesticide Applications.

Item 2: Number of Commercial Nutrient or Fertilizer Applications

The number (and timing) of nutrient or fertilizer applications is one of the key indicators of an operator’s attempt to manage nutrients. Split applications are typically recommended as one way to enhance yields while reducing environmental risks.

There has been some anecdotal evidence that the number of acres treated with nutrients or fertilizers may be under-estimated, when acres are treated with multiple applications. This stems from the fact that operators may readily know the total nutrients applied per acre per year but are not able to quickly calculate the amount applied during each application. Hence, we only get one line of data even though one or more applications were made.

Ask the operator how many applications of commercial nutrient or fertilizer were made to the selected field. Include aerial applications. The application can be made to all or part of the field.

Item 3: Nutrient or Fertilizer Applications Table

Column 2: Materials Used

Record the plant nutrients (nitrogen (N), phosphate (P_2O_5), potash (K_2O), sulfur (S), and type of nitrogen used of each fertilizer material applied to the selected target commodity field. Please select the type of nitrogen from the table listed on the questionnaire. The nutrients can be reported in either of two ways:

1. **Percent analysis:** This is the percentage composition of the product expressed in terms that the law requires and permits.

Percent analysis is the preferred method of obtaining the data. Use actual plant nutrients only if it’s absolutely necessary. Percent analysis is preferred because products used can be more easily identified this way.

2. **Pounds of actual plant nutrients.** Use pounds of actual plant nutrients if it’s absolutely necessary.

Record the fertilizer data in terms of pounds, gallons, or pounds of actual plant nutrients applied PER ACRE. Be careful that the respondent does not give you the total amount of fertilizer applied to the entire field. If a respondent knows only the total pounds of fertilizer or plant nutrients applied to the field, you must

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calculate rate per acre and enter it in the table. Rate per acre is calculated as the total quantity applied divided by the acres to which the application was made. Show the computations for deriving the rate per acre in the margin of the form.

For some crops, farmers may say that fertilizer applied to the previous crop grown on the field was partly for the benefit of the selected field. Only part of this fertilizer was actually carry-over for the target commodity. Watch out for this because we DO NOT want to include these fertilizer applications in the fertilizer table.

Important: Record each individual fertilizer application made to the selected field on a separate line.

When fertilizer materials are bulk blended for application (for example, 10-10-10-3 combined with 21-0-0-24), record each product on a separate line in the fertilizer table, even though the fertilizer blend was applied in one trip over the field.

Percent Analysis

The most common method for reporting fertilizer materials is by percent analysis of their content of Nitrogen (N), Phosphate (P_2O_5), Potash (K_2O), and Sulfur (S) in that order, though in many cases Sulfur may be left off. For example, 13-13-13-5 is 13% Nitrogen, 13% Phosphate, 13% Potash, and 5% Sulfur. This means that forty-four ($13+13+13+5$) out of every one hundred pounds of this fertilizer is active ingredients (N, P_2O_5 , K_2O , S). Fifty-six ($100 - 44$) pounds of every one hundred pounds of this nutrient or fertilizer is carrier material (inert ingredients).

Two of the more common fertilizers used in crop production are 18-46-0 (Di-ammonium phosphate or DAP) and 82-0-0 (anhydrous ammonia). If 18-46-0 were reported, you’d record 18 in Column 2 under N (nitrogen) and 46 under P_2O_5 (phosphate). The K_2O (potash) and S (sulfur) columns would be dashed since there is no potassium (potash) or sulfur in the mixture. For anhydrous ammonia, you’d record 82 under N. Since there is no phosphorus, potash, or sulfur in anhydrous, the phosphate, potash, and sulfur columns should be dashed.

Some nutrients or fertilizer materials are applied in liquid form. A

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common liquid nutrient or fertilizer material used in crop production is 32-0-0 (nitrogen solution). For this material, you would record a 32 under N for nitrogen and dash the columns for phosphate, potash, and sulfur.

Carrier or filler material makes up the rest of the total weight for commercial nutrients or fertilizers. If a farmer reports 35-45-20, he's probably reporting pounds of actual nutrients instead of analysis since the three amounts (35 + 45 + 20) add up to more than 85 percent. **However, if sulfur is incorporated into the material, this rule no longer holds true when all four analysis are added together.**

For fertilizer applications reported by percent analysis, record the quantity applied per acre (including carrier) in Column 3 and the appropriate unit of measure, pounds (code 1) or gallons (code 12), in Column 4.

For bulk blended fertilizer materials, use a separate line for each of the fertilizers that the dealer blended in the mixture. If the dealer mixed 150 pounds of 18-46-0-0 and 250 pounds of 0-0-21-23 together, record each on a separate line. DO NOT just add it up and record it on one line as 400 pounds of 18-46-21-23.

This would be a major error, because the correct analysis of this fertilizer is 7-17-13-14, calculated by:

$$\text{N} \quad (150 \div 400) \times .18 = .068 \text{ (or 7\%)}$$

because there were 150 pounds of 18-46-0-0 in the mixture and of those 150 pounds, 18% was Nitrogen.

$$\text{P}_2\text{O}_5 \quad (150 \div 400) \times .46 = .173 \text{ (or 17\%)}$$

because 46 percent of the 150 pounds was available Phosphorus.

$$\text{K}_2\text{O} \quad (250 \div 400) \times .21 = .131 \text{ (or 13\%)}$$

because there were 250 pounds of 0-0-21-23 in the mixture and of those 250 pounds 21% was Potash.

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$$S \quad (250 \div 400) \times .23 = .143 \text{ (or 14\%)}$$

because 23 percent of the 250 pounds was available Sulfur.

Actual Plant Nutrients

Another way farmers might report fertilizer use is in terms of Actual Plant Nutrients (AN) applied per acre. This may also be called pounds of active ingredients. If the farmer knew he applied 60 pounds of nitrogen; 35 pounds of phosphorus; 40 pounds of potash; and 35 pounds of sulfur PER ACRE, record this information in Column 2 and record code 19 in Column 4. In this case, Column 3 should be ‘blank’ because we know the actual amount applied for each of the three materials, so we don’t need to calculate it from percentages.

When farmers report “units” of N, P₂O₅, K₂O, or S this is usually a clue that they are reporting pounds of actual nutrients. Fertilizer materials will amount to more than the actual nutrient contents of the products applied, because part of the material applied is carrier material, just like when the farmer reports by percent analysis.

For example, if the farmer reported that he applied 100 units of Nitrogen in the form of anhydrous ammonia, he would have applied about 122 pounds of 82% nitrogen ($100 \div .82 = 122$). If this were reported by percent analysis, 82 would be recorded in the N column, 122 in Column 3 and 1 in Column 4. If it were reported as pounds of actual nutrients it would be recorded as 100 in the N column and 19 in Column 4. Column 3 would be left blank.

When actual plant nutrients (active ingredients) or “units” of a fertilizer are reported, you should probe to be sure the quantity applied is correct. One way to do this is to ask (when units were reported) if the actual weight of material applied was more than the number of units reported.

For example, “You said you put down 100 units of UAN32 per acre. Did the material you applied actually weigh more than 100 pounds per acre?”

Other Methods of Reporting Fertilizer Use

Farmers may also report fertilizers by name. The Respondent Booklet shows some of the more common fertilizers with their usual analysis.

Anhydrous ammonia is the strongest nitrogen fertilizer available. It must be stored in a tank under pressure. It is applied by injection into the ground or into irrigation water. Anhydrous is a liquid when under pressure but turns into a gas when released and is lost if not injected into the soil. Anhydrous ammonia is a very popular fertilizer because it is often cheaper (per pound of nutrient) than other forms. It may be reported as “anhydrous”, “gas”, “NH₃”, “82-0-0”, “units of nitrogen”, or as “pounds of actual nitrogen” (N).

Aqua ammonia is one of the more common types of liquid nitrogen fertilizers. It is made up of anhydrous ammonia and water and is often used in Western states. It may be reported in pounds (actual N) or gallons (material or product). Although it is a liquid, it is usually reported in pounds of actual N.

Urea is another commonly used nitrogen fertilizer because it has a high nitrogen analysis. It may be added through an irrigation system, usually as a nitrogen solution.

Calcium nitrate contains not less than 15 percent nitrogen and 19 percent calcium. Limestone or lime contains 40 percent calcium and 12 percent carbonate. Approximately 100 pounds of limestone contains the calcium equivalent of 210 pounds of calcium nitrate ($100 * .4 = 40$ pounds and $210 * .19 = 40$ pounds). For example, if 200 pounds per acre of calcium nitrate were applied to the selected field, “15” would be recorded in column 2 (Nitrogen), “200” in column 3 (quantity) and a “1” in column 4 (pounds).

With many of the other fertilizers listed in the Respondent Booklet, the analysis may vary. Probe to find out if the farmer knows the analysis or the pounds of actual nutrients applied. If he doesn’t know the analysis but knows the name, use the analysis shown in the Respondent Booklet.

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Column 3: Quantity Applied per Acre

If percent analysis is reported, record the amount of material applied to the selected field in terms of pounds or gallons applied per acre. If pounds of actual nutrients were reported in Column 2, leave this column blank.

