USDA Animal and Plant Health Inspection Service
U.S. DEPARTMENT OF AGRICULTURE

Agricultural Quarantine Inspection Monitoring (AQIM) Handbook

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When using pesticides, read and follow all label instructions.

Newest Edition Issued 2024

AQIM Handbook

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Introduction

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Purpose

The *Agriculture Quarantine Inspection Monitoring* (*AQIM) Handbook* (Handbook) provides information for:

- Analyzing information enabling managers to make risk-based decisions
- Implementing AQIM activities
- Training employees about risk analysis and management

Users

The AQIM Handbook is used primarily by CBP Agriculture Specialists, PPQ employees (including officers, managers, technicians, identifiers) involved in AQIM activities. The users would include those who are responsible for:

- Completing data worksheets
- Conducting risk management
- Determining a random sampling scheme
- Documenting statistical information
- Entering information into the Agricultural Risk Management System (ARM)
- Interpreting information in ARM
- Monitoring AQIM implementation

Related Documents

The Government Performance Results Act (GPRA) of 1993 is the basis for implementing AQIM. Refer to The Government Performance and Results Act of 1993.

Another related document is titled, “Safeguarding American Plant Resources” dated July 1, 1999. This document describes the systems needed to deliver plant protection programs. AQIM activities support a safeguarding system founded on risk-based pathway studies and performance measurement that allow maximum effectiveness of operations.

Advisories

Advisories are used throughout the *AQIM Handbook* to bring important information to your attention. Please carefully review each advisory. The definitions coincide with the American National Standards Institute (ANSI) [1] and are in the format shown below.

⚠ CAUTION

Example of the Caution message table. The Caution message is used for tasks involving minor to moderate risk of injury.

⚠ DANGER

Example of the Danger message table. The Danger message is used in the event of imminent risk of death or serious injury.

NOTICE

Example of the Notice message table. The Notice message is used to alert a reader of important information or agency policy.

SAFETY

Example of the Safety message table. The Safety message is used for general instructions or reminders related to safety.

⚠ WARNING

Example of the Warning message table. The Warning message is used in the event of possible risk of serious injury.

[1] TCIF Guideline, Admonishments (Safety-Related Warning Message), TCIF-99-021 Issue 1, p.4.

AQIM Handbook Contacts

Information Services and Manuals Unit (ISMU)

The PPQ Information Services and Manuals Unit (ISMU) issues and maintains manuals electronically on the APHIS Plant Protection and Quarantine Manuals webpage.

If you are unable to access the AQIM Handbook online or have a suggested edit (layout, spelling, etc.) please contact ISMU by email at PPQ.IRM.ISMU.Manuals.Feedback@usda.gov.

Revisions to the handbook are announced via the APHIS Stakeholder Registry to anyone, government employees and external stakeholders, who have subscribed to receive *AQIM Handbook* updates. To subscribe, navigate to APHIS Stakeholder Registry, enter your email address, and select the relevant manuals under Plant Health Information – Manual Updates.

PPQ Import Services Customer Support

If information regarding a policy, procedure, or commodity admissibility appears incorrect in the *AQIM Handbook* and you are with PPQ, contact PPQ Import Services Customer Support at 301-851-2046 or 877-770-5990 with an explanation and recommended correction. If you are with Customs and Border Protection (CBP), contact the CBP Agricultural Programs and Trade Liaison (APTL) at aptisida@cbp.dhs.gov.

AQIM Handbook Liaison

If you disagree with a policy, procedure, or have an urgent situation requiring an immediate response regarding the *AQIM Handbook* and you are with PPQ, contact PPQ Policy Headquarters at qpas-agim@usda.gov or Field Operations at agi.db.admin@usda.gov. If you are with CBP, contact the Agricultural Programs and Trade Liaison at aptisida@cbp.dhs.gov.

Chapter

2

The Government Performance and Results Act of 1993

Contents

Background

The Government Performance Results Act of 1993 (GPRA), which was passed by Congress in 1993 and updated (Modernized) in 2010, is a law that requires all government programs to be managed based on results achieved. This process includes setting specific program outcome targets, measuring progress towards those outcomes, and analyzing and using the results to make program improvements. The law connects this focus on program outcomes to the budget development process by requiring the President's budget, starting in FY 99, to include the following for each program activity.

- Long-term (5-year) strategic plan that includes a comprehensive mission statement and general outcome-oriented goal statements;
- Annual performance plans, including annual measurable goals and indicators of goal achievement;
- Annual performance reports that show whether measurable goals have been achieved.

Managing for results requires a different conceptual or philosophical framework. Refer to Table 2-1 to view the difference between our old framework and that of GPRA.

Table 2-1 One Way of Viewing the Difference Between the Old Framework and the GPRA

In the old framework for managing programs, the focus was on:	When managing for results, the focus is on:
Inputs	Outcomes
Process	Results
Activities	Strategic objectives
Compliance	Performance
Management control	Management improvements
Retrospective data analysis	Ongoing monitoring
Reporting data	Using data

The remainder of this section of the Introduction contains excerpts from the Comptroller General of the United States dated June 1996, effectively implementing the GPRA (GAO/GGD-96-118).

Federal Management Reform

Over the past several years, Congress has taken steps to fundamentally change the way Federal agencies go about their work. Congress took these steps in response to management problems so common among Federal agencies that they demanded governmentwide solutions. In addition, two contemporary forces converged to spur Congressional action:

- Year-in and your-out budget deficits that had to be brought down
- Public now demanding that **not** only should Federal agencies do their jobs more effectively, but do so with fewer people and at a lower cost

This change was, and remains, an enormous challenge. For one thing, many of the largest Federal agencies find themselves encumbered with structures and processes rooted in the past, aimed at the demands of earlier times, and designed before modern information and communications technology came into being. These agencies are poorly positioned to meet the demands of the 1990s. Moreover, many of these agencies find themselves without a clear understanding of who they are or where they are headed. Over the years, as new social or economic problems emerged, Congress assigned many agencies new and unanticipated program responsibilities. These additions may have made sense when they were made, but their cumulative effect has been to create a government in which many agencies cannot say just what business they are in.

In some cases, agencies' legislative mandates have grown so muddled that Congress, the executive branch, and other agency stakeholders and customers cannot agree on program goals, worthwhile strategies, or appropriate measures of success.

Traditionally, Federal agencies have used the amount of money directed toward their programs, or the level of staff deployed, or even the number of tasks completed as some of the measures of their performance. But at a time when the value of many Federal programs is undergoing intense public scrutiny, an agency that reports **only** these measures has **not** answered the defining question of whether these programs have produced real results.

Today's environment is results oriented. Congress, the executive branch, and the public are beginning to hold agencies accountable less for inputs and outputs than for outcomes, by which

is meant the results of government programs as measured by the differences they make, for example, in the economy or program participants' lives. The difference between outcomes and outputs is the key to understanding government performance in a results-oriented environment.

Legislative Requirements

Congress's determination to make agencies accountable for their performance lay at the heart of two landmark reforms of the 1990s:

- Chief Financial Officers (CFO) Act of 1990
- GPRA

With these two laws, Congress imposed on Federal agencies a new and more businesslike framework for management and accountability. In addition, the GPRA created requirements for agencies to generate the information that decision makers in Congress and the executive branch need when considering measures to improve government performance and reduce costs.

The CFO Act was designed to remedy decades of serious neglect in operating and reporting financial management. While the CFO Act established the foundation for improving management and financial accountability among the agencies, GPRA is aimed more directly at improving their program performance. The GPRA requires that agencies consult with Congress and other stakeholders to clearly define their missions. It requires that they establish long-term strategic goals, as well as annual goals that are linked to them. They **must** then measure their performance against the goals they have set and report publicly on how well they are doing.

Chapter

3

Strategic Plans, Performance Plans, Reports, and Budgets

Contents

Background

The experiences of leading organizations suggest that the successful implementation of the Government Performance Results Act of 1993 (GPRA) may be as difficult as it is important. For example, obtaining agreement among often competing stakeholders is never easy, particularly in an environment where available resources are declining. In addition, measuring the Federal contribution to outcomes that require the coordinated effort of numerous public and private entities—such as improvements in education, employment, or health—can require sophisticated and costly program evaluations. Three key steps are contained within the guidelines of the GPRA that redefine the methods by which strategic plans, performance plans, reports, and budgets are developed and conducted within the Federal sector. These three key steps are:

- Define mission and desired outcomes
- Measure performance
- Use performance information

Step 1: Define Mission/Desired Outcomes

The GPRA requires that federal agencies, no later than September 30, 1997, develop strategic plans covering a period of at least 5 years and submit them to Congress and the Office of Management and Budget (OMB). If done well, continuous strategic planning provides the basis for everything the organization does each day.

Strategic plans are intended to be the starting point for each agency's performance measurement efforts. Each plan **must** include a comprehensive mission statement based on the agency's statutory requirements, a set of outcome-related strategic goals, and a description of how the agency intends to achieve these goals. The **mission statement** brings the agency into focus. It explains why the agency exists, tells what it does, and describes how it does it. The strategic goals that follow are an outgrowth of the clearly stated mission.

The **strategic goals** explain the purposes of the agency's programs and the results they are intended to achieve.

For strategic planning to have this sort of impact, three practices appear to be critical. Organizations **must** do the following:

- Practice 1—involve their stakeholders
- Practice 2—assess their internal and external environments
- Practice 3—align their activities, core processes, and resources to support mission-related outcomes

Practice 1—Involve Stakeholders

Successful organizations base their strategic planning largely on the interests and expectations of their stakeholders. These organizations recognize that stakeholders will have a lot to say in determining whether their programs succeed or fail.

Among the stakeholders of Federal agencies are Congress and the administration, State and local governments, third-party service providers, interest groups, agency employees, and the American public.

Involving customers is important as well. An agency's customers are the individuals or organizations that are served by its programs. This is **not** to say that contact between a Federal agency and its customers is always direct. Many Federally mandated or Federally funded services are dispensed through third parties, such as State agencies, banks, or medical insurance providers. In such cases, Federal agencies face the particularly challenging task of balancing the needs of customers, service providers, and other stakeholders, who at times may have differing or even competing goals.

Practice 2—Assess the Environment

Successful organizations monitor their internal and external environments continuously and systematically. Organizations that do this have shown an ability to anticipate future challenges and to make adjustments so that potential problems **do not** become crises. By building environmental assessment into the strategic planning process, they can stay focused on their long-term goals even as they make changes in the way they intend to achieve them.

Assessing the external environment is particularly important, in part because so many external forces that fall beyond an organization's influence can powerfully affect its chances for success. For organizations both public and private, external forces can include newly emerging economic, social, and technological trends and new statutory, regulatory, and judicial requirements.

An organization's internal forces include its culture, its management practices, and its business processes. Today, Federal agencies find that monitoring these internal forces is especially important, given the effects of funding reductions and reorganizations. The tools available to organizations assessing the internal environment include program evaluations, employee surveys, independent audits, and reviews of business processes.

Practice 3—Align Activities, Core Processes, and Resources

An organization's activities, core processes, and resources **must** be aligned to support its mission and help it achieve its goals. Such organizations start by assessing the extent to which their programs and activities contribute to meeting their mission and desired outcomes. As

organizations became more results-oriented, they often find it necessary to fundamentally alter activities and programs so that they can more effectively and efficiently produce the services to meet customers' needs and stakeholders' interests.

As agencies align their activities to support mission-related goals, they should match funding with their anticipated results. Under a series of initiatives called Connecting Resources to Results, OMB is seeking to adopt a greater focus on agencies' goals and performance in making funding decisions.

Leading organizations strive to ensure that their core processes efficiently and effectively support mission-related outcomes. This sort of integrated approach may include tying individual performance management, career development programs, and pay and promotion standards to organizational mission, vision, and culture.

Step 2: Measure Performance

After defining their missions and desired outcomes, the second key step that successful, results-oriented organizations take is to measure their performance. Measuring performance allows these organizations to track the progress they are making toward their goals and gives managers crucial information on which to base their organizational and managerial decisions.

The GPRA incorporates performance measurement as one of its most important features. Under the Act, agencies are required to develop annual performance plans that use performance measurement to reinforce the connection between the long-term strategic goals outlined in their strategic plans and the day-to-day activities of their managers and staff. The annual performance plans are to include the following:

- Discussion of how the performance information will be verified
- Summary of the necessary resources to conduct these activities
- Performance goals for an agency's program activities as listed in the budget
- Performance indicators that will be used to measure performance

Practices 4 and 5 are designed to ensure that performance measures are an integral part of agency activities.

Practice 4—Produce a Set of Performance Measures

The experiences are that at least four characteristics are common to successful hierarchies of performance measures. That is, a set of performance measures **must** be produced at each organizational level that:

- **Demonstrate results**—performance measures should tell each organizational level how well it is achieving its goals.
- **Limited to the vital few**—the number of measures for each goal at a given organizational level should be limited to the vital few. Those vital few measures should cover the key performance dimensions that will enable an organization to assess accomplishments, make decisions, realign processes, and assign accountability.
- **Respond to multiple priorities**—government agencies often face a variety of interests whose competing demands continually force policy makers and managers to balance quality, cost, customer satisfaction, stakeholder concerns, and other factors. Performance measurement systems **must** take these competing interests into account and create incentives for managers to strike the difficult balance among competing demands.

- **Link to responsible programs**—performance measures should be linked directly to the offices that have responsibility for making programs work. A clear connection between performance measures and program offices helps to both reinforce accountability and ensure that, in their day-to-day activities, managers keep in mind the outcomes their organization is striving to achieve.

Practice 5—Collect Sufficiently Complete, Accurate, and Consistent Data

As successful organizations develop their performance measures, they pay special attention to data collection. As the experiences of these organizations demonstrated, managers striving to reach organizational goals **must** have systems in place to provide them with needed information.

Step 3: Use Performance Information

After establishing an organizational mission and goals and building a performance measurement system, the third key step in building successful results-oriented organizations is to put performance information to work. Managers should use performance information to:

- Continuously improve organization processes
- Identify performance gaps
- Set improvement goals

Organizations that progressed the farthest to results-oriented management did **not** stop after strategic planning and performance measurement. They applied their acquired knowledge and information to:

- Identify gaps in performance
- Report on the performance
- Improve performance to better support their missions

Practices 6 through 12 give structure to identifying and responding to performance information.

Practice 6—Identify Performance Gaps

Performance information can have real value **only** if they are used to identify the gap between an organization's actual performance level and the performance level it has identified as its goal. Once the performance gaps are identified for different program areas, managers can determine where to target their resources to accomplish the mission. When managers are forced to reduce their resources, the same analysis can help them target reductions to keep to a minimum the threat to the mission.

By analyzing the gap between where they are and where they need to be to achieve desired outcomes, management can:

- Target those processes that are in most need of improvement
- Set realistic improvement goals
- Select an appropriate technique to improve processes

Practice 7—Report Performance Information

Annual performance reports document the progress made toward achieving the goals established in annual performance plans. The reports link levels of performance to the budget expenditures, which is consistent with the GAPER's requirements that annual performance plans be tied to budget requests.

Practice 8—Use Performance Information to Support the Mission

Federal agencies are feeling the pressure to demonstrate that they are putting the taxpayers' money to sound use. They are expected to demonstrate improved performance even as they cut costs—two simultaneous demands that are driving the trend toward results-oriented government. As they focus on the outcomes they hope to achieve, federal managers increasingly are finding that the traditional ways they measured their success-- and thus the traditional ways they did business and provided services--are **no** longer appropriate or practical.

Practice 9—Devolve Decision Making with Accountability

Leading organizations create a set of mission-related processes and systems within which to operate, along with giving their managers extensive authority to pursue organizational goals while using those processes and systems. Allowing managers to bring their judgment to bear in meeting their responsibilities, rather than having them merely comply with overly rigid rules and standards, can help them make the most of their talents and lead to more effective and efficient operations.

Practice 10—Create Incentives

Across government, the best incentive Congress can apply to foster results-oriented management is to use information about performance measurement to make decisions about policy, program, and resource allocation, and to provide agencies with the authority and flexibility to achieve results.

Successful organizations define their missions clearly and communicate them to their employees—particularly to their managers—so they understand their contribution. At both the organizational and managerial levels, accountability requires results-oriented goals and appropriate performance measures through which to gauge progress.

Practice 11—Build Expertise

To make the most of results-oriented management, staff at all levels of an organization **must** be skilled in strategic planning, performance measurement, and the use of performance information in decision making. Training has proven to be an important tool for agencies that want to change their cultures.

Results-oriented managers view training as an investment rather than an expense. And as experts in human resource management at leading private and public organizations have pointed out, organizational learning **must** be continuous in meet changing customer needs, keep skills up to date, and develop new personal and organizational competencies.

Practice 12—Integrate Management Reforms

Within a given Federal agency, the management reforms now under way may come from various sources. Some of these reforms may be self-initiated, others may have been mandated by legislation, still others may be the result of administration initiatives such as the National Performance Review. All these reform activities need to be integrated, as the CFO Council urged in May 1995: "Existing planning, budgeting, program evaluation and fiscal accountability processes should be integrated with the GPRA requirements to ensure consistency and reduce duplication of effort. In addition, other management improvement efforts, such as implementation of the CFO Act, and FMFIA (Federal Managers' Financial Integrity Act), customer service initiatives, re-engineering, and Total Quality Management, etc., should be

incorporated into the GPRA framework to capitalize on the synergy and availability of key information and to improve responsiveness to customers and other stakeholders."

Chapter

4

Agriculture Quarantine Inspection Monitoring

Contents

Introduction

This section of the Introduction gives you the “whats and the whys” of Agriculture Quarantine Inspection Monitoring (AQIM).

What is Agriculture Quarantine Inspection Monitoring?

AQIM is a group of activities initiated to help the AQI program become a results-oriented program. That is, a program that makes decisions using information about the agricultural risks present in a pathway.

The PPQ Executive Team initiated AQIM for two basic reasons:

- To assist in meeting the requirements of the Government Performance Results Act of 1993 (GPRA) (refer to The Government Performance and Results Act of 1993 for an explanation of the GPRA)
- To provide information for risk-based decision making

What is Risk-Based Decision Making?

PPQ is accountable for reducing the pest threat to U.S. agriculture in a way that does **not** unduly restrict commerce. To accomplish this, PPQ is moving to better methods for determining **not** only what to inspect, but how to inspect it. Many of those methods use **risk analysis**.

Risk analysis in business and government provides the framework for organizing and presenting information. This framework helps employees select and justify their actions. For unimpeded trade and movement of commodities in today's world, the AQI program **must** show that imports and people are inspected and treated based on the widely accepted science of risk analysis.

Traditionally, the AQI program risk-based work on the quantity of pest interceptions and quarantine material intercepted (QMI). This seemed logical. Inspection tables were filled with QMI, pests were found, justifying a good job performance. The seriousness of the threat posed by the pest was **not** considered. In other words, effort was based on quantity, **not** the quality of the risk.

When time is spent on low-risk activities, then work on high-risk pathways suffers. Each work location **must** assess the risk of a particular pathway and change that assessment as trade and travel changes.

The entry potential of our worst pests is decreased when pathways are tracked, risk is predicted, and work reassigned. This process of tracking, predicting risk, and reassigning work based on those predictions is **risk-based decision making**. Therefore, the information produced from AQIM provides the information needed to assess the risk of entry of exotic pests and diseases.

How Does Agriculture Quarantine Inspection Monitoring Produce Information?

Information is needed for risk management and the GPRA. To produce the necessary information, AQIM uses a sampling process to estimate the amount and kind of quarantine materials and pests approaching a work location via various known pathways of pest entry. Relative pathway risks can be measured by plugging in estimated numbers of actionable pests and information about pest destination into risk assessment models. We are using information from AQIM to measure the discrepancy between the estimated amount of quarantine materials or pests approaching a location and the actual amount being intercepted by PPQ or CBP at their respective locations.

AQIM data is collected and entered at designated locations into a computer database called Agricultural Risk Management System (ARM). This software allows each location to do simple analyses of the data.

Monitoring results can be used at various levels of the workforce. Work locations can use the results to verify the risk of various entry pathways and to shift resources to activities that are most effective in managing risks. Field offices can use the results to assess the relative risks of various entry pathways and locations. At a national level, the information can be used to assess risk, redesign regulations, and justify budget requests.

Who Is Responsible?

A national team has input in coordinating AQIM via the national coordinator in Headquarters. Information is collected by Customs and Border Protection Agriculture Specialists at designated locations. Basic analysis and use of the monitoring data can be accomplished by managers and employees at work locations to assist in decision making processes. A list of key contacts is in Key Contacts for your reference.

Developing an appropriate sampling process is an important part of this effort. Designated locations **must** give considerable thought to a sampling process to ensure the gathering of valid and useful information about pathway risk and program performance. The national AQIM coordinator can offer help in setting up a sampling process that is practical and sustainable at designated locations.

Who Is Involved?

Designated locations around the country and in Puerto Rico are collecting data. For AQIM to be fully operational, most ports of entry locations will need to become involved in some way. Each designated location collecting information selects an AQIM coordinator and assistant (Roles and Responsibilities for more information). An infrastructure at the national level is also set up to coordinate the program implementation (refer to Key Contacts for information on key contacts for AQIM).

Chapter

5

Statistics and Agriculture Quarantine Inspection Monitoring

Contents

Introduction

Statistics deal with the collection, analysis, and interpretation of information. The Agriculture Quarantine Inspection Monitoring (AQIM) process uses proven statistical techniques to collect monitoring information about various pathways and the commodities entering through them into United States. The information is then used to explain and to explore the characteristics of the various pathways to assist in managing the risk they present to U.S. agriculture.

The information collected as part of AQIM will have very practical uses that will impact the work of port employees. Statistics will allow the use of AQIM information to respond to such practical questions as:

1. How much cargo approaching the work location is carrying actionable pests? What is the level of infestation of the pests in the cargo?
2. What poses the greater risk of spreading citrus canker? Is it maritime imports from South America or air passenger transport of home-grown fruit?
3. How effective is a work location in managing the pest and quarantine material threats that are identified through AQIM?

The use of valid, statistical techniques establishes the facts of the situation, and allows officers and managers to make risk-based decisions.

The following section provides additional information to better understand the role of statistics in monitoring and PPQ operations.

The Why of Statistics

Statistics allow for the objective analysis of information. The principles behind statistics help guide us to use the best methods for gathering information about a population without giving bias to the information.

Historically, selective criteria (targeting) is used to choose inspectional units that are the most likely to transport something of agricultural interest. Inspectional units that don't fit the criteria have less of a chance of being selected—that isn't random sampling. When selecting random samples, selective criteria cannot be used.

In AQIM, ports of entry randomly select pathway entrants to create a picture representative of the entire population. For example, the population might be all air passengers arriving at the international terminal of an airport. The random sampling unit would consist of 10 custom declarations (and associated passengers' baggage) per day for a year, or 3,650 custom declarations for the year. The sample would be selected randomly, such that every passenger had the same chance of selection. The randomness could be achieved in many ways. One example might be that the random sampling units are selected at preselected random times of the day.

The data could be further refined to reflect which of those units in the population pose a threat and which **do not**. Why do we do this? So that we can draw inferences and make decisions about the population in an objective, scientific way. Statistical inference is drawing conclusions about the larger population from smaller, randomly sampled portions. From these sampled portions, we can construct generalizations about the population with varying levels of confidence.

Random Selection as a Key Step

In order to draw accurate conclusions about the larger population from a smaller subset or sample of the population, it is important that the subset be as similar to the larger group as possible. This means that each unit in the subset **must** be randomly chosen from the larger population. Consequently, each unit of the larger population **must** have the same chance of being randomly selected.

Because sampling units are chosen randomly where all units have the same chance of being selected, we can measure the error involved in the information. This measure of error will allow us to judge how good our information is and how much confidence we have in the overall monitoring process.

What Are the Implications for Agriculture Quarantine Inspection Monitoring?

There are several implications of using a random sampling process for AQIM.

1. Monitoring is different from using selective criteria to determine a random sampling unit (refer to Agriculture Quarantine Inspection Monitoring Sampling Process for additional information).
2. It is imperative that selected sampling units are truly random. This eliminates the possibility of human choice or preference in the selection.

3. If the information collected is skewed to reflect high or low levels of pest and quarantine material interceptions, this will misinform any subsequent analysis and impact accurate decision making based on misinterpretation of the data collected. In some instances, reflecting lower pest or quarantine material levels than what actually exists may result in high-risk pathways being interpreted as low-risk pathways (or vice-versa) that could influence a staffing allocation/coverage decision. Conducting truly random AQIM surveys will reflect actual pest and quarantine material levels leading to appropriate staffing allocation.
4. Selected random sampling units **must** be thoroughly inspected to be sure if pests or quarantine materials are present. The goal is to have a clear snapshot of what is approaching a work location.
5. The goal of AQIM is **not** in the number of pest interceptions and quarantine material intercepted (QMIs) collected, but in the decisions based on risk and analysis that can be drawn from the monitoring.