Be careful that the respondent does not give you the total amount of fertilizer applied to the entire field. If a respondent knows only the total pounds of fertilizer or plant nutrients applied to the field and not the rate per acre, you must calculate rate per acre and enter it in the table. In the margin of the form, show the computations for deriving the rate per acre.

$$\text{Total Pounds} \div \text{Acres} = \text{Rate per Acre}$$

For example, if the farmer applied a total of 1200 pounds to a sixty-acre field, the rate per acre is calculated as:

$$1200 \text{ pounds} \div 60 \text{ acres} = 20 \text{ pounds per acre}$$

Column 4: Material Unit Code

If percent analysis is reported in Column 2, record either pounds of material (code 1) or gallons of material (code 12).

If pounds of actual plant nutrients are reported in Column 2, enter code 19 in Column 4 and leave Column 3 blank.

Column 5: When Applied

Ask the respondent whether the **nutrient or fertilizer application** was made before seeding in the fall, before seeding in the spring, at seeding, or after seeding.

Always record each application on a separate line. Do not combine multiple applications of the same nutrient or fertilizer product on one line.

Column 6: How Applied

Show the respondent the Nutrient or Fertilizer/Pesticide Applications Method Codes in the Respondent Booklet. Ask the respondent which of

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the application methods was used to apply the fertilizer to the selected field. The codes are also located above the table and are defined below.

The Application Method codes are:

Code 1 - Broadcast, Ground without Incorporation	Fertilizer material is applied to the entire surface area by land application equipment. Application may occur either before or after planting, usually before crop emergence. No mixing of the fertilizer material into the upper soil surface is needed or planned as part of the application.
Code 2 - Broadcast, Ground with Incorporation	Fertilizer material is applied to the entire surface area by land application equipment. Application usually occurs before planting, and a planned mixing of the fertilizer into the upper soil surface is completed at the time or shortly after the time of application. Incorporation of the fertilizer into the upper soil surface is often performed with a field cultivator, disk, or other tillage implement.
Code 3 - Broadcast by Aircraft	Fertilizer material is applied to the entire surface area by air application equipment. Include only those applications made by airplane or helicopter.
Code 4 - In Seed Furrow	Fertilizer material is placed in the seed furrow at planting time, generally through a separate attachment on the grain drill.
Code 5 - Irrigation Water	Fertilizer material is mixed with water in either sprinkler or gravity fed irrigation systems. The term used for this procedure is fertigation. The product is metered into the water delivery system (generally a sprinkler irrigation system) and is distributed across the field in the irrigation water.
Code 6 - Chisel, Injected or Knifed-in	Fertilizer material is injected under pressure into the soil. This application method (using high pressure) is often used to apply anhydrous ammonia.
Code 7 - Banded or Side-dressed in or over Row	Fertilizer material is placed in or over the crop row. This method is mainly used for row crops. Products are applied at or after

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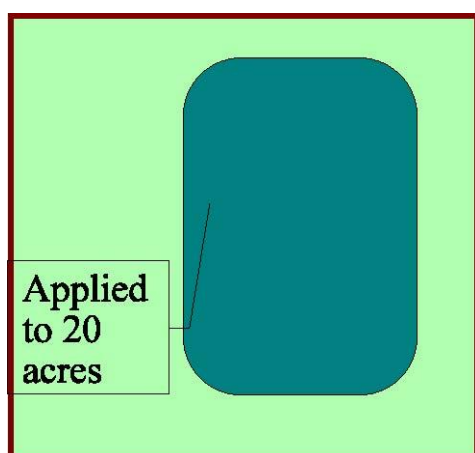
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planting. The area between the rows is not treated.

Fertilizer products applied at-planting are generally granular formulations and are placed in a 3-to-4 inch band on either side or above the seed. Early growing-season applications are also applied (either liquid or granular) on either side of the crop row.

Code 8 - Foliar or Directed Sprays

After planting, fertilizer material is sprayed on or under the plant foliage.



Column 7: Acres Treated

When only a portion of the field is treated it is called a **partial field treatment**. All land areas within the indicated area were not treated with the fertilizer application. For example, if the farmer applied 320 pounds of 18-46-0 to 20 acres in the center of a 40-acre field after the crop emerged, the line of the nutrient or fertilizer table would be completed as follows. Note the amount per acre is calculated as 320 pounds ÷ 20.0 acres treated = 16 pounds per acre.

Figure 9

L I N E	2 MATERIALS USED [Enter percentage analysis or actual pounds of plant nutrients applied per acre.] [Show Common Nutrients or Fertilizers in Respondent Booklet.] [Refer to nitrogen code list above for type of nitrogen used.]					3 What quantity was applied per acre? [Leave this column blank if actual nutrients were reported.]	4 [Enter material code.] 1 Pounds 12 Gallons 13 Quarts 19 Pounds of actual nutrients	5 When was this applied? 1 In the fall before seeding 2 In the spring before seeding 3 At seeding 4 After seeding	6 How was this applied? [Refer to code list above.]	7 How many in the selected field were treated in this application? ACRES
	N Nitrogen	P ₂ O ₅ Phosphate	K ₂ O Potash	S Sulfur	Type of N used					
	31	32	33	34	35	36	37	38	39	40
01	18	46	---	---	1	16	1	4	7	20.0

Record the number of acres in the selected field that were treated with the nutrient or fertilizer materials recorded in Column 2. If only part of a field was treated, record only those acres. For example, if the operator made a particular application of fertilizer to only 25 acres in a 40-acre field, enter 25.0 in Column 7. Since each individual application of nutrient or fertilizer must be recorded on separate lines, the figure

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entered in Column 7 can never be greater than the number of acres in the field.

Acres and tenths of acres must be reported in Column 7. Zero must be recorded after the decimal point if whole acres are recorded. For example, if the operator treated exactly 25 acres, the entry in Column 7 must be 25.0. Otherwise, the summary will consider the entry to be 2.5 and serious errors will result when we summarize the amount of nutrient applied. Applications done at seeding will normally cover the entire planted acres. However, it is possible for the application to only cover a portion of the field, for different application rates to be used, or for different products to be applied to different areas at planting. When the acres covered by “at seeding” applications do not equal the planted acres, verify this with a note in the margin.

Figure 10

LINE	2 MATERIALS USED <i>[Enter percentage analysis or actual pounds of plant nutrients applied per acre.]</i> <i>[Show Common Nutrients or Fertilizers in Respondent Booklet.]</i> <i>[Refer to nitrogen code list above for type of nitrogen used.]</i>						3 What quantity was applied per acre? <i>[Leave this column blank if actual nutrients were reported.]</i>	4 [Enter material code.] 1 Pounds 12 Gallons 13 Quarts 19 Pounds of actual nutrients	5 When was this applied? 1 In the fall before seeding 2 In the spring before seeding 3 At seeding 4 After seeding	6 How was this applied? <i>[Refer to code list above.]</i>	7 How many In the selected field were treated in this <u>application?</u>
	N Nitrogen	P2O5 Phosphate	K2O Potash	S Sulfur	Type of N used					ACRES	
	01	31 16	32 20	33 ---	34 15	35 1	36 100	37 1	38 1	39 1	40 50.0
02	31 82	32 ---	33 ---	34 ---	35 3	36 120	37 1	38 1	39 6	40 50.0	
03	31 28	32 ---	33 ---	34 ---	35 7	36 125	37 1	38 4	39 1	40 50.0	
04	31 60	32 35	33 40	34 ---	35 2	36 ---	37 19	38 4	39 7	40 50.0	

In the above example:

Line 1 shows an application of 100 pounds per acre of ammonium sulfate broadcast without incorporation in the fall, before seeding to 50 acres.

Line 2 shows an application of 120 pounds per acre of anhydrous ammonia injected in the fall, before seeding to 50 acres.

Line 3 shows an application of a 125 pounds per acre of a 28 percent nitrogen solution broadcast without incorporation after seeding to 50 acres.

Line 4 shows an application of 60 pounds of nitrogen, 35 pounds of phosphate, and 40 pounds of potash per acre, banded/side-dressed after seeding to 50 acres.

Section D - Biocontrols or Pesticide Applications

Section D Purpose

Biocontrols or Pesticide data are needed because USDA is responsible for publishing estimates of pesticide use in crop production. NASS is charged with collecting these data so that issues related to food safety, water quality, and biocontrols or pesticide cancellation can be evaluated. The Economic Research Service conducts research on the impact of alternative regulations, policies, and practices.

This section is similar to the fertilizer section. Chemical mixes are described, and application practices are enumerated. Chemical costs are a large part of the variable production costs for most crops, so getting correct information on chemical usage and costs is important.

Include all chemicals applied for the 2023 crop on the selected field.

Exclude:

- 1) Chemical applications to fence rows, ponds, canals, and ditch banks should not be recorded.

This land should not be considered part of the survey acres of interest. Often the chemicals used for killing weeds and other pests in these areas are not labeled for use on the crop in the selected field.

- 2) The use of adjuvants.

An adjuvant is used in a formulation to aid the operation or improve the effectiveness of the pesticide. Adjuvants include such materials as wetting agents, spreaders, emulsifiers, dispersing agents, foaming agents, foam suppressants, penetrants and correctives. A spray adjuvant may contain one or more surfactants, solvents, solubilizers, buffering agents, and stickers needed to formulate a specific type adjuvant. By using the proper adjuvant, it is often possible to use

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certain biocontrols or chemical pesticides in a tank mix that otherwise would present compatibility problems. However, if you or the respondent is in doubt about whether a product should be included, record it anyway and write notes to explain the situation.

Use of Supplements

The Biocontrols or Pesticide Applications table contains a column for entering the number of applications of a specified pesticide. This column (column 11) allows you to combine multiple applications of the same biocontrols or pesticide, at the same rate, and covering the same area on one line in the table. This procedure should help reduce the need for a supplement.

If more lines are needed than the number available in the table, use the ARMS Phase 2 **Biocontrols** or **Pesticides Supplement** booklet if a paper questionnaire is used. However, for the CAPI instrument, the supplement will be used as a help tool. Copy the identification as it appears on the main questionnaire to the identification box on the supplement or in CAPI. **Assign the next Table number (002, 003, 004, etc.) to each additional supplement used.** Begin numbering the supplements with Table 002 because Table 001 already appears in the questionnaire. Use as many supplements as you need. (FOR paper questionnaire ONLY). The CAPI instrument will have extra lines included for more data.

Use of Records

Because of record keeping requirements for restricted use pesticides, (sometimes called RUP’s), most operators will have records of chemical applications for each field. Encourage the respondent to use these records if they are available.

Respondents can answer many of these questions without records. Where records help most is in jogging the farmer’s memory about spot treatments, rare, irregular applications or mixes of chemicals, or deviations from usual spray schedules or rates of application.

Use of the Respondent Booklet

Both you and the respondent should use a Respondent Booklet. Most of the biocontrols or pesticide products used on each target commodity are listed in the Respondent Booklet for that commodity. It is very important to obtain the trade name as well as the formulation from the operator to ensure that the correct product code is recorded. In order to report the formulation and whether

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the product is liquid or dry, the respondent may have to look at the product label or detailed itemized receipts for the product.

Some respondents may be willing to use the booklet and to report the product code for each of the products they used. You should encourage this since it makes the job of enumeration easier as well as making reporting faster and more accurate.

To aid in identification, the products in the Respondent Booklet are categorized as LIQUID(L) or DRY(D) formulations. Ask the respondent if the product was in a liquid or dry state when it was purchased. This should help you and the respondent find and record the correct product codes.

The Respondent Booklet also lists the type or class of each product:

- Fungicide (F),
- Herbicide (H),
- Insecticide (I),
- Miscellaneous (M),
- Miscellaneous
Biological/Pheromone
(MB),
- Miscellaneous
Defoliant/Desiccant
(MD),
- Miscellaneous Growth
Regulator (MG),
- Miscellaneous Soil
Fumigant (MS),
- Miscellaneous Defoliant
(MD), and
- Other products (O).

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Some chemicals and biocontrols or pesticides have more than one use. Some products with more than one use may be listed twice if the second use is associated with a separate product code. For example,

Gramoxone Extra

4314	Gramoxone Extra 2.5 L	H
9037	Gramoxone Extra 2.5 L	MD

For products that are listed more than once, be sure to probe for what it was used for and record the product code associated with that use.

Note that each product code listed in the Respondent Booklet specifies the trade name and formulation. The numbers and letters after the product name identify the concentration and form. For example, Canopy 75DF: Canopy is the trade name and the 75DF indicates the formulation. The 75 indicates the concentration as the percent of active ingredient in a pound of product, and the DF indicates that the form of the product is Dry Flowable. For Basagran (4L): Basagran is the trade name and the 4L indicates the formulation. The 4 indicates 4 pounds of active ingredient in a gallon of product and the L indicates a Liquid Concentrate.

Also note that for several products there is more than one formulation for a given trade name: Ambush (2EC) and Ambush 25W or Diazinon 14G and Diazinon 4E and Diazinon 50W and Diazinon AG500(4E). Different formulations of a product have different concentrations of the active ingredient and inert materials.

It is extremely important that you get the correct product code because active ingredient concentrations for different products and different formulations vary greatly. Since we summarize by active ingredient in the product, recording a product or its formulation incorrectly will make a difference when the active ingredient application rate per acre is calculated. For example, if you record the code for Dyfonate II 20-G (1038) when you really should have recorded the code for Dyfonate II 10-G (1037), then we will summarize twice the amount of active ingredient than we should. That will make it look like operators apply more chemicals to crops than they actually do.

Also, if you record the Dyfonate II 10-G code when you really should have recorded the code for Dyfonate II 20-G, we will summarize half as much active ingredient as we should. This is not good either. We need the correct

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information listed in the questionnaire.

If you cannot find a reported product in the Biocontrols or Pesticide Code List in the Respondent Booklet, complete the table in Item 2 to provide the information needed to classify and summarize unlisted products. Also, make a note either on paper or in the CAPI instrument. The Field Office will research the product and assign a new product code if necessary.

Item 1: Biocontrols or Pesticide Applications

Determine if any biocontrols or pesticides were applied to the selected commodity field for the 2023 crop. Include herbicides, insecticides, fungicides, defoliants, and other pesticides.

IMPORTANT NOTE: If the field has not yet been harvested you must be sure to probe the respondent for any biocontrols or pesticide applications he plans to make to this field prior to harvest and record them in this table.

Exclude fertilizers and seed treatments. The respondent may report foliar fertilizer sprays, especially if they were part of a tank mix. Fertilizer applications should not be recorded in this section; they should have been recorded in the fertilizer section.

Herbicide materials may be applied before weeds emerge or after weeds have emerged. Some herbicides are used to “burn down” or kill weeds prior to planting in no-till systems. Herbicides applied at time of planting are generally applied to the entire soil surface (broadcast). Herbicides requiring soil incorporation may be mixed into the soil by the action of the planter or by attachments which are part of the planter. Incorporation also may be accomplished by a tandem hook-up of a tillage implement(s) behind the applicator or planter. Other herbicides are effective by being left on the surface without incorporation. Some herbicides may also be used to defoliate the crop prior to harvest.

Insecticide materials are applied to control insects that damage plants by feeding on plant tissues.

Granular insecticides are sometimes applied at planting and placed in the seed row (in-furrow) by a separate attachment.

Fungicides are applied to control disease organisms which affect the growth

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and development of the plant, such as pod-and-stem blight, anthracnose, brown spot, etc.

Other chemicals are used to fumigate the soil, regulate the growth of the plant, defoliate the crop prior to harvest, etc.

If any pesticides were applied, enter Code “1” for YES, then complete the Biocontrols or Pesticide Table. If no biocontrols or pesticides were applied, make a note to verify a No response and go to Section E.

Column 2: Product Code

Ask the operator to identify the chemical, biocontrols, or pesticide product applied to the selected commodity field. Record the product name for each chemical from the Pesticide Code List found in the Respondent Booklet. This makes it easier to refer to the product, by name, while asking the remaining questions across the table. It also makes it easier to identify a product and its code when the same product is reported more than once with different formulations.

Recording the product name also assists the Regional Field Office in editing the questionnaire and in verifying unusual applications and/or rates. Therefore, you are encouraged to record the product name in the first column.

Each different product applied must be recorded on a separate line. However, if a product is applied more than once at the same rate and to cover the same area, the applications can be recorded on one line, with the number of applications recorded in Column 11.

If two or more products are applied with a single application (tank mix) a separate line must be used for each product. Use Column 4 to identify products applied as a tank mix.

To help the respondent, start by asking if any biocontrols or pesticide products were applied **after the previous crop was harvested or plowed down**. Next, ask about other preplant products and then follow with products applied at planting and then after planting. Remind the operator to report all types of biocontrols or pesticides, including herbicides, insecticides, fungicides, defoliants, growth regulators, and desiccants.

Exclude seed treatments. Most crop seed is treated with an insecticide/fungicide product. If the seed is purchased, seed treatment is done by the seed company prior to delivery to the operator. If the operator uses his/her own seed, it may be treated prior to going to the field or the seed may be treated in the field. Field seed treatment consists of coating the seed with the insecticide or fungicide product just prior to planting.

Column 3: Product Form (Liquid/Dry)

Ask the respondent if the product was in a liquid or dry state when it was purchased. Record an “L” or a “D” in this column to indicate Liquid or Dry. Probe for clarification if the liquid or dry designation listed by the product code selected from the Respondent Booklet does not agree with what you record here for the product.