Statistical Concepts

There are several ways of analyzing the monitoring information that has been collected. This section addresses the types and benefits of analysis that are available.

Following are definitions of some basic terms used when analyzing monitoring information:

Confidence interval a level of belief that the true value of the population was captured. For AQIM, the numbers of samples taken at each work location were designed to ensure that by detecting the presence of certain pests and quarantine materials during the monitoring, PPQ could be 95% sure that it would happen again.

Data raw information that provides values for any characteristic of a larger population. For AQIM, these would be all the entries on the data collection form (i.e., flight number, origin, contaminant codes, etc.).

Mean this term is also referred to as the average. It is computed by adding all the values for a characteristic and dividing by the number of observations. For example, the mean of passengers going through an airport in a day would be the total number of passengers in one year divided by 365 days.

Probability the statistical prediction of the likelihood of possible outcomes.

Sample the part (or a subset) of a population that has been selected for monitoring.

Simple random sampling a selection process where each member of the population **must** have a known probability (**greater than** 0) of being sampled.

Variable any characteristic on which the elements of a sample differ from each other (i.e., height versus weight, cargo destinations versus type).

Data is the information that is collected from a random sampling unit (or smaller subsets) that accurately depicts characteristics (measured variables) of the larger population. Gathering data for AQIM is simple random sampling where we collect information regarding specific variables. This is done so we can predict the likelihood of an event occurring such as a pest or quarantine

material interception. The number of inspections conducted at a work location is established so that there will be a 95% confidence interval.

Types of Analysis and Use

There are several types of analysis that can be done with the AQIM data. The analysis can range from the simple to the complex. Explained here are some of the more useful methods available for use at your work location. More detailed analysis questions are located under the following pathway sections: Air—passenger baggage, Air—cargo, Maritime—cargo, Mail, Northern Border—vehicles, Northern Border—truck Cargo, Southern Border—vehicles, Southern Border—truck Cargo.

The simplest analysis is just to look at a **listing of the data**. Listings can answer questions such as what, what kind, and how many. Table 5-1 is an excerpt from a listing of the data gathered for passenger vehicles at a work location along the Southern border. Looking at the data could tell how many inspections were made on what dates, and the types of items being found.

Table 5-1 Example of a Listing Data

REC. #	Work unit:	Date:	Time Destination	Item
1413	Laredo, TX	01/01/24	1110 TX	Orange
1414	Laredo, TX	01/01/24	1300 TX	
1415	Laredo, TX	01/01/24	1253 TX	
1416	Laredo, TX	01/01/24	2010 TX	
1417	Laredo, TX	01/01/24	2330 TX	
1418	Laredo, TX	01/02/24	2130 TX	
1419	Laredo, TX	01/02/24	2015 TX	
1420	Laredo, TX	01/02/24	1540 TX	Apple
1421	Laredo, TX	01/01/24	0845 TX	

For each work location, you have the option to select one of those records with specific variables that you are interested in looking at. Refer to Table 5-2 for an example of records containing quarantine material.

Table 5-2 Printout of Records Having Specific Information

REC. #	Work unit:	Date:	Time Destination	Item
1421	Laredo, TX	01/04/24	0845 TX	Orange
1428	Laredo, TX	01/08/24	1927 TX	Apple
1432	Laredo, TX	01/10/24	1849 TX	Sugarcane
1453	Laredo, TX	01/14/24	1840 TX	Hay
1466	Laredo, TX	01/17/24	1840 TX	Pear
1486	Laredo, TX	01/05/24	0813 TX	Avocado with seed
1590	Laredo, TX	01/20/24	1005 TX	Orange
1614	Laredo, TX	01/24/24	0854 TX	Apple

REC. #	Work unit:	Date:	Time Destination	Item
1631	Laredo, TX	01/25/24	0900 TX	Eggs

Frequencies answer the question, "To what degree do unique values exist in a variable?" Looking at the frequency of a certain variable will show summary data about the variable. For example, running a frequency on the date variable will give the number of inspections that were done on each date as well as the total number of inspections. Figure 5-1 shows the frequency of items intercepted. You get a list of the different types of items intercepted and how many there were in the monitoring samples.

ITEM	Freq	Percent	Cum.
APPLE	3	30.0%	30.0%
AVOCADO, W/ SEED	1	10.0%	40.0%
EGGS	1	10.0%	50.0%
HAY	1	10.0%	60.0%
ORANGE	2	20.0%	80.0%
PEAR	1	10.0%	90.0%
SUGARCANE	1	10.0%	100.0%
Total	10	100.0%	

Figure 5-1 Printout of Frequencies of Items Intercepted

Frequencies, as well as the raw data, can also be displayed graphically using **pie** and **bar** charts (refer to Figure 5-2).

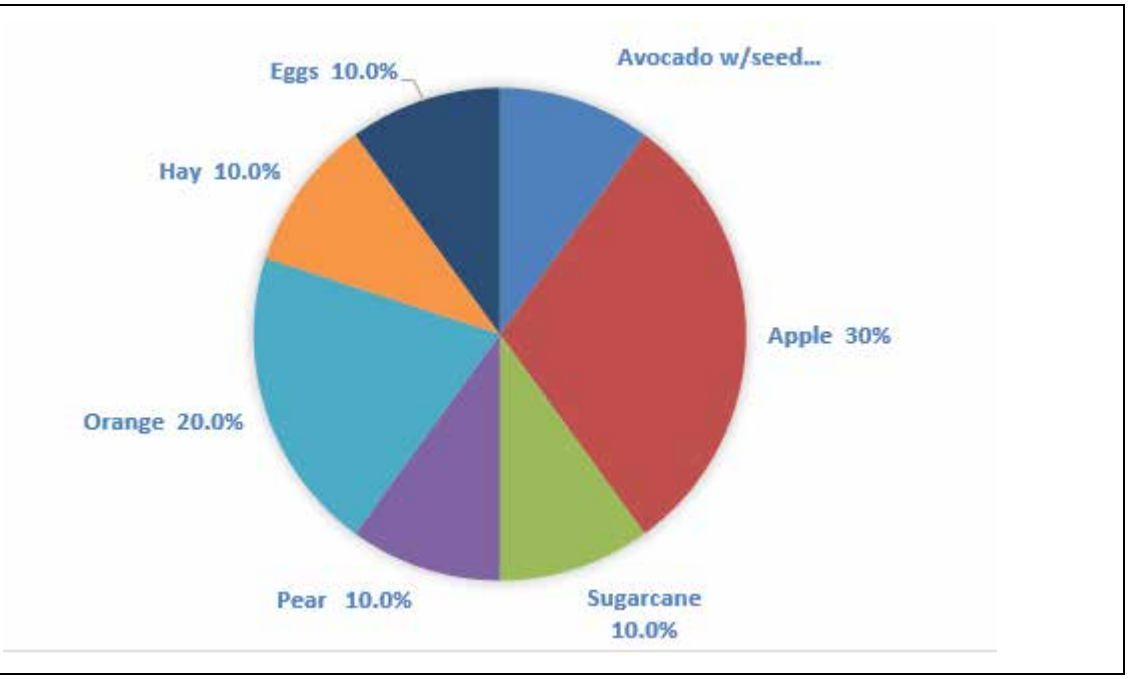

Figure 5-2 Example of Frequencies Displayed Using Pie Chart

Means or averages give an overview of the general tendency of a variable. The average number of passengers on a declaration might be of interest for your work location. This could be calculated by dividing the total number of passengers in the data file by the number of declarations (or samples). We can calculate the 'error' in this estimate and express it in the form of a **confidence interval**. Remember that the confidence interval gives an indication of how accurate the estimate is.

Proportions show the relative frequency of an event. For AQIM, we may be interested in the proportion or percentage of passengers with a QMI. We could calculate this by dividing the total number of QMIs by the number of passengers. We can also compute a confidence interval around proportions.

Next Steps

These are all statistics that are necessary to initially conduct and understand AQIM. Using statistics and risk management principles will become more critical as PPQ progresses toward complying with the Government Performance Results Act of 1993 and evaluating results-based performance.

Chapter

6

Fundamentals of Risk Analysis

Contents

Basics About Risk

Agriculture is a business filled with numerous risks. Pests, diseases, weather, and market fluctuations continually impact the potential earnings of producers. These elements of risk and the reaction of producers and consumers to that risk, result in agricultural policy setting and government programs.

USDA has several programs by which it enhances overall U.S. agricultural markets; ranging from economic forecasting to genetic research. APHIS, PPQ helps protect the natural agricultural resource base of the United States by minimizing the entry potential of risk elements, which would increase the risk agents (i.e., pests and diseases). These efforts are designed to help give producers the best possible standing in international markets.

In the past, APHIS, PPQ has responded to risk issues on a historical knowledge basis. Through observation and experience, PPQ made judgments and decisions about the potential threat posed by various commodities entering the United States. These decisions **must** now be supported by empirical information.

Risk analysis processes give PPQ a basis for responding to the mandates required by the international trade agreements: General Agreement on Tariffs and Trade (GATT) and United States-Mexico-Canada Agreement (USMCA). GATT and USMCA require transparency of risk-based decisions impacting agricultural products in U.S. markets. Therefore, PPQ **must** do business differently than in the past because of these mandates. For information and criteria about risk management, refer to the APHIS Trade Risk Analysis Position and the GATT Agreement on the Application of Sanitary and Phytosanitary Measures located in Appendix C of this Handbook.

The basic function of PPQ is to manage exotic pest and plant disease risk. To accomplish this work, decisions **must** be based upon the risk that various commodities pose to U.S. agriculture. At the heart of risk-based decision making is the need for good information. Because PPQ **does not** have perfect knowledge about the absolute risk of a particular pest, disease, or commodity; decisions **must** be made with clear understanding, knowledge, and an element of uncertainty.

Risk Analysis Process

Risk analysis is the process, tools, and methodologies by which organizations estimate the likelihood and potential consequences of an adverse event. International trade agreements require these processes be consistent, systematic, and transparent. Therefore, the organizational objective is that risk-based decision making should be pervasive throughout all levels of PPQ and APHIS.

A risk analysis process places risk analysis activities within an organizational context. The process provides an internal structure and roles and responsibilities, which define and respond to risk-based policy issues. A risk analysis process comprises risk assessment, risk management, and risk communication. Figure 6-1 chronicles the difference between risk assessment, risk management, and risk communication.

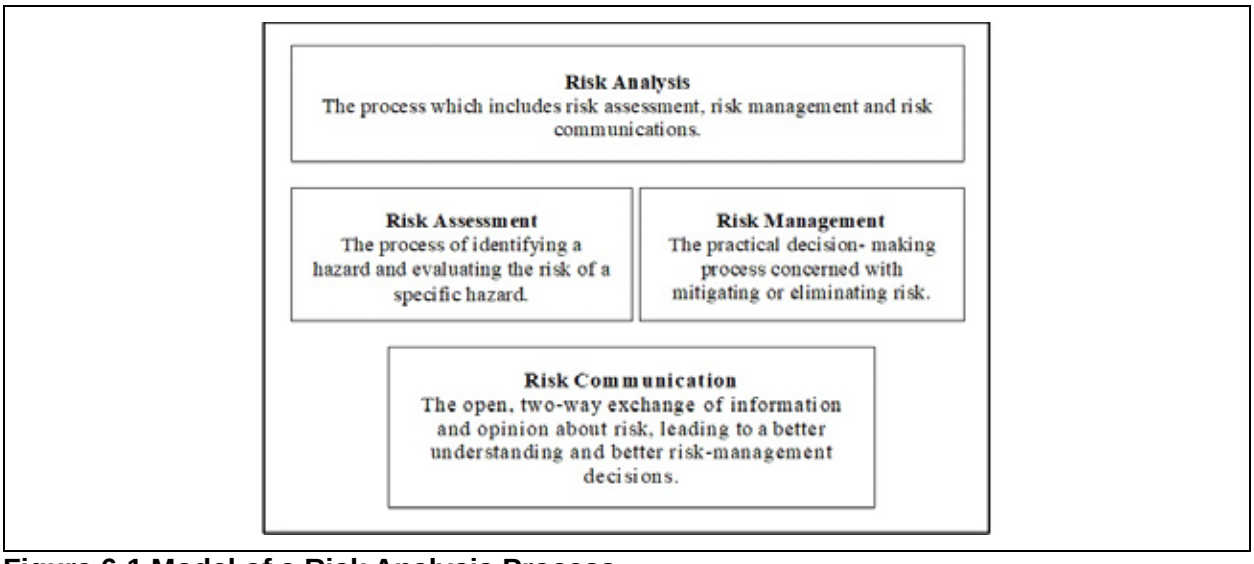

Figure 6-1 Model of a Risk Analysis Process

The risk assessment (or analysis) portion of the model pays attention to estimating the probability and magnitude of the risk. Analysis ends with developing and selecting options. AQIM plays a major role in evaluating, monitoring, and improving options or mitigation

programs. As risk analysis processes are used, it is essential to communicate with clients to ensure programmatic goals are met, and to ensure the results improve or to re-tool the process.

Field work occurs primarily at the implementation levels of risk management. PPQ officers are responsible for implementing risk management programs; monitoring and evaluating those programs; and adjusting and improving activities to ensure that risk is being managed at the best possible level. Risk analysis is a systematic way of achieving risk-based decisions.

The major barrier to risk analysis is reliable data. Data errors may come from improper sampling procedures, errors in record-keeping and data entry or faulty analysis. In addition, risk analysis **must** consider aggregate risks. For example, fruit that has citrus canker poses one level of threat while fruit that is contaminated with medfly poses another. However, if infested with citrus canker and medfly, the risk rate is more intense.

From a risk management viewpoint, agency leaders **must** actively respond to:

- What can be done to prevent, reduce, or eliminate the risk?
- What are the best options?
- Why?

There are multiple uses of risk analysis: problem definition, risk prediction, risk avoidance measures, mitigation strategies, management programs, and standards for protecting agriculture. From risk analyses, work locations can evaluate ongoing risk reduction activities; determine management and policy priorities; and identify and rank research and data collection needs.

The model in Figure 6-2 on pest risk assessment (analysis) gives context to risk analysis processes.

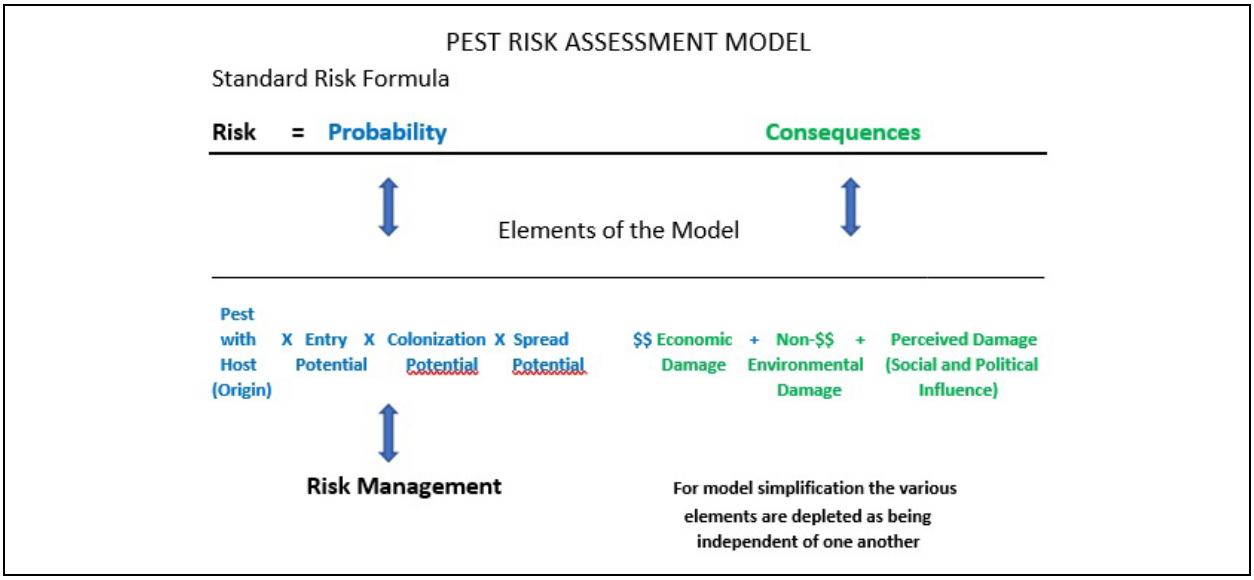

Figure 6-2 Pest Risk Assessment Model

The model in Figure 6-2 helps to exemplify that risk equals probability and consequences. It is important to note in this model that AQIM activities are focused on the element of entry potential. The intent of AQIM is to assess entry potential and devise methodologies for reducing or eliminating that potential to the best possible level through the most efficient use of resources.

Therefore, PPQ work locations can assess the approach rate of pests, evaluate the rate of detection, and devise methods to minimize or to ameliorate entry of any pest or disease.

It is important that work locations and Risk Management Teams concentrate most of their activities on reducing entry potential. However, they **must** also be aware of the other risk elements that impact overall effectiveness. Final activities at work locations may be influenced by such factors as colonization, spread potential, economic damage potential, environmental damage potential, and social-political influences.

Referring to Figure 6-2, the probability portion of the standard risk formula is multiplicative. This means that if any of the elements listed are zero (i.e., pest with host origin, entry potential, colonization potential, spread potential), then nothing can happen and there is **no** risk. However, if there is a positive occurrence or likelihood in all of these elements, then the risk level **must** be considered.

In Figure 6-2, the second portion of the standard risk formula is consequences. We tend to think of consequences in the negative. How much damage will this pest or disease threat pose in terms of dollars, environment, social, and political elements. The elements of risk consequences (i.e., economic damage potential, environment damage potential, perceived sociopolitical damage) are additive in nature. You may have a "zero" or nonissue in any two elements. But, as long as one of the elements has a positive impact, then consequences **must** be addressed. The intent is to determine if a risk will require mitigation. This brings us to the third part of the pest risk assessment model—risk management.

Risk Management

Risk management is the analysis of various options and the determination of which options can be pursued based upon current operating issues and parameters. The analysis discerns 'what is viable.' Still, it is the responsibility of the decision-makers to weigh the various options, considering positive implications as well as the negative. All consequences are **not** equal.

Historically, APHIS has viewed all pest establishments as equally unacceptable. However, some pests may be harder to eradicate than others, and some may be harder to trap or have more long-term effects. Management uses risk analysis to give greater specificity in the relative threat levels. Probability of establishment and consequences of impact **must** mutually be considered.

Therefore, the product of a risk analysis is a conclusion (or characterization) about the relative risk of a particular commodity or pest as it relates to others. It is **not** an absolute value. It is then up to the decision-makers to judge whether the risk is acceptable. If the risk is **not** acceptable, then the agency **must** move into risk management: the active intervention to minimize risk elements.

Decision makers **must** also understand that there is uncertainty in the conclusions. We are conducting predictive analysis. We cannot always be assured that what we think will happen, will in reality, occur. There is **no** perfect knowledge. In some cases, such as citrus canker and Medfly, the likelihood and impact of establishment is so great, that we can express a high confidence level in the appropriate type of action to take. However, **not** all situations are so clearly defined.

Risk strategies or decisions usually fall into one of four categories:

- Acceptance of risk
- Avoidance of risk
- Control of risk
- Risk transfer

When the probability of the loss occurring is high, the general rule is to either avoid (e.g., commodity exclusion) or control (e.g., fumigation activities) the risk agent. When the probability of the loss is low, generally the activities center around accepting or transferring the risk. Accepting risk is exemplified by the discontinued inspection of low-risk pathways. Risk transfer would occur if we decided, on some future date, we would stop excluding a particular commodity that had a high smuggling rate. We would begin to permit entry upon inspection. This way, we have transferred the risk from unknown entry paths to known ones.[1]

Regardless of which avenues are selected, there are certain principles for good risk management decision-making. A good risk management decision:[2]

- Addresses an articulated problem in its agricultural pest or disease threat context
- Emerges from a decision-making process that elicits the view of those affected by the decision, so that differing technical assessments, public values, knowledge, and perceptions are considered
- Is based on a careful analysis of the weight of scientific evidence that supports conclusions about a problem's potential risks to animal and plant health
- Is made after examining a range of regulatory and nonregulatory risk management options
- Reduces or eliminates risks in ways that:
    - Account for their multi-source, multi-risk contexts
    - Are based on the best available scientific, economic, and other technical information
    - Are feasible, with benefits reasonably related to their costs
    - Are sensitive to political, social, legal and cultural considerations
    - Give priority to preventing risks, **not** just controlling them
    - Include incentives for innovation, evaluation and research
- Can be implemented effectively, expeditiously, flexibly, and with stakeholder support
- Can be shown to have a significant impact on the risks of concern
- Can be revised and changed when significant new information becomes available while avoiding "paralysis by analysis"

Multiple elements or factors influence decisions made concerning risk. Management **must** carefully weigh each option in terms of effectiveness, feasibility, costs, benefits, unintended consequences, and cultural or social impacts.

Risk Communication

Stakeholders play an essential role in this phase by assisting in identifying risk-reduction options, developing and analyzing various avenues to pursue and evaluating the ability of each option to

[1] Risk Management. "Designing Risk Management Strategies." Module 4, Agriculture Canada.
[2] Presidential Commission on Risk Assessment and Risk Management. "Framework for Environmental Health Risk Management." Final Report Volume 1, 1997.

reduce risk (as offset by the above elements such as cost, etc.) Nonregulatory and regulatory approaches (or some combination) can be used to minimize or eliminate risk. Innovative approaches to changing behavior relative to risk (i.e., education, market incentives, monitoring, and research) may prove as effective to regulatory restrictions in ensuring compliance.

Risk Management Teams

It is essential to have an infrastructure, such as Pest Risk Teams, at work locations to deal with risk analysis and to assist management in making risk-based decisions. Following are general guidelines for the composition and structure of Pest Risk Teams.

Composition

The composition of Teams is flexible and should be diverse. Team membership should include Port Directors, managers, officers, and identifiers. Also, membership should include a back-up identifier, persons responsible for AQIM.

Structure

The structure of Pest Risk Teams depends on the size and complexity of operations at a work location. Team size may vary but should **not be greater than** eight members. Larger ports may have **more than** one team based on the different risk pathways being monitored (i.e., cargo, passenger, etc.).

Skill

Teams need to have various skills. Such a skill base may include having experience of other work locations, using data base systems, and training or experience in researching.

Automated Data Sources for Teams

- AQIM data
- Importation of regulated articles (PPQ Form 280)
- Pest interceptions

- Pest **not** known to occur (KNOTs)
- Work accomplishment data (WAD)

Role

The role of Pest Risk Teams is to conduct local risk assessments that result in ranking the risks of various pathways associated with plant pests and diseases. Teams:

- Design sampling processes
- Identify information needs and methods to obtain information
- Recommend risk management options
- Share information with other work locations, industry, and States

Recommendations from Pest Risk Teams may include some of the following options:

- Allocate staffing based upon relative risk of entry (i.e., pedestrian versus vehicle, cargo versus passenger, solid versus mixed loads, etc.)
- Change cargo inspection protocols (i.e., de-van versus tailgate)
- Change selection criteria (targeting) by validating the existing ones and developing new ones
- Change the number of units inspected, decreasing or increasing as necessary
- Develop compliance agreements for low-risk pathways in such areas as aircraft, ships, and rail cars
- Focus on risk (e.g., quality of pest interceptions and quarantine material interceptions, **not** the quantity)
- Target public awareness activities to high-risk situations

Pest Risk Teams need to:

- Explore varying solutions to gathering additional data in a statistical sound format
- Raise AQIM questions, such as, what additional data is needed
- Share successes and experiences with other Pest Risk Teams

Once these teams set issues into context, they need to establish a stakeholder collaboration process to begin risk communication. Stakeholders **do not** define the risk but **must** be involved from the beginning to ensure cooperation and compliance.

Outcome of Risk Analysis

The Risk Management Teams can use risk analysis to answer basic operating questions such as:

- What can go wrong (if we do nothing)?
- What is the probability of an adverse action happening?
- What is or will be the magnitude of the outcome of the adverse action?
- How certain can we be that our predictions are correct?

The outcome of a risk analysis is a risk characterization. A risk characterization should respond to these questions:

- Considering the hazard, what is the nature and likelihood of the pest disease damage to agriculture?