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Common form abbreviations are:

L (Liquid)	These products flow like water. Concentrations are usually expressed in pounds per gallon.
E (EC)	Emulsifiable concentrates. These are usually thicker than water and are mixed with water and applied as sprays. They contain one or more active ingredients, one or more solvents and an emulsifier. Their concentrations are generally indicated in pounds per gallon.
F (Flowable)	These products are in liquid form. They contain finely ground active ingredients suspended in the liquid. They are mixed with water for application. Their concentrations are indicated in pounds per gallon.
D (Dust)	Dusts contain a low percentage of active ingredients on a very fine dry inert carrier such as talc, chalk, or clay. They are usually applied directly as purchased. Their concentrations are expressed as percent’s.
WP (W), SP (S)	Wetable or Soluble Powders. These are dry products, much like flour, which will dissolve or disperse in water. Their concentrations are indicated in percent.
G (GR) (Granular)	Granular products contain active ingredients coated or absorbed onto coarse particles like clay, ground walnut shells or ground corn cobs. The pellets are about the diameter of the lead in a pencil (or larger); during shipment the granules have a tendency to break down and create dust. These are used as purchased. Their concentrations are expressed as percent.
DF (Dry Flowable)	These are small pellets formulated to reduce the dust problem created with granules. They are like wetable powders except that the active ingredient is formulated on a granule instead of a powder. The product pours easily into spray tanks for mixing with water. Their concentrations are expressed as percent.
Bait	Bait products contain active ingredients mixed with food or another attractive substance. Concentrations are expressed as a percentage.

Column 4: Tank Mix

Most chemicals are applied to the field as single products. However, sometimes two or more individual products are mixed in the spray tank by the farmer/custom applicator and applied to the field as a tank mix.

Products applied in a tank mix must be identified as tank mixes. Since there is only space in the table for one product per line, the separate products in tank mixes must be recorded on separate lines. Identify the products in a tank mix by recording in Column 4 the line number of the first product in the tank mix.

For example, consider a tank mix where you recorded the first product on line 6, the second product on line 7 and the last product on line 8. In Column 4 of line 6 you should record 6 so we will know this was the beginning of the list of products in that tank mix. In Column 4 of line 7, you’ll record 6 so we know that this product was part of the same tank mix that you started listing on line 6. In Column 4 of line 8, you will record 6 for the same reason.

For products not applied as part of a tank mix, enter a dash in Column 4.

For the first product in a tank mix, be sure to ask each question in Columns 5 - 12. For each additional product in the tank mix after the first product, be sure to ask the questions in Columns 6 or 7 and 8 because the answers likely will be different than for the first product. Information recorded in Columns 5, 9, 10, 11, and 12 should be the same as for the first product in the tank mix. These data can just be copied from the entries in the columns for the first product of the tank mix.

DO NOT confuse tank-mixes and packaged premixes. A tank mix is any biocontrol or pesticide spray which is prepared immediately before use by mixing two or more chemicals and water in the spray tank. Packaged premixes are brand name products that contain two or more active ingredients. These are products where the manufacturer has taken individual active ingredients and combined them in a container. Examples include Ramrod/Atrazine, Lasso/Atrazine and Bicep (Dual & Atrazine). These manufactured mixes have their own code in the Respondent Booklet, so they don’t have to be listed with separate codes for the chemicals included in the product.

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New technologies such as variable rate applications that rely on Global Positioning Satellite (GPS) information to control the precise application of chemicals create unique situations. It is possible for an applicator to have more than one chemical product tank, and to apply more than one product unequally across a field depending on the specific needs of each small area. Some areas of the field may be treated with only one of the multiple products. Since the multiple products are not mixed and applied consistently together across the field, these are not considered tank mixes. This use of GPS is still rare.

Figure 11 shows an example of how to record a biocontrol or pesticide and an example of how to record a tank mix.

Figure 11: Recording biocontrol or pesticide tank mix information

APPLICATIONS CODES for column 9											
1 Broadcast, ground without incorporation						6 Chisel/Injected or knifed in					
2 Broadcast, ground with incorporation						7 Banded in or over row					
3 Broadcast, by aircraft						8 Foliar or directed spray					
4 In seed furrow						9 Spot treatments					
5 In irrigation water											

CHEMICAL PRODUCT NAME	L I N E	2 What products were applied to this field? [Show product codes from Respondent Booklet.]	3 Was this product bought in liquid or dry form? [Enter L or D]	4 Was this part of a tank mix? [If tank mix, enter line number of first product in mix.]	5 When was this applied? 1 BEFORE planting 3 AT planting 4 AFTER Planting	6 OR 7 How much was applied per acre per application? What was the total amount applied per application in this field?	8 [Enter unit code.] 1 Pounds 12 Gallons 13 Quarts 14 Pints 15 Liquid Ounces 28 Dry Ounces 30 Grams	9 How was this product applied? [Enter code from above.]	10 How many acres in this field were treated with this product? ACRES	11 How many times was it applied? NUMBER	12 Were these applications made by--- 1 Operator, partner or family member? 2 Custom applicator? 3 Employee/ Other?
Far-go-granular	01	4211	D	---	1	12.0 0	1	6	5.0	1	2
Banyel (4L)	02	4136	L	2	4	1.0 0	14	1	5.0	1	2
Express (0F)	03	4205	D	2	4	.1 3	15	1	5.0	1	2

In this example,

- Product lines 2 and 3 are in a tank mix.
- For products mixed in a tank mix, columns 4, 5, 9, 10, 11, and 12 must be the same.

Column 5: When Applied

Ask the respondent when the product was applied to the selected field (before, at planting, after planting, or Defoliation prior to harvest), and enter the appropriate code.

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“Before-planting” applications may occur the same day or a week or several months before planting. If a tillage implement is used to incorporate the herbicide into the soil, be sure to record this activity in Section F: Field Operations.

“At-planting” herbicide or insecticide materials are applied at the time the crop is planted. These applications may be band treatments covering a small section of the row over the seed furrow or broadcast treatments covering the entire soil surface.

“After planting” herbicide, insecticide, or fungicide materials are applied after the planting operation is completed. They could be applied a few days or several weeks later.

“Defoliation prior to harvest.”

Column 6 or 7: Application Rate

Column 6 (rate per acre) or Column 7 (total amount) may be used for each product reported. Don’t use both on the same line.

Column 6: Rate per Acre per Application

Record the chemical application rate per acre used on the selected commodity field. Rate per acre is the amount used in one application to one acre. Because rates per acre are often quite small with very toxic chemicals, rates are reported to hundredths of units. **BE SURE** that if whole numbers are reported, zeros are entered after the decimal point.

If an application rate per acre is obtained in Column 6, then nothing should be entered in Column 7.

With variable rate technology and for spot treatments, application rates for a particular product or tank mix may vary across the field. In these cases, **Do Not Attempt to Obtain** a rate per acre instead, obtain the total amount applied to the field using Column 7.

Column 7: Total Amount Applied per Application

If the respondent is not able to report the application rate per acre in Column 6, use Column 7 to record the total quantity applied per application to all acres treated in the selected target commodity field.

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This figure should be a total quantity for one application, NOT the “sum total” of multiple applications.

If the respondent is able to give either total quantity applied per application or rate per acre, select the option which the respondent feels will give the most accurate data.

In some cases, respondents cannot report either the rate per acre per application of a product or the total amount of the product applied per application. In these cases, there is one additional way you might be able to collect the data we need. If the respondent knows

1. the amount of the product mixed in every 100 gallons of water,
2. the number of gallons in each tank applied, and
3. the number of tanks used to cover the acres,

Make a note of these figures. The Survey Statistician will be able to calculate the amount of product used.

Other ways of reporting include parts per million (PPM). In these cases, try to find out the amount of actual product (before mixing with water) used, and write lots of notes.

Do not record the spray volume applied to the field. The purchased (concentrated) product is mixed with water and the diluted spray solution is generally applied at rates of 20 - 60 gallons per acre with ground equipment and 5 - 10 gallons per acre by air.

Do not record the inclusion of surfactants or CARRIERS in the spray solution. They are added to the spray solution to enhance the ability of the pesticide to stick to the foliage and/or aid in the absorption into the plant system.

Do not record liquid fertilizer solutions applied in conjunction with a pesticide in the Pesticide Table. The information on liquid fertilizers should be recorded in the Fertilizer Table.

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Column 8: Unit Code

Record the units using the unit codes listed in Column 8. The unit codes are:

Code 1	Pounds	Code 15	Liquid Ounces
Code 12	Gallons	Code 28	Dry Ounces
Code 13	Quarts	Code 30	Grams
Code 14	Pints		

Write notes if any unit other than the ones listed is reported.

When the reported unit is quite small, you may need to make conversions. Some conversion factors you may need to use are:

<u>Liquid Products</u>		
1 Gallon	=	4 Quarts
1 Quart	=	2 Pints
1 Pint	=	16 Fluid Ounces
2 Cups	=	1 Pint
1 Cup	=	8 Fluid Ounces

<u>Dry Products</u>		
1 Pound	=	16 Dry Ounces
1 Ounce	=	28.3 Grams
1 Pound	=	453.6 Grams
2 Tablespoons	=	1 Ounce

BE SURE to keep the unit code and product formulation consistent. If the operator purchased a **LIQUID** pesticide product, the unit code must be liquid ounces, pints, quarts, or gallons. If a **DRY** pesticide product (granular, wettable powder, or dry flowable) was used, the unit code must be dry ounces, pounds, or grams. If the form of product conflicts with the reported unit code, perhaps the wrong product code was recorded. Check the Respondent Booklet to see if there are other formulations.

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Column 9: How Applied

Obtain the physical application method used to apply the pesticide product to the selected field. The application methods codes are printed in the **APPLICATION CODES** box positioned above Column 9 of the Pesticide Table. Show the respondent the Nutrient or Fertilizer/Biocontrols or Pesticide Applications Method Codes in the Respondent Booklet.

Herbicides, insecticides, and fungicides are most often applied as broadcast treatments to cover the entire soil surface (or plant surface) with the pesticide material. Band treatments, where a narrow band of pesticide is applied over the row covering about one-third of the soil surface, is also a common method of application. Less frequent methods include in-furrow, with irrigation water, or as spot treatments.

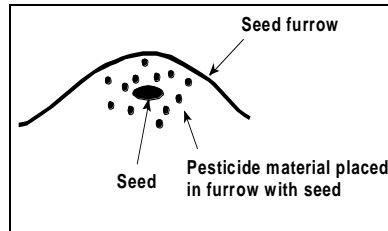
The Application Method codes are defined as follows:

Code 1 - Broadcast, Ground Without Incorporation	Pesticide material (herbicide, insecticide, fungicide, or other) is applied to the entire surface area by land application equipment. Application may occur either before or after planting, usually before crop emergence. No mixing of the pesticide material into the upper soil surface is needed or planned as part of the application.
Code 2 - Broadcast, Ground with Incorporation	Pesticide material (herbicide, insecticide, fungicide, or other) is applied to the entire surface area by land application equipment. Application usually occurs before planting, and a planned mixing of the pesticide into the upper soil surface is completed at the time or shortly after the time of application. Incorporation of the pesticide into the upper soil surface is often performed with a field cultivator, disk, or other tillage implement. This cultivation activity would also be reported in the Field Operations table.
Code 3 - Broadcast by Aircraft	Pesticide material (herbicide, insecticide, fungicide, or other) is applied to the entire

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Code 4 - In Seed Furrow



surface area by air application equipment. Include only those applications made by airplane or helicopter.

Pesticide material (herbicide, insecticide, fungicide, or other) is placed in the seed furrow **at planting time** generally through a separate attachment on the grain drill. This method is sometimes used for granular insecticides applications.

Do not confuse this with seed treatments where the seed surface is coated with a pesticide product by the farmer or seed dealer before the seed is put in the planter box. **Do not record seed treatments.**

Code 5 - In Irrigation Water

Pesticide material (herbicide, insecticide, fungicide, or other) is mixed with water in either sprinkler or gravity fed irrigation systems. The term used for this procedure is chemigation. The product is metered into the water delivery system (generally a sprinkler irrigation system) and is distributed across the field in the irrigation water.

Code 6 - Chisel, Injected or Knifed-in

Pesticide material (herbicide, insecticide, fungicide, or other) is injected under pressure into the soil. This application method (using high pressure) is used with pesticide spray materials for nematode control.

Code 7 - Banded or Sidedressed in or over Row

Pesticide material (herbicide, insecticide, fungicide, or other) is placed in or over the crop row. This method is mainly used for row crops. Products are applied **at or after planting**. The area between the rows is not treated. Weed control between rows is accomplished with mechanical cultivation. Application rates for band treatments are to be reported on a per acre basis and not the rate that was applied to the banded segment. Band treatments with the same pesticide

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product normally result in lower application rates than broadcast treatments. For example, if the band only covers one-third of the row, the application rate will normally be about one-third the broadcast application rate.

- At or after planting herbicides materials are applied by spraying the product in an 8-to-12-inch band over the crop row.

At planting insecticide and fungicide applications are generally placed in a 4-to-6-inch band directly behind the planter shoe and in front of the press wheel.

Code 8 - Foliar or Directed Sprays	After planting, pesticide material (herbicide, insecticide, fungicide, or other) is sprayed on or under the plant foliage.
Code 9 - Spot Treatments	Pesticide material is applied only to scattered spots in the field, such that the area treated is usually difficult to define. <i>See the following explanation of the difference between a spot treatment and a partial field treatment.</i> Spot applications are generally made to control specific weed problems or insects such as grasshoppers at the edges of a field. Spot applications of fungicides are unlikely.

Spot Treatment vs. Partial Field Treatment

Spot treatments should not be confused with treatment of part of a field. When an application is made only to a portion of a field, the treated acreage can be discerned. For example, the north half of a 40- acre field or ten acres throughout a field totaling 20 acres. Such partial field treatments should be reported like any other applications, including acres treated and an application code between 1 and 8.

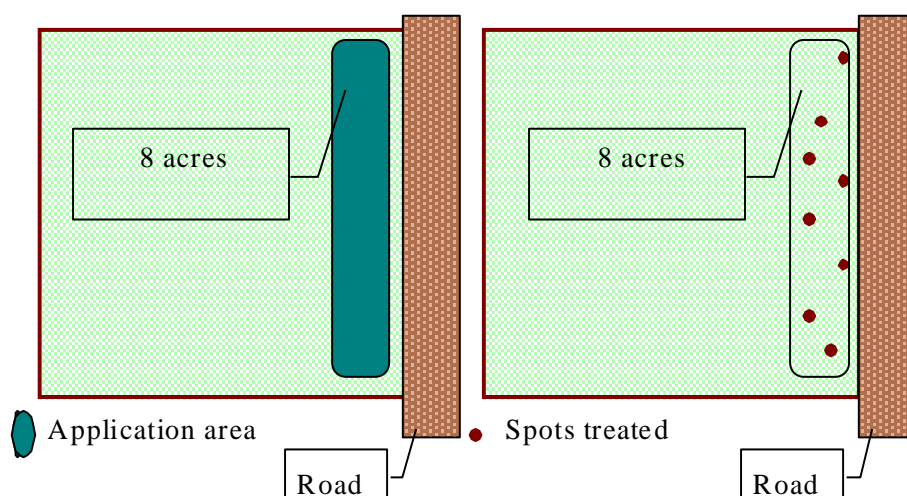
With spot treatments, rate per acre is impossible to determine. A spot treatment might involve walking or riding around with a tank on the applicator’s back, spraying a herbicide on problem weeds. Spot treatments to field crops are rare and should be verified.

If spot treatments were made in the selected field, enter the product code (column 2), product form (column 3), when applied (column 5), the total amount applied (column 7), unit (column 8), application code ‘9’ (column 9), the respondents best guess of acres covered (column 10), times applied (column 11), who applied (column 12), and cost per unit (Optional 4).

Spot treatment example: A farmer with a 40-acre field of target commodity identified a small area along a road with severe thistle infestation, and decided to spot treat these areas with Roundup Ultra. He used 2 ounces to spot treat the thistles over 8 acres of the field next to the road (the respondent best guess is that he spot treated ½ acre).

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The line of the biocontrol or pesticide table for this application would be completed as shown in Figure 12.

Figure 12 Recording a **spot** biocontrol or pesticide treatment

APPLICATIONS CODES for column 9	
1 Broadcast, ground without incorporation	6 Chisel/Injected or knifed in
2 Broadcast, ground with incorporation	7 Banded in or over row
3 Broadcast, by aircraft	8 Foliar or directed spray
4 In seed furrow	9 Spot treatments
5 In irrigation water	

CHEMICAL PRODUCT NAME	LINE	2 What products were applied to this field? [Show product codes from Respondent Booklet.]	3 Was this product bought in liquid or dry form? [Enter L or D]	4 Was this part of a tank mix? [If tank mix, enter line number of first product in mix.]	5 When was this applied? 1 BEFORE planting 3 AT planting 4 AFTER Planting	6 How much was applied per acre per application?	OR 7 What was the total amount applied per application in this field?	8 [Enter unit code.] 1 Pounds 12 Gallons 13 Quarts 14 Pints 15 Liquid Ounces 28 Dry Ounces 30 Grams	9 How was this product applied? [Enter code from above.]	10 How many acres in this field were treated with this product? ACRES	11 How many times was it applied? NUMBER	12 Were these applications made by--- 1 Operator, partner or family member? 2 Custom applicator? 3 Employee/ Other?
Roundup Ultra	01	4561	L	----	4		2.0 0	15	9	0.5	1	1

Partial field treatment example: A farmer with a 40-acre field of corn decided to treat the area along the road with Roundup Ultra. He applied 4 ounces per acre of the product as a direct spray on the foliage over 8 acres of the field next to the road. The line of the pesticide table for this application would be completed as shown in Figure13.

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Figure 13 Recording a **partial** field biocontrol or pesticide treatment

APPLICATIONS CODES for column 9												
1	Broadcast, ground without incorporation	6	Chisel/Injected or knifed in									
2	Broadcast, ground with incorporation	7	Banded in or over row									
3	Broadcast, by aircraft	8	Foliar or directed spray									
4	In seed furrow	9	Spot treatments									
5	In irrigation water											

CHEMICAL PRODUCT NAME	LINE	2 What products were applied to this field? [Show product codes from Respondent Booklet.]	3 Was this product bought in liquid or dry form? [Enter L or D]	4 Was this part of a tank mix? [If tank mix, enter line number of first product in mix.]	5 When was this applied? 1 BEFORE planting 3 AT planting 4 AFTER Planting	6 How much was applied per acre per application?	OR	7 What was the total amount applied per application in this field?	8 [Enter unit code.] 1 Pounds 12 Gallons 13 Quarts 14 Pints 15 Liquid Ounces 28 Dry Ounces 30 Grams	9 How was this product applied? [Enter code from above.]	10 How many acres in this field were treated with this product? ACRES	11 How many times was it applied? NUMBER	12 Were these applications made by--- 1 Operator, partner or family member? 2 Custom applicator? 3 Employee/ Other?
Roundup Ultra	01	4561	L	----	4			4.0 0	15	8	8.0	1	1

Note that this application covers a measurable portion of the field, and the application method can be described by an application code of 1 through 8. The portion of the field treated does not need to be contiguous to be measurable, i.e., several areas that total 8 acres would be recorded in the same way provided that the applicator adjusted his sprayer to apply at 4.00 ounces per acre.