- Which markets or groups are at risk: are some groups more likely to be a risk than others?
- How severe are the anticipated adverse impacts or effects? Are the effects reversible?
- What scientific evidence supports the conclusions about risk? How strong is the evidence? What is uncertain about the nature or magnitude of the risk?
- What is the range of informed views about the nature and probability of the risk? How confident are the analysts about their predictions for risk?
- What other sources cause the same type of effect?
- Does the risk have impacts besides those on agriculture or the environment, such as social or cultural consequences?

NOTICE

The level of detail considered in a risk assessment and included in a risk characterization should be commensurate with the problem's importance (local and national), expected impact, and level of controversy. Risk characterizations **must** include information that is useful for all stakeholders.

Pest risk teams:

1. Analyze AQIM survey data to develop estimates of agricultural pest risk approach rates for each major mode of entry at the work location.
2. Use the estimated approach rates to calculate the number of agricultural pests and diseases and high-risk quarantine materials approaching the work location.
3. Compare these numbers with the number of agricultural pests and diseases and high-risk quarantine materials actually intercepted at the work location.
4. Use the comparisons from Step 3 above, to draw some conclusions about how well the work location manages the agricultural threat approaching the work location.
5. Report its findings to work location management and PPQ officers. The group recommends actions to take at the work location to improve risk management effectiveness at the work location and recommends risk management targets for the upcoming year. The recommended actions can be based on AQIM analysis or other information collected at the work location. For example, if monitoring data shows a certain commodity to be carrying more agricultural pests than previously suspected or reported, then the work location can inspect that commodity more carefully for interceptions.
6. Then, as the work location continues its baseline monitoring, at the end of the following year (or other time frame) the Teams check to see if the actions initiated in Step 5 above, lead to meeting risk management targets.

Chapter

7

Agriculture Quarantine Inspection Monitoring Sampling Process

Contents

Information Versus Detection

There are two types of sampling that can be used to determine the characteristics of a population. Sampling for information, also known as objective or random sampling, is used to estimate characteristics for a population. On the other hand, sampling for detection, is used to detect characteristics of a population. The two types of sampling are fundamentally different in their approach to bias.

Sampling for Information

When sampling to estimate for information, bias in selection **must** be avoided to ensure objectivity in the selection of representative samples from the population. Each member of the population **must** have a known probability (**greater than** 0) of being sampled. The result is a high degree of confidence that the sample represents the population, thus useful inference can be made about the population based upon the sample.

The most effective way to eliminate bias is to randomize the sampling process and design unbiased selection mechanisms. Mathematical, mechanical, or automated (computerized)

systems and random number generators or random number tables are characteristic of the tools commonly used when sampling for information.

Sampling for Detection

Sampling for detection uses bias to discover if a specific characteristic occurs in the population. When sampling for detection, the objective is to use prior knowledge to ensure that certain members of the population have a higher probability of being sampled; whenever, prior knowledge indicates that detectable factors or patterns distinguish members of the population.

Using selective criteria based on profiling and similar subjective techniques and drawing from prior knowledge are characteristic of methodologies used when sampling for detection. It is important that such techniques are based on firm information or valid assumptions and applied as consistently as possible to detect the largest number of target items.

Summary

Based on the example in Figure 7-1, there is a subtle difference between sampling for information and sampling for detection. In fact, it may be argued that sampling for detection, utilizing bias and subjective sampling, will result in better information concerning the amount of prohibited agricultural material carried by vehicles. This may be true, provided the assumptions used for biasing the samples are 100% accurate. However, sampling for information would be necessary to determine the soundness of the assumptions. Therefore, the soundness of a scheme sampling for detection cannot be adequately measured without a baseline level of knowledge provided through sampling for information.

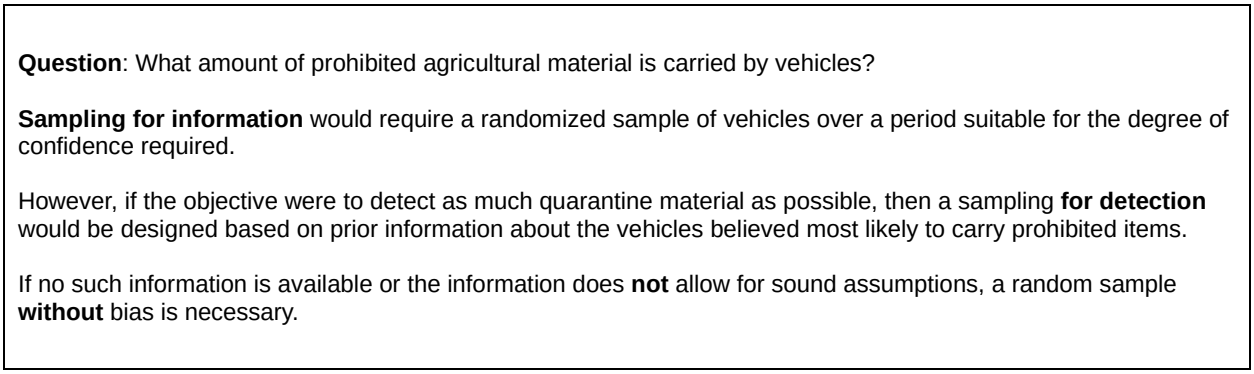

Figure 7-1 Example of Sampling for Information Versus for Detection

There are critical, although sometimes subtle, differences between sampling for information and sampling for detection. The use and legitimacy of each is dependent upon the reason sampling is needed (the objective) and the kind of prior information available.

Table 7-2 provides a summary comparison that can be used to quickly determine which type of sampling is most appropriate for a given situation.

NOTICE

It is important to note that the results of sampling for detection can provide some information about the existence for a characteristic within a population but cannot be used to infer information concerning the entire population. In situations where there is insufficient knowledge from which to develop biases, sampling **must** be randomized as in sampling for information.

Sampling for information can be more resource intensive than sampling for detection; and it can be difficult to execute in an environment that is focused on detection. Using the same mechanisms (personnel, work areas, etc.). Designed for detection tends to encourage the use of the same biases used for detection. Sampling for information under such conditions requires a special effort to overcome the psychological and logistical tendencies to bias for detection.

Table 7-1 Summary Comparison to Determine the Most Appropriate Type of Sampling

Characteristic:	Sampling for information:	Sampling for detection:
Type of sampling	Random, objective	Nonrandom or random; subjective or objective
Randomness	Essential	**Not** important **unless** a lack of knowledge prevents sampling form being biased
Bias	Eliminate	Use to advantage

Random Sampling

A basic introduction to sampling is provided in Statistics and Agriculture Quarantine Inspection Monitoring. This chapter will further explain the sampling that is used in AQIM and contrast it to the other types of sampling used by APHIS.

Sampling

First, sampling consists of selecting some part of a larger population to observe so that you can estimate something about the whole population. Sampling is used in a wide variety of situations, some of which you may be very familiar with. Political polls use a random sample of voters to predict who will win an election. A random sample of households with televisions is used to produce the Nielson ratings of television shows. Gallup polls use samples to produce estimates on wide ranging social and political issues. In almost any newspaper, magazine, or broadcast of the evening news you can see information based on some type of sample.

So why do we use samples? Because they provide a practical as well as an economical way to gather needed information. We can't afford (either the time or money) to inspect every person or piece of cargo entering the United States, so a properly chosen random sample can provide an 'estimate' for the sample that is representative of the population. Political polls commonly use around 1,000 voters to predict who is ahead in an election - even in national elections! Remember that with random sampling we can also measure the accuracy of the estimate. Therefore, we use random samples to gather information in a timely and economical manner.

How do we get a representative sample--one which we will be comfortable using to make an inference about the larger population? The answer is, by using the statistical properties of random sampling.

Statistical Criteria for Random Sampling

For a sample to be random, it **must** satisfy some statistical criteria:

1. Each unit has an equal chance of being selected. An example from AQIM would be that every air passenger baggage has an equal chance of being in the sample.
2. Each unit is selected independently of other units. An example of this might be that the usual inspection of air passenger baggage from flight X does **not** influence the selection of the next air passenger baggage to be in the sample.

Random Sampling Contrasted to Other APHIS Sampling Processes

Other sampling being done by APHIS is as follows:

- Convenience sampling—officer chooses X number of boxes from the rear of a sea container to do a tailgate inspection
- Haphazard sampling—where an officer points out a number of boxes without any specific knowledge
- Selection criteria (authoritative or intuitive) sampling—based on knowledge and skill of the officer (or sampler)

Each of these types of sampling violate one or both statistical criteria for random sampling. Can you determine why these aren't random samples? Would any of the above samples produce a representative sample? Probably **not**. A selection criterion should have a higher rate of pest and quarantine material interceptions than would a truly random sample, since you are choosing air passenger baggage most likely to have pest and quarantine material interceptions. A convenience sample **only** looks at the tailgate, so boxes at the front of a container would have **no** chance of selection. Haphazard sampling may appear to be random, but if the officer knowingly (or unknowingly) excludes any part of the cargo from inspection, then it would **not** be truly random. An example of haphazard sampling is conducting a blitz of a low-risk flight causing misguided random selection to complicate the recovery process.

One of the things that makes random sampling so attractive is that it allows you to attach some measure of confidence or certainty to the data. (Or we can measure some of the error involved with sampling). Why is that important? Remember we took just one random sample from our population. If we took another sample, we would end up with different units from the population in the sample. This second sample could give us data that could be very different from the first sample, or it could give us data that is very similar. That's one of the problems of using samples - there are **no** money-back guarantees. However, we can measure the accuracy of the information we gather. This accuracy is expressed in the form of a confidence interval. Using random sampling allows us to pick a confidence level, say 95%, and express how confident we are that our estimate is within the confidence interval. An example would be that our monitoring data shows that 2 % of the vehicles crossing at a land border site had interceptions of quarantine material.

Given we used random sampling, we could compute a confidence interval that would allow us to say we were 95% certain that the true percentage of vehicles crossing the border at that work location was between 1.4% and 2.8%.

Telling a work location that their samples have to be random is the easy part. Developing a sampling scheme to suit each work location and pathway is much more difficult. This is why each work location has developed its own sampling process. Some work locations are cooperating with U.S. Customs in sampling. Other locations have set up their own schemes to

reflect the unique aspects and abilities of its location and personnel. The important thing is that the samples are random, **not** that every sample is chosen in a like fashion.

If you have some prior knowledge about the population you are interested in, there can be better (more efficient and cost effective) ways to do the sampling. If the population can be broken up into homogeneous groups, then the sample can be drawn from each of the groups. Separate samples are drawn from each strata and inspected. If the stratification was done properly and the samples in each strata are more similar to each other than to the samples in other strata, the resulting confidence interval should be smaller. This doesn't always happen, but if the stratification is done properly, the chances are pretty good you will end up with a better estimate. Refer to Figure 7-2 for a simplistic example about the importance of knowing your population.

For example: You have often wondered how many red M&Ms are in the 1-lb. bag of candy. Instead of counting all of them, you measure out 4 oz. and count each color and record the results. Your counts reveal:

3 red, 17 browns, 10 greens, and 14 blues

You then multiply these numbers by 4 to get the final counts for the entire bag:

12 reds, 68 browns, 40 greens, and 56 blues

Based on your findings, you write a letter to the candy maker to complain; red is your favorite color. Little did you know that the reds are slightly heavier and put in the bag first. Your 4-oz. sample, however, came from the top of the bag and you did **not** shake it up first. This nonrandom sample provided inaccurate information about the population.

Figure 7-2 Example of Importance of Knowing Your Population

One Final Word on Sampling

As explained above, we could potentially decrease the error in our estimate by using stratified sampling. There is another, more direct, way to control the error (which controls the width of the confidence interval). Increasing the sample size can decrease the error associated with an estimate, regardless of the population size. The error is inversely proportion to the square root of the sample size. So, the larger the sample the narrower the confidence interval around the estimate.

An example of this concept is illustrated in Figure 7-2. If we keep the proportion of pest and quarantine material interceptions constant at 5%, watch how changing the sample size changes the width of the confidence interval. If your random sampling unit is **only** 60 of a population, the confidence interval is between 7 and 20—a very broad interval representing a greater possibility of error. But where the random sampling unit is 600 of the population, the confidence interval is between 3.2 and 7.3—much narrower. So, the larger the sample the narrower the confidence interval will be representing a smaller possibility of error.

Table 7-2 Example of How Sample Size Changes the Width of the Confidence Interval

Sample size:	Width of the confidence level:
60	.7 to 20
100	1.1 to 13.5
200	1.8 to 10.4

Sample size:	Width of the confidence level:
400	2.6 to 8.5
600	3.2 to 7.3

AQIM uses this statistical relationship to determine the different sample sizes for each estimate. To generate the sample size, you need to have some information on the approximate population size and the expected proportion in the population. You also **must** choose a confidence level and set the absolute precision at some level. Then, you **must** look at the practicality of the situation. Is the sample size realistic in terms of time and money? If **not**, what sample size would be realistic and would the resulting changes lead to acceptable estimates?

The bottom line is we use random sampling because it allows us to use statistical principles to make assumptions about the resulting sample. It should be an independent, representative part of the population from which we can generate estimates and confidence intervals around the estimate. We can then take the data from AQIM and compare it to other data that is available or combine it with data available from other sources to make more informed decisions.

The random sampling process of AQIM is probably the trickiest part of this effort. Work locations **must** give considerable thought to a sampling process to ensure the gathering of valid and useful information about pathway risk and program performance. Work locations **must** also consider proper sampling procedures related to the proportional arrival of daily arriving passengers, vehicles, mail, etc. Several sections in this Handbook provide the basic information about sampling methodology to assist work locations produce valid data. The AQIM national coordinator can offer help in setting up a random sampling process that is practical and sustainable at a new work location (refer to Key Contacts for a list of key contacts).

Data Collection and Use

AQIM uses ongoing random sample monitoring to estimate the amount and kind of agricultural materials and pests approaching a work location via various known pest entry **pathways**. Here are some examples of how a work location may use the results of the AQIM data analysis:

- Allocate resources for more effective risk management
- Assess the risk of various entry pathways to U.S. agriculture
- Identify new trends
- Justify budget requests to Congress
- Redesign policies and regulations
- Validate known potential risks

In addition, the AQIM data helps work locations answer important questions like:

1. How much cargo approaching the work location is carrying actionable pests? What is the level of infestation of the pests in the cargo?
2. Which transportation pathway has the greatest pest risk for the work location?
3. How effective are the current regulations in managing the risk of introduction of pests and diseases?
4. How effective is the work location in managing the pests and quarantine material threats which were identified in the monitoring?
5. How effective is the current cargo hold process for managing the pest threat at the work location?

AQIM data for each entry pathway is collected and entered into ARM. It is important that each work location enter the data in a timely manner. Data entry into ARM is due by the tenth day of the following month. For example, all January data needs to be entered by February 10. If the tenth day of the month falls on a weekend or a holiday, data may be entered as late as the following regular workday.

Chapter

8

Work Location Setup for Agricultural Quarantine Inspection Monitoring

Contents

Introduction

AQIM activities provide useful data on AQI program activities to local and national employees.

Success of results monitoring activities requires the following:

- Adequate assistance from internal support groups—processes, requirements, facilitation, training, electronic support systems
- Commitment of managers and employees at all levels
- Involvement of stakeholders and customers including Congressional views and coproviders
- Strategic and performance planning throughout the organization

The activities outlined in this section and the procedures for data collection (under each pathway section of the Handbook) will help set up a work location to begin AQIM. The process selected for AQIM at each worksite will become part of the ongoing operational activities for that location.

Activities for Implementing Agricultural Quarantine Inspection Monitoring

Initially, a work location **must** make a commitment to follow the agency's strategic course. This commitment is **not** just a set of prescribed activities but is a new way of doing business.

Next, work locations should establish an AQIM coordinator to develop processes that are used to collect and analyze information (refer to Roles and Responsibilities for what a work location **must** do to implement AQIM.) Results should be shared and published for all employees to benchmark process and performance. AQIM Coordinators and teams should continue the fluid process of improving AQIM systems locally.

Based upon the analysis of the information, work locations set performance targets. These targets would have an overall goal to improve AQI performance. Work locations **must**:

- Determine actual results
- Develop analysis process for measuring goals and results
- Develop strategies for closing the gaps
- Identify goals and align them with national goals
- Measure the gaps

Collecting information becomes an ongoing activity with the processes being continually evaluated and revised. There **must** be a continual cycle of:

- Assessing and evaluating process
- Identifying other relevant sources of information
- Implementing and coordinating work change activities
- Recommending risk management options

Use the following start-up activities along with the roles and responsibilities and the checklist in this section as guides when implementing AQIM.

1. Develop a common understanding of AQIM. Work with local management teams and employee representatives to conduct meetings or use other ways of communicating to all employees at the work location. Introduce the who, why, when, and where of results monitoring and AQIM. For help, contact the National AQIM Coordinator.
2. Inform brokers, other government agencies, and representatives from private industry that they will be included. Use a positive approach about their involvement and explain the advantages of monitoring. But be realistic about how the new procedures affect timeliness and holds on imports for monitoring that may **not** have been held in the past.
3. Select specific individuals for the local AQIM coordinator roles at each worksite. Refer to Roles and Responsibilities. Refer to Key Contacts for additional roles. The primary roles are:

    A. AQIM Coordinator
    B. Assistant AQIM Coordinator, if needed

4. Prepare and document a standard operating procedure (SOP) that details selected sampling processes, joint inspection procedures (if applicable), steps to resolve issues and concerns, etc. Document these details in the SOP. Keep a copy of the SOP in this Handbook. Refer to Appendix D: Trade Articles for samples or examples of standard operating procedures. Use Appendix D: Trade Articles as a guide for format and suggested content. The standard components of an SOP are:

    A. Purpose
    B. Background
    C. Guidelines (unit of inspection, sample size, operational norms)
    D. Sampling procedures
    E. Data collection and entry procedures
    F. Personnel and resources
    G. Quality control

5. Meet with the pest identifier for each worksite. If **not** already "URGENT," establish details of a "PROMPT" pest identification process when pests are encountered from AQIM sampling.
6. Acquire the necessary equipment and supplies to support ARM.
7. Data entry forms for AQIM with instructions for specific pathways. Refer to examples of data entry forms located in each pathway chapter of this Handbook.

    A. Implementation package for the AQIM sampling process.

8. Currently, the AQIM Handbook is **only** updated on the Internet, and paper editions may include old information. Always check the electronic version of the AQIM Handbook on the Internet for the most current information.

Chapter

9

Roles and Responsibilities

Contents

Introduction

Given that AQI monitoring is a key component to conducting statistically sound risk assessments, it is essential to form internal structures to ensure that monitoring activities continue. Port managers (i.e., supervisors, Port Directors) should become involved with results monitoring activities and should take an active role in the tasks, issues, and goals of AQIM. The following roles and responsibilities are suggested for collecting, recording, organizing, storing, and analyzing results monitoring data as part of the AQIM program. The numbers and roles may vary among work locations based on the size and activity of a work location.

Agricultural Quarantine Inspection Monitoring Coordinator

The roles and responsibilities of the AQIM Coordinators are:

- Arrange and coordinate data entry of AQIM records for all worksites, including collecting data, maintaining data, analyzing data, and preparing reports
- Coordinate and facilitate with local managers, supervisor(s), employee representatives, any change or revision (major or minor) to the AQIM activities
- Help resolve worksite concerns and issues that directly or indirectly involve AQIM activities
- Help with training of employees
- Implement and coordinate the established sampling process, and monitor the sampling for adherence to proper sampling techniques
- Report survey results to work location personnel. This responsibility involves running analysis procedures on ARM and facilitating meetings to discuss implications for AQI risk decision making
- Serve as the first contact point for answering basic questions about ARM software and data entry. This responsibility requires that the AQIM coordinator be familiar with the basics of

ARM software such as, starting the program and knowing what data entry screens are needed, how data entry occurs, and basic data analysis procedures. At larger work locations, serves as the central collection point from multiple worksites

- Serve as the main contact point for PPQ, QPAS in Riverdale, Maryland, and for all personnel involved with AQIM activities
- Work with management and personnel at the work location to produce a standard operating procedure (SOP) for implementing AQIM at each worksite
- Work with management to communicate to all personnel at the work location the importance of AQIM and the sampling process

Assistant Agricultural Quarantine Inspection Monitoring Coordinator

The Assistant AQIM Coordinator helps an AQIM Coordinator perform their responsibilities as needed. Large ports with multiple worksites may have **more than** one Assistant AQIM Coordinator.

Checklist

The checklist in Table 9-1 provides a general guide for starting AQIM. All listed activities may **not** apply to all work locations. These activities have contributed to the successful implementation of AQIM at many sites.

Table 9-1 Checklist for Roles and Responsibilities

Startup activities:	Who is involved?	Date; timeline; determined by work location
Meet and develop a common understanding of AQIM	· Port management initiates meetings · Use National AQIM Coordinator for assistance (refer to Appendix B: Key Contacts for contact information) · Work with employee representatives and port management	
Inform and include external customers and stakeholders	· Impacted brokers, government agencies, private industry · Port managers and officers	
Select an AQIM coordinator and assistant	Port management	
Establish a risk management team to review local operations based on monitoring results	· AQIM Coordinator · Employee representatives · Port managers	
Write standard operating procedures (refer to Appendix D: Samples of Standard Operating Procedures)	· AQIM Coordinator and Pest Risk Management Team · AQIM Coordinator and the AQIM National Team may assist	
Develop a training plan for the employees at work locations	Port management, AQIM Coordinator and Pest Risk Management Team	
Train employees to carry out AQI monitoring	· AQIM National Coordinator may be involved · Those individuals specified in a training plan	
Set a date to begin monitoring and collecting data	AQIM Coordinator and Pest Risk Management Team	
Begin monitoring and collecting data	· AQIM Coordinator · Port officers	

Checklist

Startup activities:	**Who is involved?**	**Date; timeline; determined by work location**
Enter information into ARM · Enter data worksheets into ARM · Transfer pest identification numbers to ARM, as necessary	· Individual responsible for data entry · Port identifier and AQIM Coordinator	
Analyze data and prepare report	AQIM Coordinator (or others)	Monthly
Communicate monitoring results to work location personnel. Facilitate discussion of what results mean and implications for work location decisions.	AQIM Coordinator and Port Managers	Quarterly
Set port performance targets based on monitoring feedback	· AQIM Coordinator · Employee representatives · Port managers · Port officers	Annually

Chapter

10

Air Passenger Baggage Pathways

Contents

Background

The arrival of international passengers by air has increased significantly in the past decade. The various agricultural items that air passengers can potentially carry is staggering. These items can pose a significant pest and exotic disease risk to agriculture in the United States.

The pathway “Air Passenger Baggage” encompasses all aspects of baggage movement into the United States by way of various aircraft (passenger, charter, corporate, private, etc.). Agricultural Quarantine Inspection Monitoring (AQIM) activities randomly samples air passenger’s baggage to better determine this pathway’s potential threat to agriculture.

Each designated work location will randomly sample air passenger baggage arriving at that location. The data collected from the random sampling will help to answer the following questions.

1. What is the threat of agricultural pests approaching the work location?
2. How effective is the AQI program at managing this threat?

The origin and destination of the passenger is important to determine risk levels. Just as important is whether the baggage carried by the passenger carries an agriculture pest.

While each work location will have differing rates of quantity of passengers, similar criteria for sampling will apply to all work locations. Through consistent random sampling, a depiction of the pest threat of air passenger baggage movement will emerge. Combined data from all work locations will help determine the pest risk for baggage carried by the universe of air passengers.

Monitoring of air passenger baggage is an ongoing function and is an integral part of the AQI program. The ongoing sampling of air passenger baggage will allow work locations to adjust their passenger selection or targeting criteria for the present and the future. Monitoring helps measure how well the mission of pest and exotic disease exclusion is accomplished.

Procedures for All Air Passenger Pathways

A sampling protocol of a **minimum** of 300 Customs Declarations or passenger kiosk receipts (and all passengers associated with these declarations and receipts) per month is needed at most airports. Customs Declarations are accepted verbally, electronically, or on paper. Therefore, sampling procedures, such as where to sample, will accommodate this change. Take samples from the entire passenger population; **do not** exclude any passenger or crew member. Predeparture locations **do not** have declarations and will develop and implement a sampling protocol that selects passengers and passenger family units.

Assuming a 7-day work week, follow the sampling protocol:

1. Properly select a **minimum** of 10 samples per day per airport or terminal. Some airports with multiple terminals will sample either 5 or 10 samples per terminal. Contact the National AQIM coordinator for specific sampling numbers per terminal or if unable to achieve the specified sampling amounts based on the pathway instructions. Always follow established protocols through your chain of command.
2. Apply appropriate AQIM inspection procedures for each sample.
3. A 100% hand inspection of all carry-on and checked baggage is required.
4. Record all needed data on appropriate AQIM data worksheet.
5. Report the data using ARM.