Column 10: Acres Treated

Record the number of acres in the selected field that were treated with the biocontrol or pesticide product recorded in Column 2. This will be the same as the number of planted acres recorded for the field when the entire field was treated with the biocontrol or pesticide. If only part of the selected field was treated, then enter the number of acres representing the share of the field actually treated.

Here it is important to know the difference between treated acres and treatment acres. **Treated acres** are the actual physical (land) acres of crop which were treated — it doesn’t matter how many times they were treated; they are only counted once. **Treatment acres** are the total number of acres covered by applications of a product regardless of whether they are the same acres or different acres.

If the same 40 acres are treated 4 times, the number of treated acres is

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40 and the treatment acres is 160 (4 x 40). In this example, 40 acres would be recorded.

Never record treatment acres in these questionnaires.

We account for multiple applications of the same product and formulation in one of two ways:

1. recording each event on a separate line, or
2. combining applications on one line and noting number of times in the next column, column 11.

Acres and tenths of acres must be reported in Column 10. Zero **MUST** BE recorded after the decimal point if whole acres are recorded. For example, if the operator treated exactly 25 acres, the entry in Column 10 must be 25.0. Otherwise, the summary will consider the entry to be 2.5 and we will get serious errors when we summarize active ingredients applied per acre.

Applications done at seeding will normally cover the entire planted acres. However, it is possible for the application to only cover a portion of the field, for different application rates to be used, or for different products to be applied to different areas at planting. When the acres covered by “at seeding” applications do not equal the planted acres, verify this with a note in the margin.

Column 11: Number of Applications

If the same product is applied more than once:

1. At the same rate, (Column 6 or 7)
2. In the same time period before, at, or after planting, (Column 5),
3. Using the same method of application, (Column 9),
4. Covering the same area, (Column 10), and
5. Who made the applications, (Column 12)

then the multiple applications can be recorded on one line. Column 11 is coded with the number of applications of **this** product and at **this** rate.

If the applications were at different rates, during a different time period, a different method, or covering different areas of the field, record each

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application on a separate line. For example, if 2, 4-D was applied in the Fall, record it on one line. If a second application was made in the Summer, record it separately on another line.

Column 12: Who Applied

For each individual treatment, record who made the biocontrol or pesticide application on the selected field. The codes to identify who applied the chemicals are:

- | | |
|--------|--|
| Code 1 | Operator, Partner, or Family Member |
| Code 2 | Custom Applicator |
| Code 3 | Employee or Some Other Person. |

If “who applied” was different for a multiple application line (Column 11>1), use the code for who made the most applications.

Item 2: Information for Unlisted Biocontrols or Pesticides

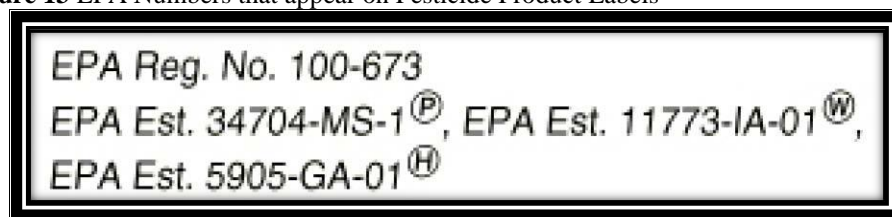
If you could not find a product in the Biocontrol or Pesticide Code List in the Respondent Booklet when completing Item 1, complete the table in Item 2 to provide the information needed to classify and summarize unlisted products. First, record the line number of the pesticide application that the information refers to. Then record what it was used for (herbicide, insecticide, fungicide). Next record the EPA registration number, if it is available, or the name and formulation of the product. Record whether the product was liquid or dry when it was purchased. Finally, record where the product was purchased. This will assist the Field Office if questions arise about the product and additional information is needed.

The EPA Product Registration number (refer to Figure 13 below) is printed on the product label. These numbers are several digits long and look somewhat like many bank and credit card account numbers, such as 312-19-18713 and 2980-4. EPA Product Registration numbers are not the same thing as EPA Establishment numbers. In this example, the EPA Product Registration number is **100-673**. EPA Establishment numbers (EPA Est.) indicate which companies are also licensed to market the product, but do not uniquely identify the product.

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Figure 13 EPA Numbers that appear on Pesticide Product Labels



If the respondent does not know the EPA product number or the trade name and formulation, record as much information about the product as you can, especially the “where purchased.” This information will enable identification of the product in the Field Office. The “where purchased” is important because if more information is needed, we can then call the dealer.

For example, if the operator has a biocontrol or pesticide applied by a custom applicator, he/she might not know the formulation of the product, but if the “where purchased” is recorded the Field Office can check to get the correct formulation.

A good, complete entry for Unlisted Products in the notes portion of the section is as follows:

Figure 14 Providing information needed for unlisted pesticide products.

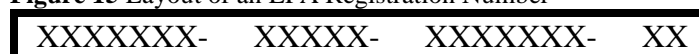
[For pest control products not listed in Respondent Booklet, specify --]

Line	Pest Control Product Type (Herbicide, Insecticide, Fungicide, etc.)	EPA No. or Tradename and Formulation	Form Purchased (Liquid or Dry)	Where Purchased [Ask only if EPA No. cannot be reported.]
6	Insecticide	Danitol 2.4 EC, EPA # 39398-17	Liquid	
16	Fungicide	RegulatorII	Liquid	Midland Chem Supply

What’s in a Registration Number?

All biocontrol or pesticide products, if properly registered, are identified by a unique number which is required to be located on the front panel of the label. This “registration number” is composed of several components, each of which has a specific meaning. These individual components are separated by a “-”. Those products registered in California, have an extra component which identifies individual brand name registrations.

Figure 15 Layout of an EPA Registration Number



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1. Firm or Establishment Number - This component identifies the company that is the primary registrant with the USEPA. The number may be as long as seven digits, or as short as 1. California assigns their own unique firm numbers to companies that register products which are not required to be registered by US EPA.
2. Product or Label Number - This five or less digit number is generally assigned sequentially to each company's individual product as it is registered with the US-EPA.
3. Distributor or Sub-Registrant's Number - This number identifies any company that is marketing a product owned by another company, generally the primary registrant. This type of registration is called a distributor registration or a sub-registration and is allowed under existing agreement certified by the USEPA. For a product registered in California, this number represents the company that holds the license for pesticide registration within the state.
4. California Revision Code - California requires companies to register and license individual brand names. The revision code, a sequence of (2) alphabetic letters, creates a unique identifier for each product. A single product may have many brand names registered within the state. Unique revision codes assigned to each one allows for identification of the specific brand name in question. These alphabetic letters may or may not appear on actual product labeling.

Section E - Pest Management Practices

Section E Purpose

This section provides data about pest management practices that growers use on their crops, either as alternatives to pesticides or practices which improve the effectiveness of pesticides. With this information, researchers can better analyze the effectiveness and performance of alternative pesticide treatment strategies, and potential impacts on the environment and public health.

Several years ago, USDA, along with the U.S. Environmental Protection Agency (EPA) and the Food and Drug Administration (FDA), presented joint testimony to Congress on a new, comprehensive, interagency effort designed to reduce the pesticide risks associated with agriculture. The threefold goal of this effort is:

1. to discourage the use of higher risk products,
2. to provide incentives for the development and commercialization of safer products; and
3. to encourage the use of alternative control methods which decrease the reliance on toxic and persistent chemicals.

Integrated Pest Management (IPM) is an approach used by farm operators to control pests in an environmentally responsible manner. IPM combines biological, cultural, and chemical methods of pest control such as monitoring of pest populations and use of natural enemies of pests. Other methods of cultural controls are used, including pest resistant crop varieties, traditional plowing and crop rotation, and use of pesticides when necessary.

Some producers may hire professionals to check their fields to determine the presence of pests. Proper identification of pest problems may reduce pesticide usage. These issues relate to and address food safety, water quality, and pesticide regulation. Data from these questions are vital to address these concerns.

Introduction and Definition of Pests

The introductory statement does two things to help the respondent:

1. It explains that you will be shifting gears for a while and asking the operator about pest management practices used on the selected field and how

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decisions are made regarding those practices.

2. It defines PESTS for the operators to include WEEDS, INSECTS, and DISEASES. Many operators tend to focus on one kind of pest depending on the crop, but we are concerned about other types of pests as well.

For example, sorghum growers may think only about weeds as pests; cotton growers may focus only on insects as pests.

In this section, when the word PESTS is used, it refers to ALL three, WEEDS, INSECTS, and DISEASES. If you don’t introduce pests this broadly for all operators, operators may answer the questions with only one kind of pest in mind.

If any PESTICIDES were recorded in the Pesticide Table in Section D, then Items 1 thru 3 must be asked. Check back to responses recorded in Section D, Column 2 of Item 1.

Item 1: Weather Data to Assist Determining Pesticide Applications

Weather data used by operators to determine either the need or when to make pesticide applications is another form of pest management. By monitoring weather data, the timing of spraying fields may increase effectiveness, allow for a lower application rate, reduce drift, or decrease the total number of applications needed. Temperature and precipitation data can be used to determine whether a chemical application is likely needed. Fungi development is more likely to occur in damp conditions with low temperatures.

If the operator monitored weather data to determine the need for or timing of pesticide applications, **enter** code “1”.

Item 2: Biological Pesticides Applied

Determine if any biological pesticides were used for the 2023 crop year. A biological pesticide is a product such as an insect growth regulator, neem, or an active bacteria.

Neem is extracted from the seeds and leaves of the neem tree. The primary mode of action of neem is to cover the plant with this natural pesticide. The insect pests refuse to eat any plant covered with neem, eventually starving to death. Neem also acts as a repellent and prevents insect reproduction.

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The active bacteria, **Bacillus thuringiensis (Bt)**, is a natural insecticide found in the soil and acts as a biological pesticide when it is applied to a crop.

If the operator applied any biological pesticides to manage pests, **enter** code “1”, if not, enter code “3”.

Item 3: Pesticides Rotated or Tank Mixed to Prevent Pest Resistance

A common pest management practice is to rotate (from one year to another) or tank mix chemicals with different mechanisms of action. By “different mechanisms of action” we mean HOW the chemical kills the pest (attacks the nervous system, digestive system, etc.). If the operator rotated products or tank mixed pesticides with different active ingredients to keep pests from becoming resistant to pesticides, **enter** code “1”, if not, enter code “3”.

Item 4: Records Kept

Only organized, formal records must be considered not just notes jotted down on scraps of paper. It doesn’t matter who kept the records -- it can be the operator or someone else.

Important Note: If scouting was performed by someone outside of the farm operation, some type of formal record should be provided to the operation. If not, please make a note as to why no records were provided.

If this field was scouted for pests, determine if some type of formal or organized written, electronic, or map records were kept for this field of specific pest activity, infestation levels or numbers of each type of pest listed.

Example: Formal Pest Record

A specific example of keeping formal pest records from a systematic scouting approach comes from the North Carolina Cooperative Extension Service. Three steps are recommended to scout for weeds:

1. make at least 10 stops in each field,
2. at each stop, mark off approximately 30 feet of row (10 paces);
3. record the type and number of weeds found within a 1-foot band in the row. Then record the scouting results on a “weed threshold worksheet” like the one below:

Figure 16 Example of information recorded in written scouting records.

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Weed	Number Counted	Number of Stops	Number of Weeds per Stop

The information recorded on the worksheet is used with other information to determine whether herbicide treatment is necessary.

Item 5 Published Information

This question asks if the operator compared scouting data against published infestation threshold information to determine whether or not to take measures for pest control. With the presence of a pest, an operator may not choose to try to control that pest since it may not reach a damaging level. The crop could possibly outgrow the pest, or natural predators or disease may keep down the pest population. **Enter** code ‘1’ for YES or “3” for NO and continue.

Item 6 Method of Pest Scouting

Scouting is the primary method of monitoring pest populations which involves observations of pests in the field in order to estimate population levels. Regular crop scouting lets growers evaluate pest populations ahead of serious problems. Scouting may be done weekly during the growing season and even daily when infestations approach economic levels or weather conditions favor rapid development of specific pests. Scouting is defined as a deliberate effort to assess the pest situation in a whole field, not just in the edge, center, high or low areas. **Enter** the code that best represents the degree to which the respondent scouted to manage pests in the selected field.

Code 1 By deliberately going to the field specifically for scouting activities: The operator deliberately scouts the field based on a planned or scheduled basis.

Code 2 By conducting general observations while performing routine tasks: The operator checks for the presence of pests as routine field tasks are performed.

Code 3 Selected field was not scouted.

Item 7: Established Scouting Process

If the operator performed systematic or counting in their scouting routine or used pheromone or other insect lures or traps in the selected field, **enter** “1” for yes, otherwise, enter “1” for no.

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Item 8: Reason for Scouting Selected Field

Continue to item 8a and 8b to determine why scouting was done to this field.

Item 8a: Pest Advisory Warning

Under certain climatic conditions, the potential for pest infestation is higher than normal. The County, Cooperative or University Extension advisor, crop consultant or other advisory source will often issue a pest advisory warning - a recommendation that growers scout their fields for particular pests. If pests were scouted in the selected field due to a pest advisory warning, **enter** “1” for yes, if not, enter “3” for no.

Item 8b: Pest Development Model

Pest monitoring consists primarily of “in field” scouting surveys. However, there are also area-wide programs that monitor pest development, population levels, migration, and seasonal emergence of overwintering insects. These predictive models are used to forecast the time and development stage of pest infestations. Often, a trapping network is used in conjunction with a predictive degree-day model to forecast insect larval growth and development and predict when growers need to scout for particular pests. If pests were scouted in the selected field because of a pest development model, **enter** “1” for yes, if not, enter “3” for no.

Item 9: Pest Scouting

Column 1: What was the field scouted for

Answer items 9a-9c accordingly.

Column 2: Was Field Scouted for Pests

Determine if the selected field was scouted for weeds, insects, or diseases.

For each type of pest for which the field was scouted, enter code “1” = YES, and then ask items in columns 2 and 3, (infestation level) and (who did the majority of the scouting for this type of pest). **Repeat** for each row. If any response for column 2 = “3” for no, columns 3 & 4 should not be asked.

Column 3: Level of Infestation

If the selected field was scouted for weeds, insects, or diseases, record the code

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which best describes the situation in the 2023 crop year for the pest discovered.

Consider the pest(s) reported with a “YES=1” from column 1; this question asks if the weed, insect, or disease problem was worse than normal in 2023, about normal, or less of a problem than normal.

Record the appropriate code and continue to column 3.

Column 4: Who Performed Scouting for Pests

Ask the respondent who did the majority of the scouting in the field for weeds, insects and mites, and diseases. If two or more people did equal amounts and there is no clear-cut major “scouter”, enter the first (lowest) code of those scouting. If the operator, a partner, or a family member did the most scouting, **enter** code “1”.

If most was done by an employee (other than the operator, a partner, or a family member), enter code “2”. If most of the scouting was done by the dealer or an employee of a farm supply or chemical company, **enter** code “3”. If a hired independent crop consultant or a commercial scouting service was used, **enter** code “4”.

If a contractor provided the scouting services for the field, enter code “4” for INDEPENDENT CROP CONSULTANT OR COMMERCIAL SCOUT.

Item 10: Used Field Mapping of Previous Weed Problems

Ask if this operation used field mapping of previous year’s weed problems to assist in making weed management decisions on the selected field this year. An operator may have used a topographic map from the National Resource and Conservation Service (old Agricultural Stabilization and Conservation Service). The operator may simply draw an outline of the field or may use a software program that allows for field mapping. By identifying trouble spots, the map can help in future pest management program plans. If this practice was used, **enter** code “1” for YES or “3” for NO and continue.

Other Pest Management Practices (Items 11 – 16)

Items 11 through 16 identifies specific practices and strategies used on the selected field for the 2023 target crop as part of an Integrated Pest Management program. For each of these items, it is important to read each question as worded

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to help the respondent focus on strategies used **ON THE SELECTED FIELD** for the 2023 crop. For most of these questions, the term “pest” covers weeds, insects, and/or diseases.

Each of these items asks if the operator used the procedure for the purpose of controlling pests on the selected field. If the procedure was used for this purpose, enter code “1” for YES. If the procedure was not used for the purpose of controlling pests, then enter “3” for NO and continue with the next item.

In some cases, the operator may have used a particular procedure, but not for the purpose of controlling pests. If this is the case, probe to verify that the operator’s purpose was other than to control pests, by saying, for example, “Did you do that to control pests?” If the purpose for the procedure was not for controlling pests, then the answer to the question is “3” for NO.

Item 11: Use of Other Types of Pest Management

Determine other type(s) of pest management for the specific purpose of managing or reducing the spread of pest in the selected field. **Enter** code “1” for all that apply.

Item 11a: Use of Diagnostic Laboratory

Determine if the operator or a crop consultant utilized the services of a diagnostic laboratory for the selected field. Enter code “1” if YES or code “3” for NO.

Item 11b: Plow Down Crop Residue

By plowing under crop debris after a crop is harvested, a vital habitat for pests is removed. If the operator used this practice, then enter a code “1” for YES or code “3” for NO.

Item 11c: Remove/Burn Down Crop Residue

By removing crop debris after a crop is harvested, a vital habitat for pests is removed. Methods of removal could include baling, burning, and removing debris from the field. If the operator used this practice, then enter a code “1” for YES or code “3” for NO.

Item 11d: Rotate Crops to Control Pests

Find out if crops were rotated in the past 3 years for the purpose of

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controlling pests. Pest control is only one of several reasons crops could have been rotated. Be sure to probe to ensure that the control of pests was a reason for rotating crops on this field. If the control of pests was a reason crops were rotated, then enter a code “1” for YES or code “3” for NO.