NOTICE

The PPQ National AQIM Coordinator has made special arrangements with several smaller to medium size airports to conduct a minimum sampling protocol of **only** 150 customs declarations per month (5 per day). These are reviewed annually and subject to change.

Foreign Arrival Air Passenger Pathway

The following ports are participating in AQIM monitoring:

- Atlanta, GA
- Baltimore, MD
- Boston, MA
- Charlotte, NC
- Chicago, IL
- Dallas, TX
- Denver, CO
- Dulles, VA
- Newark, NJ
- Ft. Lauderdale, FL
- Honolulu, HI
- Houston, TX
- Jamaica, NY
- Los Angeles, CA
- Miami, FL
- Minneapolis, MN
- Orlando, FL
- Philadelphia, PA
- Phoenix, AZ
- Romulus, MI
- San Antonio, TX
- San Francisco, CA
- San Juan, PR
- Sanford, FL
- Seattle, WA
- Tampa, FL

United States Foreign Arrival Air Passenger Baggage Worksheet

For AQIM purposes, use the Air Passenger Baggage worksheet and associated instructions for recording information gathered from U.S. foreign arrival air passenger baggage.

Predeparture Air Passenger Pathway

The following predeparture ports are participating in AQI monitoring:

- Aguadilla, PR
- Honolulu, HI
- Kona, HI
- Kahului, HI
- Lihue, HI
- Ponce, PR
- Carolina, PR

Predeparture Air Passenger Worksheet for Hawaii and Puerto Rico

For AQIM purposes, use the Predeparture Air Passenger worksheet and associated instructions for recording information gathered from predeparture air passenger baggage inspection in Hawaii and Puerto Rico.

Preclearance Air Passenger Pathway

The following preclearance ports are participating in AQI monitoring:

- Aruba, Aruba
- Bermuda, Bermuda
- Freeport, Bahamas (AQIM sampling activities suspended until further notice)
- Nassau, Bahamas
- Montreal, Canada
- Toronto, Canada
- Vancouver, Canada

Preclearance Air Passenger Worksheet

For AQIM purposes, use the Preclearance Air Passenger worksheet and associated instructions for recording information gathered from preclearance air passenger baggage inspection.

Agricultural Quarantine Inspection Monitoring Pathway Quality and Maintenance

Port managers and local AQIM coordinators are responsible for ensuring that monitoring activities are being performed properly. To help with reviewing the status of monitoring activities, refer to Appendix E: Pathway Monitoring. This appendix contains a checklist of questions port managers and local AQIM coordinators should periodically answer to ensure proper monitoring of each designated pathway at their workstations. The questions review the following topics:

- Accurate and complete data
- Adequate sampling
- Local support
- Proportional sampling

- Random sampling
- Working risk committees

Agricultural Risk Management System

Authorized users **must** enter AQIM data into the Agricultural Risk Management System (ARM) database. This web-based system is accessible from any USDA-APHIS or DHS-CBP computer. The web address is: https://arm.aphis.usda.gov/. Log in using eAuthentication. For assistance with ARM web-based systems, APHIS and DHS-CBP employees **must** contact the ARM Helpdesk by email ARM-helpdesk@usda.gov or by phone 301-851-2252. Hours of operation are 0800-2200 Eastern Standard Time (EST) Monday through Friday.

For URGENT (cargo on hold) matters, include “URGENT-APHIS-PPQ ARM Application Issue” in the email subject line.

Questions to Guide Data Analysis

For preclearance, foreign arrival and predeparture (predeparture analysis begins with question #4) use the following questions to guide your data analysis:

1. How many declarations were selected for sampling during the survey period?
2. How many declarations sampled required an action (seizure or other action required as a condition of entry) during the survey period?
3. What is the action approach rate of the sampled declarations (number of declarations, with one or more items categorized as seized/intercepted or clean/treatment, divided by the total number of declarations sampled)?
4. How many passengers were represented by all samples?
5. How many seizures/interceptions (QMIs) came from the samples?
6. What is the QMI approach rate of passengers with prohibited agricultural material (total number of QMIs divided by total passengers sampled during the survey period)?
7. How many pest interceptions (actionable pests) were made from survey samples?
8. Pest Approach Rate: What is the rate of pest interceptions in relation to number of passengers (number of actionable pests divided by number of passengers in the sample)?
9. How many QMIs were plant material? Meat or animal products?
10. What is the rate of QMIs for plant material and meat/animal products?
11. Is there a greater risk from plant material or animal products at the work location?
12. Generate a list of all the origins of passengers transiting the work location. Produce a list of origins of passengers with QMIs transiting the work location?
13. Which countries of origin have a higher rate of QMIs than passengers? Have these countries always been recognized as high-risk countries at the work location? (Example: 10% of all passengers surveyed were from Italy. Passengers from Italy were responsible for 20% of the QMIs seized/intercepted. Passengers from Italy carried double the amount of QMIs expected as based on the volume of passengers from that country.)
14. Generate a list of the state destinations of passengers transiting the work location. What are the top five destinations of passengers? What are the top five destinations of passengers with QMIs?
15. Which States are considered high-risk States?
16. What is the action approach rate for each month of the survey period?
17. Do these monthly rates correlate with traditional peak and off-peak travel times?
18. Are there easily identified trends when the rate of QMIs transiting the work location are higher?
19. Are there seasonal trends or do higher rates correlate with national or religious holidays, beginning or end of the school year, vacation periods, etc.?
20. Generate a listing and frequency of items seized/intercepted. What are the top five most frequently seized/intercepted items? Which QMI items present the greater risk?
21. Generate a list of flights.
22. Which flights were most likely carrying passengers with QMIs (top five flights)? Where were the most seized//intercepted items found--hand carried bags or checked luggage? Did the passenger declare all prohibited items? Was the passenger traveling alone, as a couple, or family? What was the reason for travel--business, vacation, visit family, tour group, school? What is the passenger’s citizenship and residency?

23. What targeting factors are currently used to identify passengers likely to carry prohibited agricultural items? How do these factors compare with survey results?
24. What additional targeting factors would be useful to identify passengers carrying prohibited items?
25. What percentage of resources are dedicated to staffing AQI activities for air passenger at the work location?
26. What is the relative risk of air passenger compared with other pathways in the work location?
27. Should resources be reallocated among all the pathways in the work location to better address the relative risk of the pathways?
28. Apply the AQIM results to the total passenger population to estimate the number of QMIs and interceptions likely to transit the work location during the survey period.
29. How many (total) passengers/crew arrived at the airport during the survey period? Using work accomplishment data (WAD) data and using the QMI approach rate and rate of pest interceptions on QMIs, calculate estimates of the number of QMIs and actionable pests transiting the work location.
30. How does the estimated number of QMIs compare with the reported number of QMIs in WAD?
31. What percentage of all QMIs transiting the work location were seized/ intercepted because of regular AQI inspections?
32. How does the estimated number of actionable pest interceptions compare with the reported number of actionable pests in WAD?

Chapter

11

Air Cargo Pathways

Contents

Background

The cargo population, or sampling universe, for AQI monitoring is defined as perishable agricultural cargo. Take random samples from this population with more intensive (hypergeometric) inspections and record necessary data about these commodities.

To properly monitor cargo, you need to have a good understanding of two key statistical principles:

1. It is important that the sample selected be representative of the commodity. Random selection helps ensure this.
2. Once the sample is selected, it is necessary to inspect the sample thoroughly and according to hypergeometric sampling procedures if applicable.

If you want your port to produce quality risk information, then each person participating **must** have a clear understanding of the sampling universe, the unit of sampling, and inspection consistency issues.

The Sampling Universe

Estimate the number of actions due to pests or smuggling in a cargo entry pathway by taking random samples from the cargo in the pathway. It is key to good statistics to carefully define this universe from which you want to draw your random sample. Answer the following questions to select the sample correctly and to make statistical inferences for the entire universe.

- How are commodities transported?
- How many shipments of these commodities are arriving at a work location?
- What is the seasonality of the commodity?

For cargo AQIM, the sampling universe is defined by the mode of transport of the cargo such as airplane, ship, or truck.

Sampling Universe Exclusions

The following commodities or commodity types are excluded from the sampling universe.

- Commodities which are precleared at foreign sites
- Commodities admissible under the National Agriculture Release Program (NARP)
- Commodities which undergo some type of mandatory treatment, **other than** cold treatment (e.g., fumigation, irradiation, hot water treatment) at work locations
- Frozen commodities
- Oil, salt, iron ore, coal, etc., which have **no** pest risk
- Seed shipments
- Transportation and exportation (T&E) cargo

Cargo Strata and Stratifying the Sample

The sampling and inspection processes for AQIM were designed to be compatible with typical cargo inspection groupings. The cargo universe is divided into several homogeneous and distinctly separate groups. Each group contains commodities that will be sampled in order to estimate the action and pest approach rates in each group. A port may be sampling one or more of the commodities in a group or across groups. With air cargo, the sampling universe is **perishable agricultural cargo**. This perishable category is defined as any commercial shipment of fresh fruit, vegetables, and cut flowers.

By sampling this category, PPQ is able to get precise estimates of the number of containers with pests approaching the port. This risk information helps the work location understand how effectively it manages the pest risk for this category, as well as for the entire cargo universe at the port.

It’s very important that each commodity in the category selected be representative of all other units of that category. All shipments of a category should have a chance of being selected as a sample. One way to ensure that the sample is representative is to choose a shipment of the

commodity at random (either random time, random number, etc.). This random selection process eliminates the bias of the Agriculture Specialist who is selecting the sample. The Agriculture Specialist's experience (bias) might lead to choosing a shipment that is more likely to be harboring a pest. This bias would make the sample **not** representative of the entire commodity universe. The survey results would be skewed and this kind of bias would hamper the port's ability to make the best decisions based on risk analysis.

Setting Up a Process

Setting up a process of selecting representative samples for each of the commodities will be one of the biggest challenges in AQIM. Because each port has its own unique set of circumstances in cargo operations, the port **must** individualize its random sampling process. Document the process and if needed, ask for feedback from other air cargo ports, the AQIM coordinator, or Port Operations staff who have experience in selecting random samples in the cargo environment. The port may even decide that the Port Risk Management Team determine and review the random sampling process on a regular basis.

The Sampling Unit

For air cargo, the sample unit is the air waybill. It is crucial that the sample unit is inspected closely enough to detect any actionable pests and mismanifested items. Air cargo sampling and inspection procedures are detailed in Table 11-2. Procedures for sampling multiple commodities within the selected air waybill are detailed in Table 11-3. Follow the procedures exactly for the monitoring estimates to be valid and useful.

Contact the National AQIM coordinator for specific sampling numbers if unable to achieve the specified sampling amounts based on the pathway instructions. Always follow established protocols through your chain of command.

Data Collection Consistency

Record the monitoring results from the inspection of a random sample unit accurately and consistently. Because each sample represents many other units, all Agriculture Specialist's **must** be as consistent as possible in following the inspection procedures.

Regulated commodities pose a special challenge. If the sample selected is a regulated commodity, it is important to understand the following:

Cargo monitoring estimates the number of air waybills approaching the work location with pest infestation levels requiring action by PPQ. AQIM uses risk-based inspection procedures for detecting a 10% or more pest infestation rate. This initial threshold is used to estimate the number of containers with a pest threat approaching a work location.

NOTICE
This 10% infestation level may change as the data for AQIM is collected and analyzed.

To be 95% sure that the Agriculture Specialist inspecting the container will find the pest when the shipment is infested at a 10% or more infestation level, the Agriculture Specialist **must**

select, at random, a specific number of boxes in the shipment. Determine this number of boxes by using the hypergeometric table in Table 11-1. Inspect each of these boxes to ensure that:

- **No** hitchhiker pests are present in the box
- **No** internal feeding insects are present in randomly selected fruit in the box
- **No** mismanifested or smuggled items are present

Table 11-1 Hypergeometric Table for Random Sampling in Commodity Inspection

Total number of boxes on air waybill:	Randomly select this number of boxes:
1 - 10	All boxes in the shipment
11 - 12	11
13	12
14 - 15	13
16 - 17	14
18 - 19	15
20 – 22	16
23 – 25	17
26 – 28	18
29 – 32	19
33 – 38	20
39 – 44	21
45 – 53	22
54 – 65	23
66 – 82	24
83 – 108	25
109 – 157	26
158 – 271	27
272 – 885	28
886 – 200,000	29

Agriculture Specialists should follow normal inspection procedures of the commodities to determine pests. For example, Agriculture Specialist's should cut fruit to detect internal feeders if external evidence is present.

Air Cargo Procedures Summary

The following ports are participating in air cargo AQIM monitoring of perishable agriculture cargo: (perishable is defined as fresh fruit, vegetables, and cut flowers).

- Atlanta, GA
- Boston, MA
- Chicago, IL
- Dallas, TX
- Dulles, VA
- Honolulu, HI

- Houston, TX
- Jamaica, NY
- Los Angeles, CA
- Miami, FL
- Newark, NJ
- San Francisco, CA
- San Juan, PR (temporarily suspended effective October 2021)

NOTICE

Exclude cut flowers for Miami, FL.

Table 11-2 Air Cargo AQIM Procedures Summary

Term:	Definition:
Commodity	1. Random sample of commercial perishable (nonfrozen) agricultural cargo 2. Cut flowers, **except** in the port of Miami, FL
Cargo population	All air waybills carrying perishable agricultural commodities, including cut flowers, destined to the United States; refer to Cargo Strata and Stratifying the Sample
Sample size	Two to four samples taken from a **minimum** of two different air waybills (AWBs) per week per airport at all ports that can sustain this sampling. If the consignment consists of smaller retail units like clamshell packaging or smaller film-wrapped retail packaging or trays in boxes, select the proper sample size from the total number of clamshells, trays, etc. for inspection. Contact the National Operations Manager for Exclusion and Imports for assistance (Mikell Tanner at 919-855-7317 or Mikell.tanner@usda.gov)
Sample selection	Examples of sample selection processes are random time, skip intervals, port discretion, etc. The port may need to first determine the total number of shipments of a category received at a port in 1 year.
Inspection methodology	Physically inspect each selected shipment at the port or consignee premise; refer to Table 4-3 before beginning inspection process. Select boxes for inspection from random locations throughout the container to detect a 10% level of infestation (at 95% confidence). Determine the number of boxes using Table 11-1. Inspect entire contents of boxes selected and available floor space of the container for agricultural pests or mismanifested or smuggled items.
Other issues	Inspect during normal business hours at the port. Costs for othertime clearance will be paid by the shipper/broker/consignee or government as per port management. Advise shippers, imports, and brokers that random sampling and inspection will be part of day-to-day operations. They should understand that there is a probability that their shipment will be intensely inspected.

NOTICE

Do not select commodities from U.S. Territories to the mainland continental U.S. (e.g., Guam, U.S. Virgin Islands, etc.) for AQIM sampling. If the random selection is from a U.S. Territory, select the next shipment that is **not** from a U.S. Territory.

Table 11-3 AQIM Sampling Procedures for Multiple Commodities in Cargo

If the randomly selected AQIM consignment is:	Then:	Which creates:
All the same perishable commodity	· APPLY hypergeometric inspection sampling to whole shipment; **AND** · SELECT the appropriate number of units for inspection	One AQIM record for ARM data input
Different perishable commodities from one or multiple origins (**other than** CUT FLOWERS)	· SELECT the single commodity with the **most** quantity (boxes, cartons, etc.); **AND** · SELECT the single commodity with the **least** quantity units (**must** be a **minimum** of five quantity units) · APPLY hypergeometric inspection sampling separately to **each** of these selections and inspect as separate AQIM samples	Two different AQIM inspections (one for each of the commodities selected) for one ARM data input
Different CUT FLOWER genera/varieties from one or multiple origins	Consider **only** boxes of single-variety cut flowers **OR** boxes of same flower composition bouquets[1]: · SELECT the cut flower genus/variety with the **most** quantity units (boxes, cartons, etc.); **AND** · SELECT the cut flower genus/variety with the **least** quantity units (**must** be a **minimum** of five quantity units)[2] · APPLY hypergeometric inspection sampling separately to **each** of these selections and inspect as separate AQIM samples	Two different AQIM inspections (one for each of the cut flower genera selected) for one ARM data input. Record cut flower variety name and origin of the cut flower (**NOT** origin of flight or vessel.)

Pathway Monitoring Maintenance and Quality Assurance

Port managers and local AQIM coordinators are responsible for ensuring monitoring activities are being performed and performed properly. To help with reviewing the status of monitoring activities, refer to Appendix E: Pathway Monitoring. This appendix contains a checklist of questions port managers and local AQIM coordinators should periodically answer to ensure proper monitoring of **each** designated pathway at their work locations. The questions review the following topics:

- Accurate and complete data
- Adequate sampling
- Local support
- Proportional sampling
- Random sampling

[1] Consider **only** bouquets in which most of its flowers are from one single flower variety, **excluding** greenery. For example, if the bouquet's flower composition is five roses, two daisies, and one carnation (**excluding** greenery), identify the bouquet as a rose bouquet.
[2] If there are multiple commodities/cut flower varieties with five boxes each, port discretion is used to select the five-box commodity to be sampled and inspected.

- Working risk committees

Air Cargo Worksheet

For AQIM purposes, use the Air Cargo data worksheet and associated instructions for recording information gathered from air cargo inspection. Properly record the commodity being inspected.

Data Collection and Maintenance

The movement of international cargo by aircraft can pose a significant exotic pest and disease risk to agriculture in the United States. The pathway “air cargo” encompasses **all** aspects of cargo movement into the United States using various types of aircraft (cargo freighter, passenger aircraft, etc.). AQIM is designed to randomly sample air cargo shipments to determine the potential threat to agriculture.

Each work location will randomly sample air cargo arriving at that work location. The data collected from the random sampling will help to answer the following questions:

1. What is the threat of agricultural pests approaching the work location?
2. How effective is the AQI program at managing this threat?

The origin and destination of air cargo shipments is important to determine risk; just as important is if the air cargo shipment carries an actual agriculture pest. While each work location will have different rates of quantity and variety of cargo, the same criteria for sampling will apply to **all** work locations. Through consistent random sampling a depiction of the pest threat of each type of cargo will emerge. Combined data from all work locations will help determine the pest risk posed by various air cargo items.

AQIM of air cargo shipments is an ongoing function and is an integral part of the AQI program. The ongoing sampling of air cargo shipments will allow work locations to adjust their selection criteria and will ultimately help accomplish the PPQ mission.

Agricultural Risk Management System (ARM)

Authorized users **must** enter AQIM data into the ARM database (https://arm.aphis.usda.gov/). This web-based system is accessible from any USDA-APHIS or DHS-CBP computer.

Log in using eAuthentication. Refer to Appendix B: Key Contacts for ARM Help Desk contact information.

Survey Results and How to Use Them

AQIM activities have been put into place to develop baseline data to help answer two basic questions:

1. What is the threat of agricultural pests approaching ports? What is the level of infestation of the pests in the cargo?
2. How effective is the AQI program at managing this threat?

Preliminary results for air cargo surveys provides a general answer for question #1. That is, there are varying rates at which prohibited agricultural materials or cargo units infested with an

agricultural pest approach the ports. Surveys show that at some ports about 1.5% of the cargo units carried actionable pests in the past year, while other work locations show rates as high as 10%.

These percentages approximate agricultural pest threat. Further analysis of the monitoring data is needed to determine the risk associated with air cargo approaching the work location. The origin and destination of the cargo are important to determine risk levels. Also, whether the cargo carries an actual agricultural pest or smuggled item is crucial in analyzing risk.

Analyses of the monitoring data need to occur at several levels of PPQ. At the ports, PPQ personnel need to study what the data means and answer the first question for their specific location. At some ports, Risk Management Teams are formed to look at monitoring data and other data, which is normally collected at the location.

At other locations, analyses of monitoring data occur to establish rates at which quarantined items and agricultural pests are approaching the borders of States, areas of the country, and the United States.

Once baseline rates are well established, PPQ can use the monitoring data as a baseline to answer the second basic question: How effective is the AQI program at managing the risk of introduction of agricultural pests and diseases? Again, each work location **must** conduct this type of analysis. AQIM provides a framework that work locations can use to carry out the analysis.

Questions to Guide Data Analysis

The following questions are a guide around which managers and Risk Management Teams can formulate information. With the answers, valid decisions can be made based on the potential risk of quarantined material and exotic pests and diseases entering a specific pathway. The value of using the monitoring data for decision making is better understood.

1. How many air waybills were selected for sampling during the survey period?
   A. How many actions were required on air waybills sampled?
   B. How many actions by strata category sampled were there?
   C. What is the action approach rate of air waybills that require action (number of air waybills requiring action divided by total air waybills in the sample)? What are the action approach rates by strata category?
2. How many pest interceptions (actionable pests) were made from survey samples?
   A. Pest approach rate: what is the rate of pest interceptions in relation to the total sampled number of air waybills (number of air waybills with actionable pests divided by total air waybills in the sample)?
3. Compare the rate of actions required for each month of the survey

   DISCUSSION:

   A. Are there easily identified trends when the rate of QMIs transiting the work location are higher?
   B. Are there seasonal trends?

C. Do higher rates correlate with national or religious holidays, certain types of containers, cargo, or importers?

4. Generate a listing and frequency of shipments requiring action. Which commodities present the greater risk?

   A. Which commodities are most likely to require action? Where were the agricultural pests found? Which commodities involved solid wood packaging (SWP) actions? What is the rate of air waybills with smuggled or mismanifested items?

   DISCUSSION:

   A. How effective is the current inspection process in detecting pests and/or smuggled cargo?

5. What types of shipments (refrigerated, mixed vegetables, dry containers, empties, cut flowers, express carriers, etc.) require higher rates of action?

   DISCUSSION:

   A. What selectivity factors are currently used to identify shipments likely to require action?
   B. What additional selectivity factors would be used to identify shipments likely to require action?
   C. Do the survey results indicate additional factors that help identify shipments most likely to require action?

6. Using monitoring data, apply the survey results to the cargo universe at the work location to estimate the number of actions required and interceptions likely to transit the work location during the same time the survey period took place.

   A. How many air waybills arrived at the port during the survey period? Using the action approach rate for air waybills requiring action, calculate an estimate of the number of air waybills transiting the work location that are likely to require action. What are the estimates per strata category?
   B. Using WAD data, how does the estimated number of actions required compare with the reported number of actions taken?
   C. How many additional actions may have been required during the survey period?
   D. How does the estimated number of actionable pest interceptions compare with the reported number of actionable pests on WAD?

   DISCUSSION:

   A. What percentage of resources are dedicated to staffing AQI activities for air cargo at the work location?
   B. What is the relative risk of air cargo compared with other pathways in the work location?
   C. Should resources be reallocated among all the pathways in the work location to better address the relative risk of the pathways?

Chapter

12

Maritime Cargo Pathways

Contents

Background

The cargo population, or sampling universe, for AQI monitoring is now defined as specific categories. Take random samples from these populations with more intensive (hypergeometric) inspections and record necessary data about these commodities.

To properly monitor cargo, you need to have a good understanding of two key statistical principles:

1. It is important that the sample selected be representative of the category. Random selection helps ensure this.

2. Once the sample is selected, inspect the sample thoroughly and according to hypergeometric sampling procedures, if applicable.

If you want your port to produce quality risk information, **each** person participating **must** have a clear understanding of the sampling universe, the unit of sampling, and consistency issues.

The Sampling Universe

Estimate the number of actions due to pests or smuggling in a cargo entry pathway by taking random samples from the cargo in the pathway. It is key to good statistics to carefully define this universe from which you want to draw your random sample. Answer the following questions to select the sample correctly and to make statistical inferences for the entire universe.

- How are commodities transported?
- How many shipments of these commodities are arriving at a work location?
- What is the seasonality of the commodity?

For AQIM, the sampling universe is defined by the mode of transport of the cargo such as airplane, ship, or truck.

Sampling Universe Exclusions

The following commodities or commodity types are **excluded** from the sampling universe:

- Commodities which are precleared at foreign sites
- Commodities that are admissible under the National Agriculture Release Program (NARP)
- Commodities that undergo some type of mandatory treatment **other than** cold treatment (e.g., fumigation, irradiation, hot water treatment) at work locations
- Frozen commodities
- Oil, salt, iron ore, coal, etc., that have **no** pest risk
- Seed shipments
- Transportation and Exportation (T&E) cargo

Cargo Strata and Stratifying the Sample

The sampling and inspection processes for AQIM were designed to be compatible with typical cargo inspection groupings. The cargo universe is divided into several homogeneous and distinctly separate groups. Each group contains commodities that will be sampled to estimate the action and pest approach rates in each group. A port may be sampling one or more of the commodities in a group or across groups. Monitor the following cargo categories:

- Commercial perishable agricultural cargo (defined as any commercial shipment of fresh fruit, vegetables, and cut flowers)

- Wood packaging material (WPM)
- Italian tile container cargo

By selecting a set number from these categories, PPQ can get precise estimates of the number of containers with pests approaching the port. This risk information helps the work location understand how effectively it manages the pest risk for each commodity, as well as for the entire cargo universe at the port.

It's very important that each commodity in a category selected be representative of all other units of that commodity. All shipments of a category should have a chance of being selected as a sample. One way to ensure that the sample is representative is to choose a shipment of the commodity at random (random time, random number, etc.). This random selection process eliminates the bias of the Agriculture Specialist who is selecting the sample. The Agriculture Specialist's experience (bias) might lead to choosing a shipment that is more likely to be harboring a pest. This bias would make the sample **not** representative of the entire commodity universe. The survey results would be skewed, and this kind of bias would hamper the port's ability to make the best decisions based on risk analysis.

Setting Up a Process

Setting up a process of selecting representative samples for each of the commodities will be one of the biggest challenges in AQIM. Because each port has its own unique set of circumstances in cargo operations, the port **must** individualize its random sampling process. Document the process and if needed, ask for feedback from other maritime cargo ports, the AQIM coordinator, or Port Operations staff who have experience in selecting random samples in the cargo environment. The port may even decide that the Port Risk Management Team determine and review the random sampling process on a regular basis.

The Sampling Unit

For maritime cargo, the sample unit is the container or container equivalent of the commodity. A container equivalent is defined as the number of pallets of a commodity (20) that would fill a 40-foot container. It is crucial that the sample unit is inspected closely enough to detect any actionable pests and mismanifested items. Maritime cargo sampling and inspection procedures are detailed in Table 12-1. Procedures for sampling multiple commodities within the selected container are detailed in Table 12-2. Follow the procedures exactly for the monitoring estimates to be valid and useful.

Contact the National AQIM coordinator for specific sampling numbers if unable to achieve the specified sampling amounts based on the pathway instructions. Always follow established protocols through your chain of command.

Data Collection Consistency

Record the monitoring results from the inspection of a random sample unit accurately and consistently. Because each sample represents many other units, all Agriculture Specialist's **must** be as consistent as possible in following the inspection procedures.

Regulated commodities pose a special challenge. If the sample selected is a regulated commodity, it is important to understand the following:

Cargo monitoring estimates the number of containers approaching the work location with commodity pest infestation levels requiring action by PPQ. AQIM uses risk-based inspection procedures for detecting a 10% **or more** pest infestation rate. This initial threshold is used to estimate the number of containers with a pest threat approaching a work location.

NOTICE

This 10% infestation level may change as the data for AQIM is collected and analyzed.

To be 95% sure the Agriculture Specialist inspecting the container will find the pest when the shipment is infested at a 10% or more infestation level, the Agriculture Specialist **must** select, at random, a specific number of boxes in the shipment. Determine this number of boxes by using the hypergeometric table illustrated in Table 12-1. **Each** of these boxes **must** be inspected at level of intensity to ensure:

- **No** hitchhiker pests are present in the box
- **No** internal feeding insects are present in randomly selected fruit in the box
- **No** mismanifested or smuggled items are present

Table 12-1 Hypergeometric Table for Random Sampling in Commodity Inspection

Total number of boxes inside sample container:	Randomly select this number of boxes:
1 - 10	All boxes in the shipment
11 - 12	11
13	12
14 - 15	13
16 - 17	14
18 - 19	15
20 – 22	16
23 – 25	17
26 – 28	18
29 – 32	19
33 – 38	20
39 – 44	21
45 – 53	22
54 – 65	23
66 – 82	24
83 – 108	25
109 – 157	26
158 – 271	27

Total number of boxes inside sample container:	Randomly select this number of boxes:
272 – 885	28
886 – 200,000	29

Agriculture Specialists should follow normal inspection procedures of the commodities to determine if pests are present. For example, Agriculture Specialists should cut fruit to detect internal feeders if external evidence is present.

Maritime Cargo Procedures Summary

The following ports are participating in maritime cargo AQIM data collection:

Commercial Perishable Agricultural Cargo

- Brooklyn, NY
- Port Everglades, FL
- Houston, TX
- Long Beach, CA
- Miami, FL
- Newark, NJ
- Philadelphia, PA
- Wilmington, DE

Wood Packaging Material (WPM)

- Baltimore, MD
- Boston, MA
- Brooklyn, NY
- Charleston, SC
- Gulfport, MS
- Honolulu, HI
- Long Beach, CA
- Miami, FL
- Newark, NJ
- New Orleans, LA
- Norfolk, VA
- Oakland, CA
- Philadelphia, PA
- Port Everglades, FL
- San Juan, PR
- Savannah, GA
- Seattle, WA
- Tacoma, WA
- West Palm Beach, FL

Italian Tile Container Cargo

- Houston, TX
- Miami, FL

- Newark, NJ
- Norfolk, VA
- Port Everglades, FL
- Savannah, GA

Table 12-2 Maritime Cargo AQIM Procedures Summary

Term:	Definition:
Commodity	Random sample of one or more of the following categories: · Commercial perishable agricultural cargo (fresh fruit, vegetables, and cut flowers) · Wood packaging material (WPM) · Italian tile container cargo
Cargo population definition	All containers (or contain equivalents) carrying the above commodities destined to the United States (refer to Sampling Universe Exclusions)
Sample size	For **commercial perishable agricultural cargo**, select two containers (or container equivalent) per week per port. If the consignment consists of smaller retail units like clamshell packaging or smaller film-wrapped retail packaging or trays in boxes, select the proper sample size from the total number of clamshells, trays, etc. for inspection. For **WPM**, select two containers per week per port. If the randomly selected sample does **not** have WPM associated with it, keep the sample but record it in the AQIM worksheet as a negative finding and follow the instructions in the AQIM worksheet. **Do not** use a perishable or Italian tile cargo sample for the WPM sample. For **Italian tile container cargo**, select two containers per peek per port (and as tile seasonality allows). Contact the National Operations Manager for Exclusions and Imports for assistance (Mikell Tanner at 919-855-7317 or email Mikell.tanner@usda.gov).
Sample selection	Examples of sample selection processes are random time, port discretion, etc. The port may need to first determine the total number of shipments of a commodity received at a port in 1 year. If commodity is seasonal, plan for sampling during the full import season of commodity, if reasonable, for the number of samples needed.
Inspection methodology	Physically inspect **each** selected shipment at the port or consignee premise. Select boxes for inspection from random locations throughout the container to detect a 10% level of infestation (at 95% confidence). Determine the number of boxes using Table 12-1. Inspect entire contents of boxes selected and available floor space of the container for agricultural pests or mismanifested or smuggled items. For **commercial perishable agricultural cargo**: 3. Refer to Table 12-3 before beginning the inspection process. 4. Inspect cargo using appropriate AQIM hypergeometric inspection procedures for each sample. 5. Record **all** needed data on appropriate AQIM data worksheet and report data using ARM. For **WPM and Italian tile container cargo**: 1. Inspection of cargo and WPM is to assure observation of as much WPM as cargo will allow. Partial or full de-vanning may be necessary based on situation and judgement of inspector. 2. Record **all** needed data on appropriate AQIM data worksheet and report data using ARM.
Other issues	Inspect during the normal business hours at the port. Costs for overtime clearance will be paid by the shipper/broker/consignee. Advise shippers, importers, and brokers that random sampling and inspection will be part of day-to-day operations. They should understand there is a probability their shipment will be intensely inspected.

Table 12-3 AQIM Sampling Procedures for Multiple Commodities in Cargo

If the randomly selected AQIM consignment is:	Then:	Which creates:
All the same perishable commodity from one origin	· APPLY hypergeometric inspection sampling to whole shipment; **AND** · SELECT the appropriate number of units for inspection	One AQIM record for ARM data input
Different perishable commodities from one or multiple origins (**other than** CUT FLOWERS)	· SELECT the single commodity with the **most** quantity (boxes, cartons, etc.); **AND** · SELECT the single commodity with the **least** quantity units (**must** be a **minimum** of five quantity units) · APPLY hypergeometric inspection sampling separately to each of these selections and inspect as separate AQIM samples	Two different AQIM inspections (one for each of the commodities selected) for one ARM data input
Different CUT FLOWER genera/varieties from one or multiple origins	Consider **only** boxes of single variety cut flowers OR boxes of same flower composition bouquets[1]: · SELECT the cut flower genus/ variety with the **most** quantity units (boxes, cartons, etc.); **AND** · SELECT the cut flower genus/ variety with the **least** quantity units (**must** be a **minimum** of five quantity units)[2] · APPLY hypergeometric inspection sampling separately to each of these selections and inspect as separate AQIM samples	Two different AQIM inspections (one for each of the cut flower genera selected) for one ARM data input. Record cut flower variety name and origin of the cut flower (**not** origin of flight or vessel.)

NOTICE

Do not select commodities from United States Territories to the mainland continental United States (e.g., Guam, U.S. Virgin Islands, etc.) for AQIM sampling. If the random selection is from a U.S. Territory, select the next shipment that is **not** from a U.S. Territory.

Pathway Monitoring Maintenance and Quality Assurance

Port managers and local AQIM coordinators are responsible for ensuring that monitoring activities are being performed and performed properly. To help with reviewing the status of monitoring activities, refer to Appendix E: Pathway Monitoring. This appendix contains a checklist of questions port managers and local AQIM coordinators should periodically answer to ensure proper monitoring of each designated pathway at their work locations. The questions review the following topics:

- Accurate and complete data
- Adequate sampling

[1] Consider **only** bouquets where most of its flowers are from one single flower variety, **excluding** greenery. For example, if the bouquet's flower composition is five roses, two daisies, and one carnation (**excluding** greenery), identify the bouquet as a rose bouquet.
[2] If there are multiple commodities/cut flower varieties with five boxes each, port discretion is used to select the five-box commodity to be sampled and inspected.

- Local support
- Proportional sampling
- Random sampling
- Working risk committees

Maritime Cargo Worksheet

For AQIM purposes, use the Maritime Cargo data worksheet and associated instructions for recording information gathered from maritime cargo inspection. Properly record the commodity being inspected.

Data Collection and Maintenance

Traditionally, PPQ based port work on how much cargo was inspected and on the number of pest interceptions found on cargo. Ports inspected cargo, found pests, and tallied them to justify good job performance. AQIM emphasizes work efforts based on the potential threat posed by foreign pests and quarantine material.

By sampling a set number of samples from each cargo stratum, PPQ is able to get precise estimates of the number of cargo containers with pests approaching. It is then easier to make comparisons which help the port understand how effectively it manages the pest risk in each cargo grouping, and therefore, for the cargo universe.

Every port needs to be involved in AQIM. Each port has a group of managers, supervisors, and Agriculture Specialists who manage results monitoring and the subsequent risk management functions at the port. All CBP personnel are involved and supportive of the process.

The expected results are that PPQ will have results monitoring systems in place that will meet the needs of management and the requirements of the GPRA.

Agricultural Risk Management System (ARM)

Authorized users **must** enter AQIM data into the ARM database (https://arm.aphis.usda.gov/). This web-based system is accessible from any USDA-APHIS or DHS-CBP computer.

Log in using eAuthentication. Refer to Appendix B: Key Contacts for ARM Help Desk contact information.

Survey Results and How to Use Them

AQIM activities have been put into place to develop baseline data to help answer two basic questions:

1. What is the threat of agricultural pests approaching ports? What is the level of infestation of the pests in the cargo?
2. How effective is the AQI program at managing this threat?

Preliminary results for maritime cargo surveys provides a general answer for question #1. That is, there are varying rates at which prohibited agricultural materials or cargo units infested with

an agricultural pest approach the ports. Surveys show that at some ports about 1.5% of the container units carried actionable pests in the past year, while other work locations show rates as high as 20%.

These percentages approximate agricultural pest threat. Further analysis of the monitoring data is needed to determine the risk associated with air cargo approaching the work location. The origin and destination of the cargo are important to determine risk levels. Also, whether the cargo carries an actual agricultural pest or smuggled item is crucial in analyzing risk. Analysis of the monitoring data needs to occur at several levels of PPQ. At the ports, PPQ personnel need to study what the data means and answer the first question for their specific location. At some ports, Risk Management Teams are formed to look at monitoring data and other data, which is normally collected at the location.

At other locations, analyses of monitoring data occur to establish rates at which quarantined items and agricultural pests are approaching the borders of States, areas of the country, and the United States.

Once baseline rates are well established, PPQ can use the monitoring data as a baseline to answer the second basic question: How effective is the AQI program at managing the risk of introduction of agricultural pests and diseases? Again, each work location **must** conduct this type of analysis. AQIM provides a framework that work locations can use to carry out the analysis.

Questions to Guide Data Analysis

1. How many containers were selected for sampling during the survey period?

   A. How many actions were required on containers sampled?
   B. How many actions by strata category sampled were there?
   C. What is the action approach rate of containers that require action (number of containers requiring action divided by total containers in the sample)? What are the action approach rates by strata category?

2. How many pest interceptions (actionable pests) were made from survey samples?

   A. Pest approach rate: what is the rate of pest interceptions in relation to the total sampled number of containers (number of containers with actionable pests divided by total containers in the sample)?

3. Compare the rate of actions required for each month of the survey

   DISCUSSION:

   A. Are there easily identified trends when the rate of QMIs transiting the work location are higher?
   B. Are there seasonal trends?
   C. Do higher rates correlate with national or religious holidays, certain types of containers, cargo, or importers?

4. Generate a listing and frequency of shipments requiring action. Which commodities present the greater risk?

A. Which commodities are most likely to require action? Where were the agricultural pests found? Which commodities involved solid wood packaging (SWP) actions? What is the rate of containers with smuggled or mismanifested items?

DISCUSSION: how effective is the current inspection process in detecting pests and/or smuggled cargo?

5. What types of shipments (refrigerated, mixed vegetables, dry containers, empties, cut flowers, express carriers, etc.) require higher rates of action?

   DISCUSSION:

   A. What selectivity factors are currently used to identify shipments likely to require action?
   B. What additional selectivity factors would be used to identify shipments likely to require action?
   C. Do the survey results indicate additional factors that help identify shipments most likely to require action?

6. Using monitoring data, apply the survey results to the cargo universe at the work location to estimate the number of actions required and interceptions likely to transit the work location during the same time the survey period took place.

   A. How many containers arrived at the port during the survey period? Using the action approach rate for air waybills requiring action, calculate an estimate of the number of containers transiting the work location that are likely to require action. What are the estimates per strata category?
   B. Using WAD data, how does the estimated number of actions required compare with the reported number of actions taken?
   C. How many additional actions may have been required during the survey period?
   D. How does the estimated number of actionable pest interceptions compare with the reported number of actionable pests on WAD?

   DISCUSSION:

   A. What percentage of resources are dedicated to staffing AQI activities for maritime cargo at the work location?
   B. What is the relative risk of maritime cargo compared with other pathways in the work location?
   C. Should resources be reallocated among all the pathways in the work location to better address the relative risk of the pathways?

Chapter

13

Mail Facility Pathway

Contents

Background

During the past decade, the arrival of air and surface foreign mail has increased significantly. The various agricultural items that foreign mail can potentially carry is staggering. These agricultural items can pose significant exotic pest and disease risks to U.S. agriculture. Therefore, PPQ is using AQIM to randomly sample U.S. Postal Service foreign mail to determine the potential threat of foreign mail.

Each work location that services a mail facility will randomly sample air and surface foreign mail arriving at that location. The data collected from the random sampling will help to answer the following questions:

1. What is the threat of agricultural pests approaching the work location via this pathway?
2. How effective is the AQI program at managing this threat?

In order to determine risk levels, the origin and destination of foreign mail is important, as well as, whether agriculture items in foreign mail carry any pest or disease.

While each mail facility has a differing amount of foreign mail, the same criteria for sampling foreign mail applies to all mail facilities. By consistently taking random samples of foreign mail, PPQ will be able to depict any emerging pest threat by this pathway. The combined data from all work locations that service mail facilities will help PPQ determine the pest risk of agricultural items carried in the universe of foreign mail.

Monitoring foreign mail is an ongoing PPQ function and is an integral part of the AQI program. The ongoing sampling of foreign mail will allow work locations to adjust their selection criteria

for the present and the future. Also, monitoring helps PPQ measure how well its workforce is accomplishing the mission to exclude exotic pests and diseases.

Standard Operating Procedures

Sample 300 mail packages per month (**excluding** obvious book/magazine bundles or packages.) Months with nonwork holidays will affect this number. Depending on the actual number of workdays per week, properly select the following mail package samples per day:

- If working 5 days per week, select 14
- If working 6 days per week, select 12
- If working 7 days per week, select 10

1. Apply appropriate AQIM inspection procedures for each sample.
2. Record all needed data on appropriate AQIM data worksheet.
3. Report the data using ARM.

Contact the National AQIM coordinator if unable to achieve the specified sampling amounts based on the pathway instructions. Always follow established protocols through your chain of command.

The following ports are participating in AQIM sampling:

- Chicago, IL
- Jamaica, NY
- Los Angeles, CA
- Miami, FL
- Newark, NJ

Pathway Monitoring Maintenance

Port managers and local AQIM coordinators are responsible for ensuring that monitoring activities are being performed and being performed properly. To help with reviewing the status of monitoring activities, refer to Appendix E: Pathway Monitoring.

This appendix contains a checklist of questions port managers and local AQIM coordinators should periodically answer to ensure proper monitoring of each designated pathway at their work locations. The questions review the following topics:

- Accurate and complete data
- Adequate sampling
- Local support
- Proportional sampling
- Random sampling
- Working risk committees

Mail Facility Worksheet

For AQIM purposes, use the Mail Facility Data Worksheet and associated instructions for recording information gathered from foreign mail inspection.

Agricultural Risk Management System (ARM)

Authorized users **must** enter AQIM data into the ARM database (https://arm.aphis.usda.gov/). This web-based system is accessible from any USDA-APHIS or DHS-CBP computer.

Log in using eAuthentication. Refer to Appendix B: Key Contacts for ARM Help Desk contact information.

Survey Results and How to Use Them

AQIM activities have been put into place to develop baseline data to help answer two basic questions:

1. What is the threat of agricultural pests approaching ports? What is the level of infestation of the pests in the cargo?
2. How effective is the AQI program at managing this threat?

Preliminary results for air cargo surveys provides a general answer for question #1. That is, there are varying rates at which prohibited agricultural materials or cargo units infested with an agricultural pest approach the ports. Surveys show that at some work locations about 2% of the foreign mail had prohibited items. At other work locations, surveys show that the rate of prohibited items in foreign mail occurred near 6%.

These percentages approximate agricultural pest threat. Further analysis of the monitoring data is needed to determine the risk associated with air cargo approaching the work location. The origin and destination of the cargo are important to determine risk levels. Also, whether the cargo carries an actual agricultural pest or smuggled item is crucial in analyzing risk.

Analyses of the monitoring data need to occur at several levels of PPQ. At the ports, PPQ personnel need to study what the data means and answer the first question for their specific location. At some ports, Risk Management Teams are formed to look at monitoring data and other data, which is normally collected at the location.

At other locations, analyses of monitoring data occur to establish rates at which quarantined items and agricultural pests are approaching the borders of States, areas of the country, and the United States.

Once baseline rates are well established, PPQ can use the monitoring data as a baseline to answer the second basic question: How effective is the AQI program at managing the risk of introduction of agricultural pests and diseases? Again, each work location **must** conduct this type of analysis. AQIM provides a framework that work locations can use to carry out the analysis.

Questions to Guide Data Analysis

1. How many foreign mail packages were selected for sampling during the survey period?

   A. How many mail packages sampled required an action (seizure or other action required as a condition of entry) during the survey?
   B. What is the action approach rate of mail packages requiring action (number of mail packages, with one or more items categorized as seized/intercepted or clean/treatment, divided by the total number of mail packages sampled)?
   C. How many seizures (QMIs) came from the samples?
   D. What is the QMI approach rate of mail packages with prohibited agricultural material (total number of QMIs divided by total mail packages sampled during the survey period)?

2. How many pest interceptions (actionable pests) were made from survey samples?

   A. Pest approach rate: what is the rate of pest interceptions in relation to the number of mail packages (number of actionable pests divided by number of mail packages in the sample)?

3. How many QMIs were plant material? Meat or animal products?

   A. What is the rate of QMIs for plant material and meat/animal products?

   DISCUSSION:

   A. Is there a greater risk from plant material or animal products at the work location?

4. Generate a list of all the origins of mail packages transiting the work location. Produce a list of origins of mail packages with QMIs transiting the work location.
5. Generate a list of the destination of mail packages transiting the work location. What are the top five destinations of mail packages? What are the top five destinations of mail packages with QMIs?

   DISCUSSION:

   A. Which State are considered high-risk States?

6. What is the action approach rate for each month of the survey period?

   DISCUSSION:

   A. Do these monthly rates correlate with traditional peak and off-peak mailing periods?
   B. Are there easily identified trends when the rate of QMIs transiting the work location are higher?
   C. Are there seasonal trends or do higher rates correlate with national or religious holidays, beginning or end of the school year, vacation periods, etc.?

7. Generate a listing and frequency of items seized/intercepted. What are the top five most frequently seized/intercepted items? Which QMI items present the greater risk?
8. Apply the survey results to the total mail package population to estimate the number of QMIs and interceptions likely to transit the work location during the survey period.

   A. How many (total) mail packages arrived at the mail facility during the survey period? Using WAD data and using the QMI approach rate and rate of pest interceptions on QMIs, calculate estimates of the number of QMIs and actionable pests transiting the work location.

DISCUSSION:

A. How does the estimate number of QMIs compare with the reported number of QMIs on WAD?
B. What percentage of all QMIs transiting the work location were seized/ intercepted because of the AQI program?
C. How does the estimated number of actionable pest interceptions compare with the reported number of actionable pests on WAD?
D. What percentage of all actionable pests transiting the work location were intercepted because of the AQI program?

Chapter

14

Northern Border Vehicles Pathway

Contents

Background

This pathway covers passenger vehicles entering the United States via northern border crossings. Record information on a worksheet even if **no** agricultural item(s) are found.

Standard Operating Procedures

Collect random samples from the entire, noncommercial, vehicle population approaching the crossing. Sample five to ten samples per day or the required number approved based on days the port is staffed. Refer to Table 14-1 to determine the required minimum number of samples. Use a random time generator tool (e.g., Random.org) to generate random sampling numbers. **Only** ports having one or more full time Agriculture Specialist will conduct vehicle sampling. Continue randomly collecting AQIM samples while under Code Orange or higher alerts.

Contact the National AQIM coordinator for specific sampling numbers if unable to achieve the specified sampling amounts based on the pathway instructions. Always follow established protocols through your chain of command.

Table 14-1 Sampling Protocol Based on Number of Personnel

If the number of full-time agriculture specialists is/are:	Then the sampling protocol is:
1	**Minimum** of 5 samples per day (100 per month)[1]
2 **or more**	**Minimum** of 10 samples per day[1]

For each AQIM sample:

- Use the 7-point inspection procedures on all vehicles and 100% hand inspection procedures of **all** passenger baggage and personal effects.
- Record **all** needed data on the appropriate AQIM data worksheet.
- Report data using ARM.

Refer to Table 14-2 for AQIM sample numbers per port per month.

Table 14-2 Northern Border Vehicle Sample Numbers

Port:	# of samples per month:	Port:	# of samples per month:
Alexandria Bay, NY	150	Jackman, ME	100
Blaine, WA	300	Lynden, WAS	100
Buffalo, NY	300	Oroville, WA	150
Calais, ME	150	Pembina, ND	150
Champlain, NY	150	Portal, ND	150
Derby Line, VT	150	Porthill, ID	100
Detroit, MI	300	Port Huron, MI	300
Dunseith, ND	100	Raymond, MT	150
Eastport, ID	150	Rooseville, MT	100
Grand Portage, MN	100	Sumas, WA	150
Highgate Springs, VT	150	Sweetgrass, MT	150
Houlton, ME	150	Van Buren, ME	100
International Fall, MN	150		

[1] Locations are encouraged to sample **more than** the minimum.

Passenger Vehicle Universe

The passenger vehicle universe includes automobiles, vans, recreational vehicles, cab area of all types of noncommercial trucks, and other similar passenger type vehicles.

Inspection Criteria for the 7-Point Inspection

1. Under hood
2. Glove compartment
3. Trunk area including side panel compartment
4. Under spare tire compartment
5. Under seats
6. All luggage and handbags
7. Other interior side panel compartments

Pest Interception Procedures

Pest interception information resulting from random sample surveys is an important factor regarding risk management. All quarantine material found needs to undergo 100% inspection for pests. Record **all** pest types and quantities found on quarantine material on pest interception form(s).

Send pest interceptions from seized/intercepted items to port or area identifiers. Mark the interception "**PROMPT: NORTHERN BORDER MONITORING**."

Safety

Always maintain safe working conditions. When a condition develops that challenges the safety of the Agriculture Specialist, terminate the inspection until the hazardous condition is corrected. The exercise of good judgment will dictate when these situations need to be addressed and how acceptable alternatives can be employed.

Pathway Monitoring Maintenance

Port managers and local AQIM coordinators are responsible for ensuring that monitoring activities are being performed and being performed properly. To help with reviewing the status of monitoring activities, refer to Appendix E: Pathway Monitoring. This appendix contains a checklist of questions port managers and local AQIM coordinators should periodically answer to ensure proper monitoring of each designated pathway at their work locations. The questions review the following topics:

- Accurate and complete data
- Adequate sampling
- Local support
- Proportional sampling
- Random sampling
- Working risk committees

Northern Border Vehicle Worksheet

For AQIM purposes, use the Northern Border Vehicle Data Worksheet and associated instructions for recording information gathered from northern border vehicle inspections.

Agricultural Risk Management System (ARM)

Authorized users **must** enter AQIM data into the ARM database (https://arm.aphis.usda.gov/). This web-based system is accessible from any USDA-APHIS or DHS-CBP computer.

Log in using eAuthentication. Refer to Appendix B: Key Contacts for ARM Help Desk contact information.

Survey Results and How to Use Them

AQIM activities have been put into place to develop baseline data to help answer two basic questions:

1. What is the threat of agriculture pests approaching work locations?
2. How effective are the AQI operations managing this threat?

Preliminary results for Northern border vehicle surveys provide a general answer for question #1. That is, there are varying rates at which prohibited agricultural materials approach the Northern border crossings. These prohibited agricultural materials are what could have agricultural pests.

Further analysis of the monitoring data is needed to determine the risk associated with the specific agricultural items approaching the work location. The origin and destination of the agricultural items are important to determine risk levels. Also, whether the agricultural items carry an actual agricultural pest is crucial to analyzing risk.

Analysis of the monitoring data needs to occur to answer the first question for specific work locations. Analysis tools are available to help with these analyses, which are explained in the next subsection. At the same time, PPQ holds risk analysis workshops around the country to introduce risk analysis concepts. At some work locations, Risk Management Teams are formed to look at monitoring data and other data which is normally collected. Those locations that contribute to a group sample may want to form an interstate risk management group.

At all other locations, analyses of monitoring data occur to understand the rates at which prohibited items and agricultural pests are approaching the borders of States, areas of the country, and the United States.

Once baseline rates are well established, port managers can use the monitoring data as a baseline to answer the second basic question: How effective are the AQI operations at managing the risk of introduction of agricultural pests and diseases? Again, each work location **must** conduct this type of analysis. AQIM provides a framework which work locations can use to carry out the analysis.

Questions to Guide Data Analysis

1. How many vehicles were selected for the sampling during the survey period?
    A. How many vehicles sampled required an action (seizure or other action required as a condition of entry) during the survey period?

B. What is the action approach rate of vehicles requiring action (number of vehicles with one or more items categorized as seized/intercepted or clean/treatment divided by the total number of vehicles sampled)?
C. What is the total number of QMIs seized/intercepted during the survey period?
D. How many seizures (QMIs) came from the samples during the survey period?
E. What is the QMI approach rate of vehicles with prohibited agricultural material (total number of QMIs divided by total vehicles sampled during the survey period)?

2. How many pest interceptions (actionable pests) were made from survey samples?

   A. Pest approach rate: What is the rate of pest interceptions in relation to number of vehicles (number of actionable pests divided by number of vehicles in the sample)?

3. How many QMIs were plant material? Meat or animal products?

   A. What is the rate of QMIs for plant material and meat or animal products?
   B. Is there a greater risk from plant material or animal products at the work location?

4. How many vehicles were sampled at each crossing? What is the rate of QMI seizures at each crossing? Which crossings have a higher rate of QMIs than vehicles?

   DISCUSSION:

   A. Are these crossings staffed accordingly? AQIM data analysis provides information on which crossing is the higher risk according to the approach rate. This analysis helps determine if staff is properly allocated among the crossings. The example in Table 14-3 shows that according to the approach rates, vehicles crossing Bridge B could represent the greater risk at the work location. Staff each location according to the level of risk.

Table 14-3 Example of Number of Vehicles Sampled and Approach Rate

Northern border vehicle bridges:	Vehicles sampled:	QMIs:	Approach rate (%):
A	540	15	2.7
B	360	25	6.9
C	900	30	3.3

5. What are the destinations of vehicles transiting the work location? Is local traffic (**less than** 25 miles from the work location) considered high risk? What are the number of QMIs traveling to local locations versus distant locations?

DISCUSSION:

A. Which States are considered high-risk States? How can you best select vehicles destined to these high-risk States to protect U.S. agriculture?

6. Compare the action approach rate for each month of the survey period.

DISCUSSION:

A. Are there easily identified monthly trends when the rate of QMIs transiting the work location are higher?
B. Are there seasonal trends or do higher rates correlate with national or religious holidays, beginning or end of the school year, vacation periods, etc.?
C. Do these rates correlate with traditional peak and off-peak travel times?

7. Generate a listing and frequency of items seized/intercepted. What are the top five items most frequently seized/intercepted? Which QMIs present the greatest risk?
8. Which vehicles (and at which crossing) were carrying prohibited items? Where were the items found, hand carried bags, passenger compartment, glove box, truck, luggage? Did the passenger declare all prohibited items? Was the passenger traveling alone, as a couple, or family? What was the reason for travel business, vacation, visit family, tour group, school? What type of vehicle was used to transport prohibited items?

DISCUSSION:

A. How do current selective targeting factors compare with survey results?
B. What selectivity factors could be changed or added to identify vehicles carrying prohibited items?
C. What percentage of resources are dedicated to staffing AQI activities for northern border vehicles at the work location?
D. What is the relative risk of northern border vehicles compared with other pathways in the work location?
E. Should resources be reallocated among all the pathways in the work location to better address the relative risk of the pathways?

9. Apply the monitoring results to the total approaching population to estimate the number of QMIs and pest interceptions likely to transit the port during the survey period by answering:

A. How many total vehicles entered the port during the survey period? Using the rate of QMIs and pest interceptions from AQIM, calculate estimates of the number of QMIs and actionable pests transiting the port.

DISCUSSION:

A. What percentage of all QMIs transiting the port were seized/intercepted because of the AQI program, use WAD data?
B. How does the estimated number of QMIs compare with the reported number of QMIs on WAD?
C. How does the estimated number of actionable pest interceptions compare with the reported number of actionable pests on WAD?
D. What percentage of all actionable pests transiting the port were intercepted because of the AQI program?

Chapter

15

Northern Border Truck Cargo Pathway

Contents

Background

The cargo population, or sampling universe, for AQI monitoring in the northern border truck cargo pathway is defined as **commercial plant perishable agricultural cargo**. Take random samples from this population with more intensive (hypergeometric) inspections. Record necessary data about these commodities.

To properly monitor cargo, you need to have a good understanding of two key statistical principles:

1. It is important that the sample selected be representative of the universe. Random selection helps ensure this.
2. Once the sample is selected, it is necessary to inspect the sample thoroughly.

If you want your work location to produce quality risk information, then each person participating **must** have a clear understanding of the sampling universe, cargo strata and stratifying the sample, the unit of sampling, and consistency issues.

The Sampling Universe

You estimate the number of actions due to pests or improperly manifested items in a cargo entry pathway by taking random samples from the cargo in the pathway. It is key to good statistics to carefully define this universe from which you want to draw your random sample. Answer the following questions to select the sample correctly and make statistical inferences for the entire universe.

- How are commodities transported?
- How many commodities are arriving at a work location?
- What kinds of commodities are arriving?
- Are certain types of commodities of more interest to PPQ than others?

For AQIM, the universe is defined by the mode of transport of the cargo, in this case, the truck.

Sampling Universe Exclusions

Initially, PPQ has decided to limit the universe. The following commodities or commodity types will be excluded from the sampling universe:

- Border Release Advance Screening and Selectivity (BRASS) released cargo
- Commodities precleared at foreign sites
- Commodities admissible under the National Agriculture Release Program (NARP)
- Commodities that undergo some type of mandatory treatment, **other than** cold treatment (e.g., fumigation, irradiation, hot water treatment) at work locations
- Frozen commodities
- Loose bulk loaded perishable cargo (floor loaded on the truck bed; **no** boxes, crates, cartons, bags, etc. used for commodity containment)
- Oil, salt, iron ore, coal, etc., that have **no** pest risk
- Seed shipments
- Transportation and exportation (T&E) cargo

Cargo Strata and Stratifying the Sample

The sampling and inspection processes for AQIM were designed to be compatible with typical cargo inspection groupings. The cargo universe is divided into several homogeneous and distinctly separate groups to estimate the pest approach rates in each group.

By sampling a set number of samples from each cargo group, PPQ can get precise estimates of the number of trucks with pests approaching the border. It is then easier to make comparisons, which helps the work location understand how effectively it manages the pest risk for this category, as well as for the entire cargo universe at the port.

It is very important that each sample selected be representative of all other units in that category. One way to ensure that the sample is representative is to choose a truck at random (either random time, random number, etc.). This random selection process eliminates the bias of the Agriculture Specialist selecting the sample. The Agriculture Specialist’s experience (bias) might lead to choosing a truck that is carrying a commodity that is more likely to be harboring a pest. This bias would make the sample **not** representative of the entire truck universe. The monitoring results

would be skewed toward those commodities likely to harbor a pest. This bias would hamper the work location's ability to make the best decisions based on risk analysis.

Setting Up a Process

Setting up a process of selecting representative samples in each group will be one of the biggest challenges in AQIM. Because each work location has its own unique set of circumstances in cargo operations, the work location **must** individualize its random sampling process. Document the process and, if needed, ask for feedback from other work locations, the AQIM coordinator, or port operations staff who have experience in selecting random samples in the cargo environment.

The Sampling Unit

For northern border truck cargo, the sample unit is the truck box containing the commodity, **not** including the cab. It is crucial that the sample unit is inspected closely enough to detect any actionable pests or improperly manifested items. Northern border truck cargo sampling and inspection procedures are detailed in Table 15-2. Procedures for sampling multiple commodities on the selected truck are detailed in Table 15-3.

Contact the National AQIM coordinator for specific sampling numbers if unable to achieve the specified sampling amounts based on the pathway instructions. Always follow established protocols through your chain of command.

Follow the procedures exactly in order for the monitoring estimates to be valid and useful.

Data Collection Consistency

Record the monitoring results from the inspection of a random sample unit accurately and consistently. Because each sample represents many other units, all Agriculture Specialists **must** be as consistent as possible in following the inspection procedures.

Regulated commodities pose a special challenge. If the sample selected is a regulated commodity, it is important to understand the following:

Cargo monitoring estimates the number of trucks approaching the work location with pest infestation levels requiring action by PPQ. AQIM uses risk-based inspection procedures for detecting 10% or more pest infestation rate. This initial threshold is used to estimate the number of trucks with a pest threat approaching a work location.

NOTICE
This 10% infestation level may change as the data for AQIM is collected and analyzed.

To be 95% sure the Agriculture Specialist inspecting the sample truck will find the pest when the shipment is infested at a 10% or more infestation level, the Agriculture Specialist **must** select, at random, a specific number of boxes in the shipment. Determine this number of boxes by using the hypergeometric table in Table 15-1. Inspect each of these boxes to ensure:

- **No** hitchhiker pests are present in the box
- **No** internal feeding insects are present in randomly selected fruit in the box
- **No** mismanifested or smuggled items are present

Table 15-1 Hypergeometric Table for Random Sampling

Total # of boxes on the truck:	Randomly select this # of boxes:
1 – 10	All boxes in the shipment
11 – 12	11
13	12
14 – 15	13
16 – 17	14
18 – 19	15
22 – 22	16
23 – 25	17
26 – 28	18
29 – 32	19
33 – 38	20
39 – 44	21
45 – 53	22
54 – 65	23
66 – 82	24
83 – 108	25
109 157	26
158 – 271	27
272 – 885	28
886 – 200,000	29

Agriculture Specialists should follow normal inspection procedures of fruits or vegetables to make these determinations (e.g., fruit should be cut to detect for internal feeders if external evidence is present).

Northern Border—Truck Cargo Procedures Summary

Sample northern border truck cargo for AQIM at the following ports (and the staffed crossings managed by these ports):

- Alexandria Bay, NY
- Blaine, WA
- Buffalo, NY
- Champlain, NY
- Detroit, MI
- Port Huron, MI

Refer to Table 15-2 for sampling details of northern border truck cargo.

Table 15-2 Northern Border Truck Cargo Procedures Summary

Item:	Definition:
Cargo population	**Commercial plant, perishable agricultural cargo** is any commercial shipment of perishable, fresh fruit, vegetables, and plants, even if stated as Canadian origin. Refer to Sampling Universe Exclusions. NOTE: commodities with mandatory cold treatment are also included. **Reefer-equipped containers: SUSPEND UNTIL FURTHER NOTICE**
Sample size	The sample size is six to twelve inspections per week per port from a **minimum** of six trucks. If the consignment consists of smaller retail units like clamshell packaging or smaller film-wrapped retail packaging or trays in boxes, select the proper sample size from the total number of clamshells, trays, etc. for inspection. Contact the National Operations Manager for Exclusion and Imports for assistance (Mikell Tanner at 919-855-7317 or email Mikell.tanner@usda.gov)
Inspection methodology	Physically inspect each truck at port or consignee premise. Refer to Table 15-3 before beginning the inspection process. Inspect cargo using appropriate AQIM hypergeometric inspection procedures. Determine the number of boxes using the hypergeometric sampling rates from Table 15-1. Select boxes for inspection from random locations throughout the truck to detect a 10% level of infestation (at 95% confidence). Inspect entire contents of boxes selected and available floor space of the truck for agricultural pests or mismanifested or smuggled items. If a bulk shipment is randomly selected for AQIM inspection and **is not loose bulk floor loaded**, determine best estimate of total number of box equivalents as if this was a boxes cargo shipment. (Using an average 10 kg (approximately 22 lbs.) box or carton as reference.) Based on the estimated number of boxes, use the hypergeometric table to determine the number of box equivalents that **must** be randomly inspected. E.g., I fa bulk shipment contains 16 bins of jalapeno peppers with total weight of 14400 kg (31,746 lbs.), the estimated box equivalent of this shipment is 1440 boxes or cartons. In this instance, the hypergeometric table indicates that a total of 29 box or carton equivalents **must** be randomly selected from the entire shipment and inspected for AQIM.
Other issues	Inspect cargo during normal port business hours. Costs for overtime clearance will be paid by the shipper/broker/consignee, or government. Advise shippers, importers, and brokers that random sampling and inspection will be part of day-to-day operations. They should understand that there is a probability that their shipment will be intensely inspected.

Table 15-3 AQIM Sampling Procedures for Multiple Commodities in Cargo

If the randomly selected AQIM consignment is:	Then:	Which Creates:
All the same perishable commodity from one origin	· APPLY hypergeometric inspection sampling to whole shipment, AND: · SELECT the appropriate number of units for inspection	One AQIM record for ARM data input
Different perishable commodities from one or multiple origins (**other than** CUT FLOWERS)	· SELECT the single commodity with the most quantity (boxes, cartons, etc.) AND; · SELECT the single commodity with the least quantity units (**must** be a **minimum** of five quantity units) · APPLY hypergeometric inspection sampling separately to each of these selections and inspect as separate AQIM samples	Two different AQIM inspection (one for each of the commodities selected) for one ARM data input

If the randomly selected AQIM consignment is:	Then:	Which Creates:
Different CUT FLOWER genera/varieties from one or multiple origins	CONSIDER **only** boxes of single variety cut flowers OR boxes of same flower composition bouquets[1]: · SELECT the cut flower genus/variety with the most quantity units (boxes, cartons, etc.) AND; · SELECT the cut flower genus/variety with the least quantity units (**must** be a **minimum** of five quantity units)[2] · APPLY hypergeometric inspection sampling separately to each of these selections and inspect as separate AQIM samples	Two different AQIM inspections (one for each of the cut flower genera selected) for one ARM data input. Record cut flower variety name and origin of the cut flower (**not** origin of flight or vessel)

Pathway Monitoring Maintenance and Quality Assurance

Port managers and local AQIM coordinators are responsible for ensuring that monitoring activities are being performed and being performed properly. To help with reviewing the status of monitoring activities, refer to Appendix E: Pathway Monitoring. This appendix contains a checklist of questions port managers and local AQIM coordinators should periodically answer to ensure proper monitoring of each designated pathway at their work locations. The questions review the following topics:

- Accurate and complete data
- Adequate sampling
- Local support
- Proportional sampling
- Random sampling
- Working risk committees

Northern Border Truck Cargo Worksheets

AQIM sampling for northern border refrigerated (reefer) truck cargo is SUSPENDED until further notice.

However, sampling will continue for nonrefrigerated northern border truck cargo. Use the Northern Border Truck Cargo data worksheet and associated instructions for recording information gathered from northern border truck cargo inspections.

Agricultural Risk Management System (ARM)

Authorized users **must** enter AQIM data into the ARM database (https://arm.aphis.usda.gov/). This web-based system is accessible from any USDA-APHIS or DHS-CBP computer.

Log in using eAuthentication. Refer to Appendix B: Key Contacts for ARM Help Desk contact information.

[1] Consider **only** bouquets in which most of its flowers are from one single flower variety, **excluding** greenery. E.g., if the bouquet's flower composition is five roses, two daisies, and one carnation (**excluding** greenery), identify the bouquet as a rose bouquet.
[2] If there are multiple commodities/cut flower varieties with five boxes each, port discretion is used to select the five-box commodity to be sampled and inspected.

Survey Results and How to Use Them

AQIM activities have been put into place to develop baseline data to help answer two basic questions:

1. What is the threat of agricultural pests approaching work locations?
2. How effective is the AQI program at managing this threat?

Results of surveys for Norther border truck cargo provided a general answer for question 1. There are varying rates at which prohibited agricultural materials and pests approach the work locations. These prohibited agricultural materials are what can have agricultural pests.

Further analysis of the monitoring data is needed to determine the risk associated with the prohibited items approaching the work location. The origin and destination of the prohibited items is important to determine risk levels.

Also, whether the prohibited item carries an actual agricultural pest is crucial in analyzing risk.

Analyses of the monitoring data need to occur at several levels of PPQ. At the work locations, PPQ personnel need to study what the data means and answer the first question for their specific work location. Analysis tools are available to help with these analyses, which are explained in the next subsection. At the same time, PPQ holds risk analysis workshops around the country to introduce risk analysis concepts. At some work locations, Risk Management Teams are formed to look at monitoring data and other data, which are normally collected at the work location.

At other locations, analyses of monitoring data occur to establish the rates at which quarantined items and agricultural pests are approaching the borders of States, areas of the country, and the United States.

Once baseline rates are well established, PPQ can use the monitoring data as a baseline to answer the second basic question: how effective is the AQI program at managing the risk of introduction of agricultural pests and diseases? Again, each work location **must** conduct this type of analysis. AQIM provides a framework which work location can use to carry out the analysis.

Questions to Guide Data Analysis

1. How many trucks were selected for sampling during the survey period?
   A. How many actions were required on the trucks sampled?
   B. How many actions by strata category sampled were there? (Previous data has multiple strata.)
   C. What is the action approach rate of trucks that require action (number of trucks requiring action divided by total trucks in the sample)?
2. How many pest interceptions (actionable pests) were made from survey samples?
   A. Pest approach rate: what is the rate of pest interceptions in relation to the total sampled number of trucks (number of trucks with actionable pests divided by total trucks in the sample)?
3. Compare the rate of actions required for each month of the survey.

   DISCUSSION:

   A. Are there easily identified trends when the rate of cargo actions transiting the work location are higher?
   B. Are there seasonal trends?
   C. Do higher rates correlate with national or religious holidays, certain types of trucks, cargo, or importers?
4. Generate a listing and frequency of shipments requiring action. Which commodities present the greater risk?

Chapter

16

Southern Border Vehicles Pathway

Contents

Background

This pathway covers passenger vehicles entering the United States via southern border crossings. Record information on a worksheet even if **no** agricultural item(s) are found.

Standard Operating Procedures

Collect random samples from the entire, noncommercial, vehicle population approaching the crossing. Sample five to ten samples per day or the required number approved based on days the port is staffed. Refer to Table 16-1 to determine the required minimum number of samples. Use a random time generator tool (e.g., random.org) to generate random sampling numbers. **Only** ports having one **or more** full time Agriculture Specialists will conduct vehicle sampling. Locations are encouraged to sample **more than** the minimum of samples per day when possible. Continue randomly collecting AQIM samples while under Code Orange or higher alerts.

Contact the National AQIM coordinator for specific sampling numbers if unable to achieve the specified sampling amounts based on the pathway instructions. Always follow established protocols through your chain of command.

Table 16-1 Sampling Protocol Based on Number of Personnel

If the # of full-time Agriculture Specialists is/are:	The sampling protocol is:
1	Minimum of 5 per day (100 per month)[1]
2 **or more**	Minimum of 10 samples per day[1]

For each AQIM sample:

- Use the 7-point inspection procedures on all vehicles and 100% hand inspection procedures of all passenger baggage and personal effects.
- Record all needed data on the appropriate AQIM data worksheet.
- Report data using ARM.

Sample southern border vehicles at the following ports (and the staffed crossings managed by these ports):

- Anzalduas, TX
- Brownsville, TX
- Calexico East, CA
- Calexico West, CA
- Columbus, NM
- Douglas, AZ
- Eagle Pass, TX
- El Paso, TX
- Hidalgo, TX
- Laredo, TX
- Los Indios, TX
- Nogales, AZ
- Otay Mesa, CA
- Pharr, TX
- Progreso, TX
- Roma, TX
- San Luis, AZ
- Santa Teresa, NM
- San Ysidro, CA
- Tecate, CA
- Ysleta, TX

Passenger Vehicle Universe

The passenger vehicle universe includes automobiles, vans, recreational vehicles, cab area of all types of noncommercial trucks, and other similar passenger type vehicles.

Inspection Criteria for the 7-Point Inspection

Inspect the following areas of all randomly selected vehicles:

[1] Locations are encouraged to sample **more than** the minimum.

1. Under hood
2. Glove compartment
3. Trunk area including side panel compartment
4. Under spare tire compartment
5. Under seats
6. All luggage and handbags
7. Other interior side panel compartments

Pest Interception Procedures

Pest interception information resulting from random sample surveys is an important factor about risk management. All quarantine material found needs to undergo 100% inspection for pests. Record all pest types and quantities found on quarantine material on pest interception form(s).

Send pest interceptions from seized items to port or area identifiers. Mark the interception "**PROMPT: SOUTHERN BORDER MONITORING**."

Safety

Maintain safe working conditions at all times. When a condition develops that challenges the safety of the Agriculture Specialist, terminate the inspection until the hazardous condition is corrected. The exercise of good judgment will dictate when these situations need to be addressed and how acceptable alternatives can be employed.

Pathway Monitoring Maintenance

Port managers and local AQIM coordinators are responsible for ensuring that monitoring activities are being performed and being performed properly. To help with reviewing the status of monitoring activities, refer to Appendix E: Pathway Monitoring. This appendix contains a checklist of questions port managers and local AQIM coordinators should periodically answer to ensure proper monitoring of each designated pathway at their work locations. The questions review the following topics:

- Accurate and complete data
- Adequate sampling
- Local support
- Proportional sampling
- Random sampling
- Working risk committees

Southern Border Vehicle Worksheet

For AQIM purposes, use the Southern Border Vehicle Data Worksheet and associated instructions for recording information gathered from southern border vehicle inspections.

Agricultural Risk Management System (ARM)

Authorized users **must** enter AQIM data into the ARM database (https://arm.aphis.usda.gov/). This web-based system is accessible from any USDA-APHIS or DHS-CBP computer.

Log in using eAuthentication. Refer to Appendix B: Key Contacts for ARM Help Desk contact information.

Survey Results and How to Use Them

AQIM activities have been put into place to develop baseline data to help answer two basic questions:

1. What is the threat of agricultural pests approaching work locations?
2. How effective is the AQI program at managing this threat?

Preliminary results for Southern border vehicle surveys provide a general answer for Question 1. That is, there are varying rates at which prohibited agricultural materials approach the work locations. These prohibited agricultural materials are what can have agricultural pests. Surveys show that at some work locations about 1% of the vehicles carried prohibited items in the past year. At other ports, surveys show that passengers and vehicles are carrying prohibited items at a higher rate, sometimes near 6%.

These percentages are a rough approximation of agricultural pest threat. Further analysis of the monitoring data is needed to determine the risk associated with the prohibited items approaching the work location. The origin and destination of the prohibited items is important to determine risk levels. Also, whether the prohibited item carries an actual agricultural pest is analyzing risk.

Analyses of the monitoring data need to occur at several levels of PPQ. At the work locations, PPQ personnel need to study what the data means and answer the first Question for their specific location. Analysis tools are available to help with these analyses which are explained in the next subsection. At the same time, PPQ holds risk analysis workshops around the country to introduce risk analysis concepts. At some work locations, Risk Management Teams are formed to look at monitoring data and other data, which are normally collected at the location.

At other locations, analyses of monitoring data occur to establish rates at which quarantined items and agricultural pests are approaching the borders of States, areas of the country, and the United States.

Once baseline rates are well established, PPQ can use the monitoring data as a baseline to answer the second basic question: How effective is the AQI program at managing the risk of introduction of agricultural pests and diseases? Again, each work location **must** conduct this type of analysis. AQIM provides a framework which work location can use to carry out the analysis.

Questions to Guide Data Analysis

The following questions are a guide for managers and Risk Management Teams to formulate information around. With the answers, valid decision can be made based on the potential risk of quarantined material and exotic pests and diseases entering a specific pathway. The value of using the monitoring data for decision making is better understood.

1. How many vehicles were selected for the sampling during the survey?
    A. How many vehicles sampled required an action (seizure or other action required as a condition of entry) during the survey?
    B. What is the action approach rate of vehicles requiring action (number of vehicles with one or more items categorized as seized or clean/treatment divided by the total number of vehicles sampled)?
    C. What is the total number of QMIs seized during the survey?
    D. How many seizures (QMIs) came from the samples during the survey?
    E. What is the QMI approach rate of vehicles with prohibited agricultural material (total number of QMIs divided by total vehicles sampled during the survey)?
2. How many pest interceptions (actionable pests) were made from survey samples?
    A. Pest approach rate: what is the rate of pest interceptions in relation to number of vehicles (number of actionable pests divided by number of vehicles in the sample)?
3. How many QMIs were plant material? Meat or animal products?
    A. What is the rate of QMIs for plant material and meat or animal products?

    DISCUSSION:

    A. Is there a greater risk from plant material or animal products at this work location?
4. How many vehicles were sampled at each crossing? What is the rate of QMI seizures at each crossing? Which crossings have a higher rate of QMIs than vehicles?

    DISCUSSION:

    A. Are these crossings staffed accordingly? AQIM data analysis provides information on which crossing is the higher risk according to the approach rate. This analysis helps determine if staff is properly allocated among the crossings. The example in Table 16-2 shows that according to the approach rates, vehicles crossing Bridge B could represent the greater risk at the work location. Staff each location according to the level of risk.

Table 16-2 Example of Number of Vehicles Samples and Approach Rate

Southern border vehicle bridges:	Vehicle sampled:	QMIs:	Approach rate (%):
A	540	15	2.7
B	360	25	6.9
C	900	30	3.3

5. What are the destinations of vehicles transiting the work location? Is local traffic (**less than** X miles from the work location) considered a high risk? What are the number of QMIs traveling to local locations versus distant locations?

    DISCUSSION:

    A. Which states are considered high risk States? How can you best select vehicles destined to these high-risk States to protect U.S. agriculture?
6. Compare the action approach rate for each month of the survey period.

DISCUSSION:

A. Are there easily identified monthly trends when the rate of QMIs transiting the work location is higher?
B. Are there seasonal trends or do higher rates correlate with national or religious holidays, beginning or end of the school year, vacation periods, etc.?
C. Do these rates correlate with traditional peak and off-peak travel times?

7. Generate a listing and frequency of items seized. What are the top five items most frequently seized? Which QMIs present the greatest risk?
8. Which vehicles (and at which crossing) were carrying prohibited items? Where were the items found in carried bags, passenger compartment, glove box, truck, luggage? Did the passenger declare all prohibited items? Was the passenger traveling alone, as a couple, or family? What was the reason for travel? Business, vacation, visit family, tour group, school? What type of vehicle was used to transport prohibited items?

DISCUSSION:

A. How do current selectively factors compare with survey results?
B. What selectivity factors could be changed or added to identify vehicles carrying prohibited items?
C. What percentage of resources are dedicated to staffing AQI activities for southern border vehicles at the work location?

Chapter

17

Southern Border Truck Cargo Pathway

Contents

Background

The cargo population, or sampling universe, for AQI monitoring in the southern border truck cargo pathway is defined as commercial plant perishable agricultural cargo. Take random samples from this population with more intensive (hypergeometric) inspections. Record necessary data about these commodities.

To properly monitor cargo, you need to have a good understanding of two key statistical principles:

1. It is important that the sample selected be representative of the commodity. Random selection helps ensure this.
2. Once the sample is selected, inspect the sample thoroughly and according to hypergeometric sampling procedures if applicable.

If you want your work location to produce quality risk information, then each person participating **must** have a clear understanding of the sampling universe, the unit of sampling, and inspection consistency issues.

The Sampling Universe

Estimate the number of actions due to pests or improperly manifested items in a cargo entry pathway by taking random samples from the cargo in the pathway. It is key to good statistics to carefully define this universe from which you want to draw your random sample. Answer the following questions to select the sample correctly and to make statistical inferences for the entire universe.

- How are commodities transported?
- How many shipments of these commodities are arriving at a work location?
- What is the seasonality of the commodity?

For AQIM, the universe is defined by the mode of transport of the cargo, in this case, the truck.

Sampling Universe Exclusions

Initially, PPQ has decided to limit the universe. The following commodities or commodity types will be excluded from the sampling universe:

- Border Release Advance Screening and Selectivity (BRASS) released cargo
- Commodities precleared at foreign sites
- Commodities admissible under the National Agriculture Release Program (NARP)
- Commodities that undergo some type of mandatory treatment, **other than** cold treatment (e.g., fumigation, irradiation, hot water treatment) at work locations
- Frozen commodities
- Loose, bulk-loaded perishable cargo (floor loaded on the truck bed; **no** boxes, crates, cartons, bags, etc. used for commodity containment)
- Oil, salt, iron ore, coal, etc., that have **no** pest risk
- Seed shipments
- Transportation and exportation (T&E) cargo

Cargo Strata and Stratifying the Sample

The sampling and inspection processes for AQIM were designed to be compatible with typical cargo inspection groupings. The cargo universe is divided into several homogeneous and distinctly separate groups to estimate the pest approach rates in each group. A port may be sampling one or more of the commodities in a group or across groups. With southern border cargo, the universe is the commercial plant perishable agricultural cargo. This category is defined as any commercial formal or informal entry of fresh fruit, vegetables, or other unprocessed or nonrefined plant product.

By sampling a set number of samples from each cargo group, PPQ can get precise estimates of the number of trucks with pests approaching the border. This risk information helps the work location understand how effectively it manages the pest risk for this category, as well as for the entire cargo universe at the port.

It is very important that each sample selected be representative of all other units of that category. All shipments of a category should have a chance of being selected as a sample. One way to ensure that the sample is representative is to choose a truck at random (either random time, random number, etc.). This random selection process eliminates the bias of the Agriculture Specialist selecting the sample. The Agriculture Specialist's experience (bias) might lead to choosing a truck that is carrying a commodity more likely to be harboring a pest. This bias would make the sample **not** representative of the entire commodity universe. The survey results would be skewed toward commodities likely to harbor a pest. This kind of bias would hamper the work location's ability to make the best decisions based on risk analysis.

Setting Up a Process

Setting up a process of selecting representative samples in each group will be one of the biggest challenges in AQIM. Because each work location has its own unique set of circumstances in cargo operations, the work location **must** individualize its random sampling process. Document the process and, if needed, ask for feedback from other work locations, the AQIM coordinator, or port operations staff who have experience in selecting random samples in the cargo environment.

The Sampling Unit

For southern border truck cargo, the sample unit is the truck box containing the commodity, **not** including the cab. It is crucial that the sample unit is inspected closely enough to detect any actionable pests or improperly manifested items. Southern border truck cargo sampling and inspection procedures are detailed in Table 17-2. Procedures for sampling multiple commodities on the selected truck are detailed in Table 17-3.

Contact the National AQIM coordinator for specific sampling numbers if unable to achieve the specified sampling amounts based on the pathway instructions. Always follow established protocols through your chain of command. Follow the procedures exactly for the monitoring estimates to be valid and useful.

Data Collection Consistency

Record the monitoring results from the inspection of a random sample unit accurately and consistently. Because each sample represents many other units, all Agriculture Specialists **must** be as consistent as possible in following the inspection procedures.

Regulated commodities pose a special challenge. If the sample selected is a regulated commodity, it is important to understand the following:

Cargo monitoring estimates the number of trucks approaching the work location with commodity pest infestation levels requiring action by PPQ. AQIM uses risk-based inspection procedures for detecting a 10% **or more** pest infestation rate. This initial threshold is used to estimate the number of trucks with a pest threat approaching a work location.

NOTICE

This 10% infestation level may change as the data for AQIM is collected and analyzed.

To be 95% sure the Agriculture Specialist inspecting the sampled truck will find the pest, when the shipment is infested at a 10% or more infestation level, the Agriculture Specialist **must** select, at random, a specific number of boxes in the shipment. Determine this number of boxes by using the hypergeometric table in Table 17-1. Inspect each of these boxes to ensure:

- **No** hitchhiker pests are present in the box
- **No** internal feeding insects are present in randomly selected fruit in the box
- **No** mismanifested or smuggled items are present

Table 17-1 Hypergeometric Table for Random Sampling

Total # of boxes on the truck:	Randomly select this # of boxes:
1 – 10	All boxes in the shipment
11 – 12	11
13	12
14 – 15	13
16 – 17	14
18 – 19	15
22 – 22	16
23 – 25	17
26 – 28	18
29 – 32	19
33 – 38	20
39 – 44	21
45 – 53	22
54 – 65	23
66 – 82	24
83 – 108	25
109 157	26
158 – 271	27
272 – 885	28
886 – 200,000	29

Agriculture Specialists should follow normal inspection procedures of the commodities to determine if pests are present (e.g., fruit should be cut to detect internal feeders if external evidence is present).

Southern Border—Truck Cargo Procedures

Sample southern border truck cargo for AQIM at the following ports (and the staffed crossings managed by these ports):

- Brownsville, TX
- Calexico West, CA[1]

[1] Sampling is suspended until further notice.

- El Paso, TX
- Laredo, TX[1]
- Los Indios, TX
- Nogales, AZ[1]
- Otay Mesa, CA[1]
- Pharr, TX[1]
- San Luis, AZ[1]

Refer to Table 17-2 when sampling and inspecting southern border truck cargo commodities for AQIM.

Table 17-2 Southern Border Truck Cargo Procedures Summary

Item:	Definition:
Cargo population	**Commercial plant, perishable agricultural cargo** is any commercial shipment of perishable, fresh fruit, vegetables, and plants, even if stated as Canadian origin. Refer to Sampling Universe Exclusions. NOTE: commodities with mandatory cold treatment are also included. **Reefer-equipped containers: SUSPEND UNTIL FURTHER NOTICE**
Sample size	The sample size is six to twelve inspections per week per port from a **minimum** of six trucks. If the consignment consists of smaller retail units like clamshell packaging or smaller film-wrapped retail packaging or trays in boxes, select the proper sample size from the total number of clamshells, trays, etc. for inspection. Contact the National Operations Manager for Exclusion and Imports for assistance (Mikell Tanner at 919-855-7317 or email Mikell.tanner@usda.gov)
Inspection methodology	Physically inspect each truck at port or consignee premise. Refer to Table 17-3 before beginning the inspection process. Inspect cargo using appropriate AQIM hypergeometric inspection procedures. Determine the number of boxes using the hypergeometric sampling rates from Table 17-1. Select boxes for inspection from random locations throughout the truck to detect a 10% level of infestation (at 95% confidence). Inspect entire contents of boxes selected and available floor space of the truck for agricultural pests or mismanifested or smuggled items.
	If a bulk shipment is randomly selected for AQIM inspection and **is not loose bulk floor loaded**, determine best estimate of total number of box equivalents as if this was a boxes cargo shipment. (Using an average 10 kg (approx. 22 lbs.) box or carton as reference.) Based on the estimated number of boxes, use the hypergeometric table to determine the number of box equivalents that **must** be randomly inspected. E.g., I fa bulk shipment contains 16 bins of jalapeno peppers with total weight of 14400 kg (31,746 lbs.), the estimated box equivalent of this shipment is 1440 boxes or cartons. In this instance, the hypergeometric table indicates that a total of 29 box or carton equivalents **must** be randomly selected from the entire shipment and inspected for AQIM.
Other issues	Inspect cargo during normal port business hours. Costs for overtime clearance will be paid by the shipper/broker/consignee, or government. Advise shippers, importers, and brokers that random sampling and inspection will be part of day-to-day operations. They should understand that there is a probability that their shipment will be intensely inspected.

Table 17-3 AQIM Sampling Procedures for Multiple Commodities in Cargo

If the randomly selected AQIM consignment is:	Then:	Which Creates:
All the same perishable commodity from one origin	· APPLY hypergeometric inspection sampling to whole shipment, AND: · SELECT the appropriate number of units for inspection	One AQIM record for ARM data input
Different perishable commodities from one or multiple origins (**other than** CUT FLOWERS)	· SELECT the single commodity with the most quantity (boxes, cartons, etc.) AND; · SELECT the single commodity with the least quantity units (**must** be a **minimum** of five quantity units) · APPLY hypergeometric inspection sampling separately to each of these selections and inspect as separate AQIM samples	Two different AQIM inspection (one for each of the commodities selected) for one ARM data input
Different CUT FLOWER genera/varieties from one or multiple origins	CONSIDER **only** boxes of single variety cut flowers OR boxes of same flower composition bouquets[2]: · SELECT the cut flower genus/variety with the most quantity units (boxes, cartons, etc.) AND; · SELECT the cut flower genus/variety with the least quantity units (**must** be a **minimum** of five quantity units)[3] · APPLY hypergeometric inspection sampling separately to each of these selections and inspect as separate AQIM samples	Two different AQIM inspections (one for each of the cut flower genera selected) for one ARM data input. Record cut flower variety name and origin of the cut flower (**not** origin of flight or vessel)

Pathway Monitoring Maintenance and Quality Assurance

Port managers and local AQIM coordinators are responsible for ensuring that monitoring activities are being performed and performed properly. To help with reviewing the status of monitoring activities, refer to Appendix E: Pathway Monitoring. This appendix contains a checklist of questions port managers and local AQIM coordinators should periodically answer to ensure proper monitoring of each designated pathway at their work locations. The questions review the following topics:

- Accurate and complete data
- Adequate sampling
- Local support
- Proportional sampling
- Random sampling
- Working risk committees

Southern Border Truck Cargo Worksheet

For AQIM purposes, use the Southern Border Truck Cargo Data Worksheet and associated instructions for recording information gathered from southern border truck cargo inspection. Properly record the commodity being inspected.

[2] Consider **only** bouquets in which most of its flowers are from one single flower variety, **excluding** greenery. E.g., if the bouquet's flower composition is five roses, two daisies, and one carnation (**excluding** greenery), identify the bouquet as a rose bouquet.
[3] If there are multiple commodities/cut flower varieties with five boxes each, port discretion is used to select the five-box commodity to be sampled and inspected.

Agricultural Risk Management System (ARM)

Authorized users **must** enter AQIM data into the ARM database (https://arm.aphis.usda.gov/). This web-based system is accessible from any USDA-APHIS or DHS-CBP computer.

Log in using eAuthentication. Refer to Appendix B: Key Contacts for ARM Help Desk contact information.

Survey Results and How to Use Them

AQIM activities have been put into place to develop baseline data to help answer two basic questions:

1. What is the threat of agricultural pests approaching work locations?
2. How effective is the AQI program at managing this threat?

There are varying rates at which prohibited agricultural materials and pests approach the work locations. These prohibited agricultural materials are what can have agricultural pests.

Further analysis of the monitoring data is needed to determine the risk associated with the prohibited items approaching the work location. The origin and destination of the prohibited items is important to determine risk levels. Also, whether the prohibited item carries an actual agricultural pest is crucial in analyzing risk.

Analyses of the monitoring data need to occur at several levels of PPQ. At the work locations, PPQ personnel need to study what the data means and answer the first question for their specific work location. Analysis tools are available to help with these analyses, which are explained in the next subsection. At the same time, PPQ holds risk analysis workshops around the country to introduce risk analysis concepts. At some work locations, Risk Management Teams are formed to look at monitoring data and other data, which are normally collected at the work location.

At other locations, analyses of monitoring data occur to establish the rates at which quarantined items and agricultural pests are approaching the borders of States, areas of the country, and the United States.

Once baseline rates are well established, PPQ can use the monitoring data as a baseline to answer the second basic question: How effective is the AQI program at managing the risk of introduction of agricultural pests and diseases? Again, each work location **must** conduct this type of analysis. AQIM provides a framework which work location can use to carry out the analysis.

Questions to Guide Data Analysis

1. How many trucks were selected for sampling during the survey period?
    A. How many actions were required on the trucks sampled?
    B. How many actions by strata category sampled were there? (Previous data has multiple strata.)
    C. What is the action approach rate of trucks that require action (number of trucks requiring action divided by total trucks in the sample)?
2. How many pest interceptions (actionable pests) were made from survey samples?
    A. Pest Approach Rate: What is the rate of pest interceptions in relation to the total sampled number of trucks (number of trucks with actionable pests divided by total trucks in the sample)?
3. Compare the rate of actions required for each month of the survey

    DISCUSSION:

    A. Are there easily identified trends when the rate of cargo actions transiting the work location are higher?
    B. Are there seasonal trends?
    C. Do higher rates correlate with national or religious holidays, certain types of trucks, cargo, or importers?
4. Generate a listing and frequency of shipments requiring action. Which commodities present the greater risk?
    A. Which commodities most likely to require action? Where were the agricultural pests found? What is the rate of trucks with smuggled or mismanifested items?

    DISCUSSION:

    A. How effective is the current tailgate inspection process in detecting pests and/or smuggled cargo?
5. What types of shipments (refrigerated, mixed vegetables, dry containers, empties, cut flowers, express carriers, etc.) require higher rates of action?

    DISCUSSION:

    A. What selectivity factors are currently used to identify shipments likely to require action?
    B. What additional selectivity factors would be used to identify shipments likely to require action?
    C. Do the survey results indicate additional factors that help identify shipments most likely to require action?
6. Using monitoring data, apply the survey results to the cargo universe at the work location to estimate the number of actions required and interceptions likely to transit the work location during the same time the survey period took place
    A. How many trucks arrived at the work location during the survey period? Using the action approach rate for trucks requiring action, calculate an estimate of the number of trucks transiting the work location that are likely to require action.

B. Using WAD data, how does the estimated number of actions required compare with the reported number of actions taken?
C. How many additional actions may have been required during the survey period?
D. How does the estimated number of actionable pest interceptions compare with the reported number of actionable pests on WAD for truck cargo?

DISCUSSION:

A. What percentage of resources are dedicated to staffing AQI activities for southern border truck cargo at the work location?
B. What is the relative risk of this pathway compared with other pathways in the work location?
C. Should resources be reallocated among all the pathways in the work location to better address the relative risk of the pathways?

Appendix

A

Government Performance Results Modernization Act of 2010

Refer to the following link for the complete GPRA Modernization Act:

Government Performance Results Modernization Act of 2010.

Appendix

B

Key Contacts

Contents

Responsibilities of Work Locations

Work locations where AQIM is conducted are responsible for the following AQIM activities:

- Analyze the data collected
- Collect all results monitoring data
- Develop performance target, using selected indicators
- Ensure quality data and analysis
- Enter all data into ARM
- Prepare budget documents and reports request by other USDA offices
- Set program and meeting end-results

Agricultural Risk Management System (ARM) Technical Questions/Issues

Authorized users **must** enter AQIM data into the ARM database (https://arm.aphis.usda.gov/). For assistance with ARM web-based systems, APHIS and DHS-CBP employees **must** contact the ARM Helpdesk by email ARM-helpdesk@usda.gov or by phone 301-851-2252. Hours of operation are 0800-2200 EST Monday through Friday.

For URGENT (cargo on hold) matters, include “URGENT-APHIS-PPQ ARM Application Issue” in the email subject line. This web-based system is accessible from any USDA-APHIS or DHS-CBP computer. Log in using eAuthentication.

AQIM Operational and Policy Questions/Issues

PPQ Field Operations via email: aqi.db.admin@aphis.usda.gov.

PPQ Policy Headquarters: Edna Cintron-Velazquez, 240-454-1835 or email QPAS-AQIM@usda.gov.

Appendix

C

Trade Articles

Contents

Introduction

Use this appendix to obtain information and criteria on risk management. Contained here are the:

- APHIS Trade Risk Analysis Position
- GATT Agreement on the Application of Sanitary and Phytosanitary Measures

APHIS Trade Risk Analysis Position[1]

Introduction

The Animal and Plant Health Inspection Serviced (APHIS) anticipates and responds to U.S. issues that involve animal and plant health, conflicts with wildlife, environmental stewardship, and animal well-being. With our customers and stakeholders, we promote the health of animal and plant resources to facilitate their movement in the global marketplace and to ensure abundant agricultural products and services for American consumers.

An important component of the APHIS mission is to facilitate the safe movement of import and export commodities. APHIS uses risk analysis to make trade decisions in a risk assessment (the scientific evaluation of the biological risks and potential consequences), risk management (a process of determining appropriate mitigation measures to reduce risk), and risk communication (the sharing of risk information). The results of risk analyses provide well supported recommendations to APHIS decision makers to achieve the objective of facilitating safe trade.

The Agreement on Sanitary and Phytosanitary Measure of the General Agreement on Tariffs and Trade requires that countries base their animal, plant, and human health requirements related to trade on relevant international standards. If appropriate standards **do not** exist, or a country chooses **not** to use the existing international standards, then the Agreement requires that the regulatory authorities of the importing country base their import requirements on a scientific risk analysis.

Like many in the international trade community, APHIS holds the view that mutually accepted standards will help ensure safe trade that is consistent, fair, enhances economic prosperity and reduces trade tensions. APHIS is committed to an active role in the International Office of Epizootics, the International Plant Protection Convention, and other international standard setting bodies to further the development of risk analysis standards and guidelines.

APHIS recognizes that risk analysis is a dynamic process and therefore **must** retain sufficient flexibility to incorporate scientific advances. APHIS is committed to revising risk analysis procedures, as appropriate, to continually take advantage of the best available science.

The Agreement on Sanitary and Phytosanitary (SPS) Measures of the General Agreement on Tariffs and Trade (GATT) requires members to base their animal, plant, and human health requirements related to trade on an objective analysis of risk. The SPS Agreement also requires that members make their risk analysis procedures transparent and available to other interested members.

To address the issue of transparency under the SPS Agreement, this document provides an overview of the risk analysis process used by the Animal and Plant Health Inspection Service (APHIS) of the United States Department of Agriculture.

APHIS has a long history of practical experience and knowledge related to risk analysis. Considerable time and resources have been invested in refining risk analysis models and techniques as well as developing new ones. APHIS also actively supports and participates in international discussions to further the development of risk analysis standards and procedures related to trade.

[1] APHIS Trade Committee, Trade Risk Analysis Core Team, 1996.

APHIS and Risk Assessment

Risk analysis, as defined by APHIS, is equivalent to risk assessment as defined in the SPS Agreement. The APHIS risk analysis definition and subsequent explanations provide additional detail and interpretation of the SPS risk assessment definition.

The SPS Agreement defines risk assessment as:

> "The evaluation of the likelihood of entry, establishment or spread of a pest or disease within the territory of an importing Member according the sanitary or phytosanitary measure which might be applied, and of the associated potential for adverse effects on human or animal health arising from the presence of additives, contaminants, toxins, or disease-causing organisms in food, feedstuffs and beverages."

APHIS defines risk analysis as a process comprised of risk assessment (the scientific evaluation of the biological risks and potential consequences), risk management (a process of determining appropriate mitigation measures to reduce risk), and risk communication (the sharing of risk information). The results of APHIS risk analyses provide well supported recommendations to APHIS decision makers to achieve the objective of facilitating safe trade.

APHIS believes its definition is fully consistent with the SPS Agreement. The documentation of this process provides risk analysts with guidance in the preparation of recommendations for decision makers and makes the process more transparent to our trading partners.

APHIS Risk Analysis Principles

APHIS recognizes that there are various approaches to risk analysis. The selection of the approach depends on the circumstances associated with the commodity and the current pest or disease information.

Regardless of the approach, APHIS believes that a credible risk analysis process **must** embody the following principles:

- Flexible
- GATT Consistent
- Open to Review
- Science based
- Well documented

GATT Consistent

APHIS risk analysts understand and comply with GATT SPS terms and principles and produce agency recommendations that can withstand ATT/ World Trade Organization (WTO) challenges. Compliance with the SPS Agreement also means that APHIS is committed to using relevant standards of the International Office of Epizootics, the International Plant Protection Convention, or other relevant international or regional organizations recognized by the WTO. Alternatives to the standards may be used when supported by objective risk analyses.

Science Based

Data used in APHIS risk analyses are collected and evaluated using the best available scientific methods. Also, APHIS analysts recognize the importance of describing uncertainty and

identifying data gaps. APHIS analysts actively solicit input and review from the scientific community to the extent necessary to confirm the scientific integrity of risk analysis.

Well Documented

Data used in the risk analysis are organized, evaluated, and referenced in a systematic manner and in sufficient detail to allow interested parties to understand the process.

Flexible

Because of the pest and disease situations evaluated using risk analysis, methods that apply to one situation may be irrelevant or misleading in evaluating another. While acknowledging that various methods can be used, APHIS analysts are able to articulate the rationale for the choice of a method. Flexibility also means that the risk analysis process is dynamic and able to accommodate new information and technology.

Open to Review

APHIS acknowledges its responsibility to document the risk analysis process and allow interested parties to provide relevant scientific information and comments on the process and results.

Components of the APHIS Process for Risk Analysis

When initiating a risk analysis because action is proposed, such as a commodity importation or other relevant event, APHIS analysis will identify and record background information and situation-specific details, such as the source of the request, the origin, proposed destination, and intended use for the commodity. The analysis then proceeds following the general process outlined below.

Risk Assessment

APHIS defines risk assessment as the evaluation of the likelihood and the biological and economic consequences of entry, establishment or spread of a pest or disease agent within the territory of an importing country. Risk assessments also consider the degree of uncertainty associated with a proposed action.

The degree of uncertainty depends upon the availability and quality of pest/ disease data. An agent for which little is known cannot be as precisely assessed as one for which much more relevant information is available. A high degree of biological uncertainty, because of limited scientific information, may justify conservative estimate. However, APHIS also recognized the importance of updating risk assessments as additional scientific information becomes available.

A risk assessment evaluates the unmitigated pest or disease risk to determine if there is sufficient risk to warrant mitigation. The focus is on establishing the existence of biological and economic consequences and the likelihood of their occurrence. In many cases, there is broad agreement concerning this risk, negating the need for formal risk assessment.

Formal risk assessments are conducted when the unmitigated risk is **not** clearly understood to be wither acceptable or unacceptable. These assessments are also important when assumptions concerning the level of unmitigated risk are challenged or when new information concerning the unmitigated risk has been provided. The assessment of risk at this level typically involves the evaluation of origin, commodity, and destination factors.

Origin risk factors: the evaluation of the exports is to estimate the likelihood that agents of sanitary or phytosanitary concern are associated with a commodity importation, including:

- Geographic and environmental characteristics
- Prevalence of a pest or disease agent in the exporting area
- Previous risk assessments (including foreign country) on commodity and related commodities from the same origin
- Regulatory infrastructure of the exporting country
- Sanitary and phytosanitary status of the adjoining or neighboring areas
- Surveillance system(s)
- Trading partners and practices

Commodity risk factors: APHIS analysts consider information about the commodity to estimate the likelihood of introduction of a particular pest or disease agent. Commodity factor include:

- Intended use of the product
- Interception data
- Nature of raw material used to produce commodity
- Pest or disease agent survival in transit
- Type of class of commodity

Destination risk factor: an evaluation of the likelihood and consequences of a particular pest or disease agent surviving, multiplying, establishing, and spreading in the territory of the importing country. Destination factors include:

- Availability of susceptible host and/or competent vectors
- Distribution of the commodity
- Geographical and environmental characteristics

Risk Management

APHIS defines risk management as the process of analyzing and recommending options for mitigating pest and disease agents of concern identified through risk assessment.

In determining appropriate levels of protections, the SPS Agreement requires that countries base their animal, plant, and human health requirements on relevant international standards. If an appropriate standard does **not** exist or a country chooses **not** to use an existing standard, then the Agreement requires regulatory authorities of the importing country to base their health requirements on a scientific analysis of the risks to animal, plant, or human health and to share information regarding the analyses with interested parties.

The analysis risk mitigation options may vary due to the differing nature of animal, plant, and human health issues.

Consistent with SPS Agreement, APHIS maintains transparent processes for objectively evaluating new risk mitigation alternatives in situations where an international standard may **not** exist or may **not** be appropriate. In evaluating these alternatives, APHIS will consider biological as well as economic factors including, but **not** limited to, potential damage in terms of loss of production or sales in the event of entry, establishment or spread of a pest or disease; the costs of control or eradication in the territory of the importing Member; and the relative cost effectiveness of alternative approaches to risk eradication.

APHIS recognizes the responsibility of the exporting country to address the importing country's sanitary and Phytosanitary issues of concern. APHIS approves risk management options based on a comprehensive evaluation of the efficacy and feasibility of the option in reducing the likelihood and magnitude of the biological and economic consequences identified in the risk assessment.

Efficacy: the degree to which a mitigation option reduces the likelihood magnitude of adverse biological and economic consequences is a measure of its efficacy. Evaluating mitigation options for efficacy is an iterative process that involves revisiting risk assessment to determine the degree to which risk is reduced by the implementation of the option. In cases where an acceptable efficacious option exists, the efficacy of new options needs to compare favorably with existing options.

Feasibility: the evaluation of mitigation options for feasibility normally focuses on technical, operational, and economical factors affecting the implementation of mitigation options. It is in this level of evaluation that factors relevant to industry needs and practices are considered, as well as the potential for applying new technologies.

This level of evaluation is a responsibility shared primarily by the exporting country and the commercial sector (industry). APHIS assumes that feasibility has been considered when a risk management proposal is offered by the exporting country. The role of APHIS in this level of evaluation is to assess whether the exporting country can meet its obligations and to ensure that undesirable impacts are **not** placed upon the United States (e.g., at National level).

APHIS recognizes that information to objectively determine tolerable risk levels may **not** always be readily available. In accordance with the SPS Agreement, APHIS adheres to the premise that it may be necessary to institute provisional sanitary and phytosanitary measures until scientific evidence can be obtained to justify a different position.

APHIS is committed to working with relevant parties to obtain and evaluate this information in a timely manner. APHIS is committed to ensuring that recommended measure are **not** more trade restrictive than required to achieve their appropriate level of sanitary and phytosanitary protection.

Risk Communication

APHIS defines risk communication as the process of exchanging information concerning risk with interested parties (e.g., domestic and foreign industry groups, foreign governments, consumer groups, and other interested individuals). This includes the active exchange of information throughout the risk analysis process with involved parties and the communication of the conclusions of risk analyses to all interested and impacted parties. This process includes routine interaction with the scientific community to ensure the validity of scientific data, methods, and assumptions.

When risk analysis is used as a basis for promulgating regulations, APHIS meets risk communication goals and transparency obligations by publishing proposed and final rules in the Federal Register. APHIS demonstrates its commitment to transparency by notifying the WTO of any measure which may affect another country's trade.

New proposed regulatory changes published in the Federal Register specify the risks and the requirements which will be imposed to mitigate the risks. After public comments are received

and reviewed a decision is made regarding a final result. If comments and input are compelling enough for APHIS to change its position, the proposed rules will be withdrawn and alternative courses of action may be considered. Both the proposed and final rules explain the factors supporting the agency's choice of mitigation measures, including the agency's geological concerns and scientific rationale to support the decision.

Conclusion

APHIS considers the product of risk analysis to be risk-based recommendations. Decision makers take those recommendations into account as well as other factors they may consider relevant.

GATT Agreement on the Application of Sanitary and Phytosanitary Measures[2]

Assessment of Risk and Determination of the Appropriate Level of Sanitary or Phytosanitary Protection

1. Members shall ensure that their sanitary or phytosanitary measures are based on an assessment, as appropriate to the circumstances, of the risk to human, animal or plant life or health, considering risk assessment techniques developed by the relevant international organizations.
2. In the assessment of risks, Members shall consider available scientific evidence; relevant processes and production methods; relevant inspection, sampling and testing methods; prevalence of specific diseases or pests; existence of pest or disease-free areas; relevant ecological and environmental conditions; and quarantine or other treatment.
3. In assessing the risk to animal or plant life or health and determining the measure to be applied for achieving the appropriate level of sanitary or phytosanitary protection from such risk, Member shall take into account relevant economic factors: the potential damage in terms of loss of productions or sales in the event of the entry; establishment or spread of a pest or disease; the costs of control or eradication in the territory of the importing Member; and the relative cost-effectiveness of alternative approaches to limiting risks.
4. Member should, when determining the appropriate level of sanitary or phytosanitary protection, consider the objective minimizing negative trade effects.
5. With the objective achieving consistency in the application of the concept of appropriate level of sanitary or phytosanitary protection against risks to human life or health, or to animal and plant life or health, each Member shall avoid arbitrary or unjustifiable distinctions in the levels it considers to be appropriate in different situations, if such distinctions result in discrimination or a disguised restriction on international trade. Member shall cooperate in the Committee, in accordance with paragraphs 1, 2, and 3 of Article 12, to develop guidelines to further the practical implementation of this provision. In developing the guidelines, the Committee shall consider all relevant factors, including the exceptional character of human health risks to which people voluntarily expose themselves.
6. Without prejudice to paragraph 2 of Article 3, when establishing or maintaining sanitary or phytosanitary measures to achieve the appropriate level of sanitary or phytosanitary

[2] GATT Agreement on the Application of Sanitary and Phytosanitary Measures.

protection, Members shall ensure that such measures are **not** more trade-restrictive than required to achieve their appropriate level of sanitary or phytosanitary protection, considering technical and economic feasibility.

7. In cases where relevant scientific evidence is insufficient, a member may provisionally adopt sanitary or phytosanitary measures based on available pertinent information, including that from the relevant international organizations, as well as from sanitary or phytosanitary measures applied by other Members. In such circumstance, Member shall seed to obtain the additional information necessary for a more objective assessment of risk and review the sanitary or phytosanitary measure accordingly within a reasonable period.
8. When a Member has reason to believe that a specific sanitary or phytosanitary measure introduced or maintained by another Member is constraining, or has the potential to constrain its exports and the measure is **not** based on the relevant international standards, guidelines, or recommendations, or such standards, guidelines, or recommendations **do not** exist, an explanation of the reasons for such sanitary or phytosanitary measure may be requested and shall be provided by the Member maintaining the measure.

Appendix

D

Standard Operating Procedure

Contents

Introduction

Every work location participating in the AQIM Program must develop a standard operating procedure (SOP) for each pathway, and it must include the following parts. Each location's SOP will be written using their preferred format and taking into consideration their working facilities and the operation.

1. Purpose and Background

To help PPQ become a result-oriented organization, PPQ uses AQI program performance information to make risk-based decisions. AQIM will provide "hard" data for risk-based decisions and to meet the requirements of the Government Performance and Results Act (GPRA).

The National Performance Review requires government agencies to objectively measure how well they are achieving their legislative missions. The GPRA requires government agencies to develop accurate performance measurements as part of their budget submission. AQIM is a valuable tool in performing risk assessment and is an integral component of PPQ's selectivity approach.

2. Points of Contact

AQIM local coordinator name and contact information

3. Sampling and Inspection Procedures

Provide the steps that **must** be followed to ensure randomness in the sample selection and inspection processes.

Use the information for the appropriate pathway as guidance when developing the steps to be followed for sampling and inspection. Each pathway participating in the AQIM Program has their own inspection protocol.

4. Data Collection and Data Entry

Complete the AQIM worksheet for each inspection and enter the information into the ARM database (https://arm.aphis.usda.gov/). Ensure the ARM record is completed with all the necessary information and closed.

5. Pest Interception Procedures

Pest interception information resulting from random sample surveys is an important factor regarding risk management. Provide the steps that **must** be followed when a pest is found during the AQIM inspection. All quarantine material found during the AQIM inspection must be 100% inspected for pests. Record all pests found on the appropriate form. Send pest interception to port or area identifiers. After the pest identification has been determined, ensure the AQIM inspection record in ARM is finished and closed in the system.

The following are examples of SOPs. These are **only** examples. The SOPs do **not** need to exactly follow this format.

Example for Air Passenger Baggage

Purpose and Background

PPQ uses AQI program information to make risk-based decisions. AQIM will provide "hard" data for risk-based decisions and to meet the requirements of the Government Performance and Results Act (GPRA).

The GPRA requires government agencies to develop accurate performance measurements as part of their budget submission. AQIM is a valuable tool in performing risk assessment and is an integral component of PPQ's selectivity approach.

Points of Contact

(List the names and contact information of the staff coordinating the AQIM program)

Sampling and Inspection Procedures

Sampling

Select random times each day using a random time generator (i.e., random.org). The site monitoring leaders prepare the daily schedule and notify all working on the baggage floor of the designated times.

Rotate all inspections among all personnel. At the designated time, the Agriculture Specialist or technician at concourse 'E' responsible for selecting the passenger for inspection will select the fifth passenger back from the checkpoint.

Alternate between all open red and green lines when counting to select the fifth passenger. If the passenger selected has already been designated to go to PPQ Secondary, the passenger will also be included in the sample.

At terminal 'B' at the designated time, the CBP-Agriculture Specialist will select the first passenger that enters the baggage carousel area. Mark the selected passenger's declaration with the random time, the work 'random' and 'USDA' with a green marker.

If a random inspection is missed, a passenger may be selected using the above procedures any time prior to the next random inspection. Make a note on the data form each time an inspection is missed. Include a brief note as to why the inspection was missed.

Inspection

Ensure that every passenger's hand-carried and checked baggage is 100% inspected; this inspection must be done by hand. Do **not** use the x-ray machine for the inspection. Bag and label all seizures as an AQIM QMI. Thoroughly inspect the seized/intercepted material for pests.

All members of a household on the same Customs declaration (CBP Form 6059-B) will be examined and counted as one sample. Customs declarations are completed orally, on paper, or electronically. Adjust sampling procedures accordingly.

Inspect every Customs declaration that approaches the work location through the Federal Inspection Service (FIS) areas, excluding diplomats with A-1, A-2 status, and "domestic" declarations.

Make sure to inspect 10 samples per day per terminal. Example—sample size: 7,300 declarations per year—3,650 declarations per year at both "E" and "B" (10 per day at both "E" and "B").

AQIM should **not** interfere with and **does not** replace normal passenger processing operations. Continue to perform secondary examinations during this sampling period.

Data Collection and Data Entry

Complete the AQIM worksheet for each inspection and enter the information into the ARM database (https://arm.aphis.usda.gov/). Ensure the ARM record is completed with accurate information and closed. Ensure the recorded information is spelled correctly.

Pest Interception Procedures

Pest interception information resulting from random sample surveys is an important factor regarding risk management. Provide the steps that **must** be followed when a pest is found during the AQIM inspection. All quarantine material found during the AQIM inspection must be 100% inspected for pests. Record all pests found on the appropriate form. Send pest interception to port or area identifiers. Identify the interception as "PROMPT: pathway type," e.g., "PROMPT: Northern Border Vehicles." After the pest identification has been determined, ensure the AQIM inspection record in ARM is finished and closed in the system.

Example for Maritime Cargo

Purpose and Background

This SOP is to help U.S. Customs and Border Protection (CBP) Agricultural Quarantine Inspection (AQI) in (location's name) cargo environment to become result oriented. The AQIM provides "hard" data for risk-based decisions and to meet the requirements of the Government Performance and Results Act (GPRA).

The GPRA requires government agencies to develop accurate performance measurements as part of their budget submission. AQIM is a valuable tool in performing risk assessment and is an integral component of PPQ's selectivity approach.

Points of Contact

CBP-Ag Specialist Joe Cruise
AQIM Program Coordinator
joe.cruise@cbp.dhs.gov

Sampling and Inspection Procedures

Inspection

The inspection protocol depends on the type of strata a container falls into. Each container is required to have a physical inspection of the commodity.

Exclusions:

- Commodities admissible according to the National Agriculture Release Program (NARP)
- Commodities that are precleared at foreign sites
- Frozen commodities and those undergoing some type of mandatory treatment (e.g., fumigation, irradiation, hot water, steam sterilization)
- Non-reefer AQI interest that can be cleared with just a paperwork review
- Oil, salt, iron ore, coal, etc., which pose no risk

Commodities with mandatory cold treatments are included.
Monitor the following cargo categories:

- Commercial perishable agricultural cargo (defined as any commercial shipment of fresh fruit, vegetables, and cut flowers)
- Wood packaging material (WPM)
- Italian tile container cargo

Sampling

Sampling unit: the random sampling unit is one container or container unit. A container unit is equivalent to 20 pallets or 20,000 kilograms for the purposes of AQI monitoring when converting bulk shipments for sampling.

Select two containers (or container equivalent) randomly per week per port. If the consignment consists of smaller retail units like clamshell packaging or smaller film-wrapped retail packaging or trays in boxes, select the proper sample size from the total number of clamshells, trays, etc. for inspection. Refer to Table 12-1 and Table 12-2 for more details regarding the sampling and inspection procedures. Make sure you have all the documents and forms required to perform the random sampling procedure.

Use the calendar chart to determine the day the sample will be chosen.

All the active 212s (hold sheets) in the section will be used for sampling.

When you have identified the container that will be inspected, verify that it is not under an exclusion. If there is **no** exclusion, notify section personnel of the “hold” and fill in the information on the “Random Sample Chart.”

The containers will be stripped 100%. Select boxes for inspection from random locations throughout the container to detect a 10% level of infestation (at 95% confidence). The number of boxes required for inspection will be determined using the hypergeometric table.

Inspect entire contents of boxes selected and the container’s floor space for agricultural pests or mis-manifested or smuggled items. The container unit will be inspected based on the commodity. If it is a regulated commodity, strip the container 100% according to the hypergeometric table. If it is unregulated, the normal inspection procedures may be used, but requires a more intense examination. If it is a mixed load, follow the most restrictive mode of inspection.

Note: If a non-reefer AQI interest container can be cleared by reviewing documents, do **not** select it for monitoring. Select another container.

Data Collection and Data Entry

Complete the AQIM worksheet for each inspection and enter the information into the ARM database (https://arm.aphis.usda.gov/). Ensure the ARM record is completed with accurate information and closed. Ensure the recorded information is spelled correctly.

Pest Interception Procedures

Pest interception information resulting from random sample surveys is an important factor regarding risk management. Submit a diagnostic request to the identifier for each of the pests found during the inspection. After the pest identification has been determined, ensure the AQIM inspection record in ARM is finished and closed.

Appendix

E

Pathway Monitoring

Quality Assurance Questions

Use this list of quality assurance questions to review the status of monitoring activities at work locations. Local port managers and local AQIM coordinators should periodically answer these questions to ensure proper monitoring of each designated pathway at their work locations.

1. AQIM Sampling and monitoring

    A. What has been done to ensure that the samples are as random as possible?
    B. Is a Standard Operating Procedure (SOP) for AQIM developed, updated, and available to employees?
    C. What is being done to limit bias?
    D. What difficulties are encountered in ensuring randomness?
    E. How are these difficulties being dealt with?
    F. How are samples selected so that they are proportional to the approaching population?
    G. What is done to ensure that all the appropriate population (i.e., passengers, vehicles, or cargo) have a chance to be selected?
    H. What system is used to select times for selecting samples?
    I. How is timing of sample selection adjusted so busy times have proportionally more samples?
    J. What aspects of monitoring have been the most difficult to implement? What has been done to improve the situation?
    K. What changes have been made in daily operations because of monitoring?

2. Inspections, QMIs, and pest interceptions

    A. What is done to ensure that all samples are properly inspected (100% inspection of noncargo baggage/mail; ensuring hypergeometric cargo inspection process is used where applicable)?
    B. How are AQIM QMIs separated and marked?
    C. How are QMIs inspected for pests?
    D. If pests are found, what system is in place to ensure the pest interception number from the PPQ Form 309 or the ARM Diagnostic Request event is entered as part of the monitoring record?
    E. How often is contraband fruit inspected for pests?
    F. Is all the contraband 100% inspected for multiple pests?

3. Data review

    A. Are current data worksheets being used and instructions followed?
    B. Who coordinates and ensures completeness and accuracy of AQIM data collection?
    C. How is consistency ensured?
    D. Is the data entry up to date?
    E. How often is data quality assurance done?
    F. What does the available gap analysis information show about AQIM and port operations?
    G. How reasonable are the initial results?
    H. What is the port doing with the information?

AQIM Handbook

Glossary

Definitions, Terms, and Abbreviations

analysis. determining the nature or proportion of one or more data elements or sets of data

approach rate. total prohibited agricultural items seized/intercepted or total PPQ cargo actions per the respective, total sampled population

AQIM. acronym for Agricultural Quarantine Inspection Monitoring

ARM. acronym for the Agricultural Risk Management System, a web-based service-oriented system to support the operational and analytical needs of USDA-APHIS-PPQ and DHS-CBP Agricultural Quarantine Inspection programs

confidence interval. level of belief that the true value of the population was captured; for AQIM, the numbers of samples taken at each work location were designed to ensure that by detecting the presence of certain pests and quarantine materials during the monitoring, PPQ could be 95% sure that it would happen again

data. raw information that provides values for any characteristic of a larger population. For AQIM, these would be all the entries on the data collection form (i.e., flight number, origin, contaminant codes, etc.)

decision making. final choice or commitment to action; decisions are impacted by the risk analysis process, resource issues and political implications

hazard. elements or events which represent potential harm; an adverse event or adverse outcome. In risk analysis, hazard is specified by describing what might go wrong and how this might happen

mean. this term is also referred to as the average. It is computed by adding all the values for a characteristic and dividing by the number of observations. E.g., the mean of passengers going through an airport in a day would be the total number of passengers in one year divided by 365 days

mitigation. deliberate action(s) taken to reduce the risk associated with a pest organism or plant disease. Consistent with risk management strategies

monitoring. to watch, check, or regulate the performance of a process or activity

negligible risk. risk value so low (or reasonable) that most parties agree to accept risk at or below this level under most circumstances (also known as tolerable, **not** significant or minimal risk)

pest risk assessment. determination of whether a pest organism is of quarantine significance, and the evaluation of the likelihood and consequences of its introduction, including discussions of the uncertainty associated with the estimates

pest risk management. decision-making process concerned with mitigating the risk of introduction or spread of a plant quarantine pest

probability. statistical prediction of the likelihood of possible outcomes

proportions. shows the relative frequency of an event, e.g., percentage of passengers with a QMI

QMI. quarantine material intercepted

quarantine security. management decision concerning the safety at a defined level of pest risk; additional mitigation is **not** required when quarantine security is achieved

random sampling. each member of the population **must** have a known probability of being sampled (**greater than** 0)

risk. likelihood and magnitude (of the consequence) of occurrence of an adverse event

risk analysis. process that includes risk assessment, risk management, and risk communication

risk assessment. process of identifying a hazard and evaluating the risk of a specific hazard in qualitative or quantitative terms; this process should include estimates of uncertainty and should be objective, repeatable, and scientific

risk communication. open, two-way exchange of information and opinion about risk, leading to a better understanding and better risk management decisions

risk management. pragmatic process concerned with developing options for mitigating or eliminating the risk

safety. degree to which risks are judged acceptable, a subjective measure of the acceptability of risk

sample. part (or a subset) of a population that has been selected for monitoring

simple random sampling. selection process where each member of the population **must** have a known probability (**greater than** 0) of being sampled

strata. homogeneous and distinctly different groups created for the purpose of dividing cargo

variable. any characteristic on which the elements of a sample differ from each other (i.e., height versus weight, cargo destinations versus type)

WAD. acronym for Work Accomplishment Data