Item 11e: Maintain Ground Covers

Determine if any ground covers, mulches, or physical barriers were maintained in or around the selected field to reduce pest problems. If this practice was used, enter code “1” for YES or code “3” for NO.

Item 11f: Consider Pest Resistance When Selecting Crop Variety

Find out if the operator considered pest resistance offered by different crop varieties in selecting the variety planted in this field. Enter code “1” if YES or code “3” for NO.

Item 11g: No-till or Minimum-till for Weed Control

Determine whether no-till or minimum-till was practiced on this field for weed control during the growing season after the target commodity was planted. If YES, enter code “1” or code “3” for NO.

Item 11h: Planting Location Practices

Another pest management practice is to determine where to plant a particular crop. Crop location can have a negative or positive impact on pest populations. As an example, a wind break could create a pocket for a certain pest infestation such as flies or weeds. A prominent shaded area can harbor mold or a rot that could also have a negative impact. If this practice was used, enter code “1” for YES or code “3” for NO.

Item 11i: Adjust Planting or Harvesting Dates

Find out if the planting or harvest date was adjusted on this field for the purpose of controlling pests. If yes, enter code “1” or code “3” for NO.

Item 11j: Chopping, Mowing, Tilling, Burning, etc.

Eliminating habitat where pests can breed, and grow is an important pest management strategy. Farmers often mow or otherwise maintain areas

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immediately adjacent to fields to minimize the habitat where insects live.

Find out if practices such as mowing, burning, tilling, and chopping of field edges, lanes, or roadways, were used to slow or control the spreading of pests into the field. If yes, enter code “1” or code “3” for NO.

Item 11k: Cleaning of Equipment

Cleaning of equipment used in a field prevents carrying pests (such as weeds and disease) from one field to another. Find out if the operator cleaned the any equipment used in this field to reduce or prevent the spread of pests to or from the selected field. If yes, enter code “1” or code “3” for NO.

Item 11l: Adjusted Row Spacing or Plant Density

Find out if row spacing (width) or plant density (number of seeds planted per acre) were adjusted in this field for the purpose of controlling pests. Enter code “1” if YES or code “3” for NO.

Item 11m: Seed Treated

If the seed used on the selected field was treated for insect or disease control after it was purchased, enter “1” for YES or code “3” for NO.

Item 11n: Maintain Beneficial Insect or Vertebrate Habitat

If the operator maintained a beneficial insect or vertebrate habitat for the purpose of managing or reducing the spread of pests in the selected field, enter “1” for YES or code “3” for NO.

Item 11o: Maintain Practices to Isolate Organic from Non-organic Crops or Land

A buffer harvest is taken when there are no barriers between organic and non-organic cropland. For example, if an organic apple field is located all the way to a non-organic neighboring field, a certain amount of the organic field has to be harvested as conventional. If the operator maintained buffer strips or border rows to isolate organic from non-organic crops or land (or took a buffer harvest), enter “1” for YES or code “3” for NO.

Item 11p: Use of Flamer to Kill Weeds

If a flamer was used to kill weeds in the selected field for the purpose of maintaining or reducing the spread of pests, enter “1” for YES or code “3” for NO.

Item 11q: Early or Late Planting to Avoid Weeds

If the operator planted early or late to avoid weeds in the selected field for the purpose of maintaining or reducing the spread of pests, enter “1” for YES or code “3” for NO.

Item 12: Beneficial Organisms

If the operator applied or released any beneficial organisms such as nematodes, fungi, insects, etc. in the selected field to manage pests, enter “1” for YES or code “3” for NO.

Item 13: Biological Pest Control

Biological pest control methods include beneficial organisms (pest predators and parasites) such as floral lures, attractants, repellents, and mating disruption that are used to control crop pests, biochemical agents such as pheromone, microbial organisms such as *Bacillus thuringiensis* (Bt) and other bacteria, viruses, fungi, and protozoa. If this practice was used, enter code “1” for YES or code “3” for NO.

Item 14: Trap Crop

If a trap crop was planted in any part of this field to manage insects, enter code “1” for Yes or code “3” for NO.

Item 15: Fallow Insect

If this field was left fallow the previous year to help manage insect infestation on this field, enter “1” for YES or code “3” for NO.

Item 16: Water Management Practices

Water management practices include irrigation scheduling, drainage control, and other water management practices. If water management practices were used to control pests in this field, enter code “1” for YES or code “3” for NO.

Conclusion

Item 1: Survey Results or Other Agency

After completing the interview, offer the results of the survey or other Agency or Field Office publications to the respondent. A number of publications will result from the ARMS, and they will be published in a variety of sources. Many of these are explained in Chapter 1 of this Manual. In addition, there may be other releases from NASS or your Field Office that responding farm operators may be interested in. We would like to serve the respondents better by providing survey results and other information that they will find useful and interesting.

Your Survey Statistician will explain which publications from Headquarters or from your Field Office to offer to participants in the ARMS. The Survey Statistician will instruct you how to record requests for information from each respondent, if any Release order forms need to be filled out, or if any additional coding is required on the questionnaire.

If the respondent would like a free copy of the survey results, **enter the respondents e-mail address in cell 1095.**

Ending Time

Record the ending time of the interview in cell 0005 **OR** the total hours in cell 0008. If more than one person was interviewed or it took more than one appointment to complete the interview, times should reflect the approximate total time for the questionnaire. Exclude the time you spend reviewing the questionnaire or verifying calculations by yourself after you have completed the interview. Be sure the ending time is after the beginning time entered on the face page. Use military time.

Item 2: Records Use

Do not ask these remaining questions of the Respondent. They are only for administrative purposes and analysis. You should fill them out after the interview is completed.

Analysts and other data users are interested in comparing reported data with the use of records. The use of records should indicate data are of a higher quality. Enter a code "1" to indicate the respondent referred to and used written records when reporting the indicated items.

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Fertilizer Data

If farm records were used for completing the majority of the **fertilizer** data items in the questionnaire, enter code “1” for YES in cell 0011 if not, enter “3” for NO.

Pesticide Data

If farm records were used for completing the majority of the **pesticide** data items in the questionnaire, enter code “1” for YES in cell 0012, if not, enter “3” for NO.

Item 3: Supplements Used

Record the total number of each type of supplement used in completing this interview in the designated cell. These items are important to provide a means to check for misplaced or lost supplement sheets during the computer edit. Be sure all the supplements are inside the questionnaire before mailing the questionnaire or turning it over to a supervisor.

Operation Email and Phone

If the e-mail and phone number is different from whom will be receiving the survey results, please enter the information. Also, check the phone if the phone number is a cell phone.

Respondent Name and Phone

Enter the respondent’s name. Only enter the respondents phone number if it is different from the operations phone number in item code 9936.

Thank the respondent for completing the survey!

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Administrative Items

Response Code

Upon completion of the interview, enter the response code in cell 9901 on the Back Page of the questionnaire. Response codes are:

Code 1 - Complete

The questionnaire is complete, including questionnaires for respondents that are no longer in business.

- Use Response Code 1 for operations that you have determined DID NOT grow the target commodity this year. Complete means you have obtained all the data needed for the questionnaire.
- Use Response Code 1 for institutional farms, such as prison farms, private or university research farms, high school FFA farms, not-for-profit farms operated by religious organizations, and Indian reservations produce agricultural commodities, but do not meet the ARMS definition of a farm or ranch. Production practices, costs, and income characteristics of these operations are not representative of the general farm population. Assign Response Code 1 to these types of operations and describe the specific type of operation on the face page with a note.

Code 2 - Refusal

The respondent refused to cooperate or grant an interview.

Code 3 – Inaccessible/Incomplete

The operator was not available throughout the survey period (inaccessible). You will also use code 3 if the respondent gave an interview but could not or would not answer a lot of the questions (incomplete questionnaire)

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Respondent Code

The respondent code identifies the person who was interviewed. Enter the code identifying the person who provided most of the data in cell 9902.

Code 1	=	Operator or Manager
Code 2	=	Operator’s Spouse
Code 3	=	Accountant or Bookkeeper
Code 4	=	Partner
Code 8	=	Office Hold
Code 9	=	Other

Record the respondent’s name and phone number.

Mode Code

The mode code identifies how the person was interviewed. ARMS Phase 2 completes must be by face-to-face interview.

Code 2	=	Telephone	Code 3	=	Face-to-Face
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Enumerator Name

Sign the questionnaire and record your enumerator ID number in cell 9998.

Date

Record the date the questionnaire was completed. Enter the date in MMDDYY format on the lines provided in cell 9910. For example, if the interview was completed on November 8, 2023, enter the month and day 1 1 0 8 2 2 in the date cell.

Optional Use

Item codes 9906 and 9916 are reserved for your Field office use. These cells should remain blank unless your Field office directs you otherwise.

Review the entire questionnaire before forwarding it to your Supervisor. Make sure all items are complete, including ‘Yes’ and ‘No’ boxes checked, and dashes are entered in cells when the response is ‘None’ or ‘No’ as appropriate. Make sure notes are present and complete for unusual situations.

NOTES: