



LABOR AND POPULATION

CHILDREN AND FAMILIES
EDUCATION AND THE ARTS
ENERGY AND ENVIRONMENT
HEALTH AND HEALTH CARE
INFRASTRUCTURE AND
TRANSPORTATION
INTERNATIONAL AFFAIRS
LAW AND BUSINESS
NATIONAL SECURITY
POPULATION AND AGING
PUBLIC SAFETY
SCIENCE AND TECHNOLOGY
TERRORISM AND
HOMELAND SECURITY

The RAND Corporation is a nonprofit institution that helps improve policy and decisionmaking through research and analysis.

This electronic document was made available from www.rand.org as a public service of the RAND Corporation.

Skip all front matter: [Jump to Page 1](#) ▼

Support RAND

[Purchase this document](#)

[Browse Reports & Bookstore](#)

[Make a charitable contribution](#)

For More Information

Visit RAND at www.rand.org

Explore [RAND Labor and Population](#)

View [document details](#)

Limited Electronic Distribution Rights

This document and trademark(s) contained herein are protected by law as indicated in a notice appearing later in this work. This electronic representation of RAND intellectual property is provided for non-commercial use only. Unauthorized posting of RAND electronic documents to a non-RAND website is prohibited. RAND electronic documents are protected under copyright law. Permission is required from RAND to reproduce, or reuse in another form, any of our research documents for commercial use. For information on reprint and linking permissions, please see [RAND Permissions](#).

This product is part of the RAND Corporation monograph series. RAND monographs present major research findings that address the challenges facing the public and private sectors. All RAND monographs undergo rigorous peer review to ensure high standards for research quality and objectivity.



Kurdistan Regional Government
Ministry of Planning

Designing a System for Collecting Policy-Relevant Data for the Kurdistan Region—Iraq



Sandra H. Berry
Nicholas Burger
Harun Dogo
Krishna B. Kumar
Alessandro Malchiodi
Jeffrey Martini

Tewodaj Mengistu
Howard J. Shatz
Alexandria C. Smith
Artur Usanov
Joanne K. Yoong



LABOR AND POPULATION

CD-ROM Enclosed



Kurdistan Regional Government
Ministry of Planning

Designing a System for Collecting Policy-Relevant Data for the Kurdistan Region—Iraq

Sponsored by the Kurdistan Regional Government

Sandra H. Berry
Nicholas Burger
Harun Dogo
Krishna B. Kumar
Alessandro Malchiodi
Jeffrey Martini

Tewodaj Mengistu
Howard J. Shatz
Alexandria C. Smith
Artur Usanov
Joanne K. Yoong



LABOR AND POPULATION

The research described in this monograph was sponsored by the Kurdistan Regional Government and was conducted in RAND Labor and Population, a division of the RAND Corporation.

The authors of this report are listed in alphabetical order.

Library of Congress Cataloging-in-Publication Data is available for this publication.

ISBN: 978-0-8330-8590-0

The RAND Corporation is a nonprofit institution that helps improve policy and decisionmaking through research and analysis. RAND's publications do not necessarily reflect the opinions of its research clients and sponsors.

RAND® is a registered trademark.

Cover image courtesy of iStockphoto.

© Copyright 2014 Kurdistan Regional Government

Permission is given to duplicate this document for personal use only, as long as it is unaltered and complete. Copies may not be duplicated for commercial purposes. Unauthorized posting of RAND documents to a non-RAND website is prohibited. RAND documents are protected under copyright law. For information on reprint and linking permissions, please visit the RAND permissions page (<http://www.rand.org/publications/permissions.html>).

Published 2014 by the RAND Corporation
1776 Main Street, P.O. Box 2138, Santa Monica, CA 90407-2138
1200 South Hayes Street, Arlington, VA 22202-5050
4570 Fifth Avenue, Suite 600, Pittsburgh, PA 15213-2665
RAND URL: <http://www.rand.org>

To order RAND documents or to obtain additional information, contact
Distribution Services: Telephone: (310) 451-7002;
Fax: (310) 451-6915; Email: order@rand.org

Preface

Comprehensive and reliable statistics are crucial for policy formulation in any region or country. Statistics make it possible to identify the most pressing needs, track the progress of policies and initiatives currently in place, and plan future development. Most important, statistics form the foundation upon which successful policy planning in many areas rests. The Kurdistan Region—Iraq (KRI) is hampered by the lack of such statistics as it aims to improve infrastructure, encourage private-sector development, attract foreign investment, and create a sustainable economy.

This study, which was funded by the Kurdistan Regional Government (KRG) and conducted under the auspices of Dr. Ali Sindi, Minister of Planning, surveys the availability of reliable policy-relevant data in the KRI, identifies the high-priority areas for which more data are required, and develops guidance for a system to collect these data at the regional, district, subdistrict, and individual levels on an ongoing basis. For the study, we interviewed KRG officials in several ministries, assessed available data, conducted cross-country benchmarking, and studied best practices in data-collection methodologies. This monograph summarizes our activities. Since the primary intended audience of this report is the KRG, it is also intended to serve as a “user manual” to the officials and staff of the KRG as they design and develop their data-collection capabilities.

This research was undertaken within RAND Labor and Population, a division of the RAND Corporation. RAND Labor and Population has built an international reputation for conducting objective, high-quality, empirical research to support and improve policies and organizations around the world. Its work focuses on international development, children and families, demographic behavior, education and training, labor markets, social welfare policy, immigration, financial decisionmaking, and issues related to aging and retirement with a common aim of understanding how policy and social and economic forces affect individual decisionmaking and human well-being.

The authors of this report are listed in alphabetical order. Krishna B. Kumar and Howard J. Shatz, senior economists at RAND, are the principal investigators of this study. Dr. Kumar may be reached via email at kumar@rand.org or by phone at 310-393-0411 x7589. Dr. Shatz may be reached via email at hshatz@rand.org or by phone at 703-413-1100 x5184.

More information about RAND is available on our website: <http://www.rand.org>.

Contents

Preface	iii
Figures and Tables	ix
Summary	xi
Acknowledgments	xxi
Abbreviations	xxiii

CHAPTER ONE

Introduction	1
Methods Used	1
Organization of This Monograph	3

CHAPTER TWO

Kurdistan Regional Government Institutions and Data Interactions	5
Objectives	5
Organizational Structure of the Kurdistan Regional Government	5
Purposes of the Kurdistan Regional Statistics Office and Its Structure	6
Interactions Among Government Agencies for Collecting Data	6
Intragovernmental Collection and Cooperation Within the Kurdistan Regional Government	6
Federal-Regional Relations	7
The Statistics Law	8

CHAPTER THREE

Available Data and Statistics	9
Objective	9
Information Collection and Management Approach	9
RAND's Data Management System	9
Available Data	10
Data RAND Has Obtained	10
Data RAND Has Identified But Not Verified	11
Summary of Data Availability and Key Challenges	12

CHAPTER FOUR

Policy and Data Priorities of the Kurdistan Regional Government	15
Objectives	15
Key Policy Priorities	15
Essential Services for the Short to Medium Term	16
A Well-Functioning Private Sector to Provide Jobs and Economic Opportunity	17

Agriculture.....	17
Tourism	18
Governance.....	19
Key Data Priorities.....	19
Census	19
Regional Accounts and Labor Market Indicators.....	19
Summary.....	20

CHAPTER FIVE

Data Requirements to Address Policy Priorities of the Kurdistan Regional Government	21
Objective.....	21
From Policy Priorities to Data.....	21
An Overview of the Data Spreadsheets.....	22
Water: A Detailed Example of an Urgent Priority Sector.....	23
Private-Sector Development: A Detailed Example of a Longer-Term Priority	25
Policy Questions That Recommended Data Can Address	26
Health.....	26
Education.....	27
Electricity.....	27
Road Transport	27
Macroeconomic Data.....	27
Agriculture.....	28
Tourism	28
Good Governance	28
Crosscutting Data-Collection Issues.....	28
Critical Indicators.....	29
Collecting the Critical Indicators.....	30
Summary.....	30

CHAPTER SIX

Methodologies for Data Collection and Handling.....	33
Objective.....	33
Types of Data Collection.....	33
Administrative Data.....	33
Census Data	34
Surveys.....	34
Choosing Among Data-Collection Options.....	35
Elements of High-Quality Data Collection and Data Management	36
Instrument and Protocol Design.....	36
Sampling.....	38
Ethics and Human Subjects Protection	40
Quality Control During Field Implementation.....	42
Storage and Dissemination	43
Human Capital for Data Collection and Management	45
How to Collect the Data That the Kurdistan Region—Iraq Needs.....	47
Recommendations	51

CHAPTER SEVEN

Institutional Arrangements to Meet Policy Priorities	53
Objective	53
The Statistical System	53
Statistical System Models and Organizational Considerations	55
National Statistical Systems of the Middle East and North Africa	55
Economies with Similar Per Capita Gross Domestic Product: Focus on Bosnia and Herzegovina	57
Federalized Statistical Systems	59
Links Between Statistics and Geographic Information	62
Findings for Kurdistan Regional Government Statistical Institutions	63
The Kurdistan Regional Government Statistics Law	64
Guidance Regarding the Kurdistan Regional Statistics Office and the Department of Information and Mapping	65
Specific Recommendations Regarding Cooperation Between the Iraqi Federal Government and the Kurdistan Regional Government	65

CHAPTER EIGHT

A Recommended Roadmap to Policy-Relevant Data Collection	67
Objectives	67
Considerations and Criteria Used in Preparing the Roadmap	67
A Roadmap Should Reflect Priorities and Ease of Implementation	67
A Roadmap Should List Processes That Aid Implementation	68
A Roadmap Should Aid Capacity Building	68
The Roadmap	68
Prioritized Steps in the Roadmap	69
Roadmap Steps by Priority and Ease of Implementation	71
Roadmap Steps by Type of Activity	72

CHAPTER NINE

Conclusions and Next Steps	73
---	----

APPENDIXES

A. RAND Data Team Meetings	75
B. Kurdistan Regional Government Websites Summary	77
C. Log of Available Documents	79
D. References Used to Inform the Data Spreadsheets for the Priority Policy Areas	85
E. Data-Related Information and Communications Technology and Physical Infrastructure to Meet Policy Needs	89
F. Comments on Proposed Organizational Charts for the Kurdistan Regional Statistics Office	93
Bibliography	103

Figures and Tables

Figures

2.1.	Organizational Structure of the Kurdistan Regional Statistics Office	7
7.1.	Organization and Staffing of the Republika Srpska Institute of Statistics	60
F.1.	Proposed Organization Structure for the Kurdistan Regional Statistics Office	98
F.2.	Proposed Organization Structure for the Erbil Directorate of Statistics	99
F.3.	Proposed Organization Structure for the Duhok Directorate of Statistics	100
F.4.	Proposed Organization Structure for the Sulaimani Directorate of Statistics	101

Tables

S.1.	Critical Indicators to Inform Policymaking	xiv
4.1.	Summary of Policy and Data Priorities of the Kurdistan Regional Government	20
5.1.	Summary of Details in Spreadsheets	23
5.2.	Examples of Water Data Items	24
5.3.	Examples of Private-Sector Data Items	25
5.4.	Critical Indicators to Inform Policymaking	31
6.1.	Data-Collection Options for Critical Data Indicators	48
7.1.	Statistical Organizations Across the Middle East and North Africa	56
8.1.	Roadmap Steps by Priority and Ease of Implementation	72
8.2.	Roadmap Steps by Type of Activity	72
B.1.	Kurdistan Regional Government Websites Summary	77
C.1.	Log of Available Documents, as of March 2011	79
F.1.	Comparative Statistical Areas	94

Summary

Comprehensive and reliable statistics are essential for policy formulation in any region or country. Statistics make it possible to identify the most pressing needs, track the progress of policies and initiatives currently in place, and plan future development. Most important, statistics form the foundation upon which successful policy planning in many areas rests. The KRG is hampered by the lack of such statistics as it aims to improve infrastructure, encourage private-sector development, attract foreign investment, and create a sustainable economy.

The overall objectives of this project were to survey the availability of reliable policy-relevant data in the KRG, identify the high-priority areas for which the KRG requires data, and develop guidance for a system to collect these data on an ongoing basis.

We begin our discussion by describing the baseline conditions for data collection and statistics in the KRG, specifically current statistical institutions and available data and statistics. We then report on KRG policy priorities, the heart of our analysis. Because the KRG's goal is to have data-driven policy development, policy priorities should govern data collection. Given the policy priorities, we define the data indicators needed for each policy area, dividing them into (1) critical indicators needed at the highest level of policymaking, (2) high-priority indicators, and (3) lower-priority indicators. We discuss how to reform and develop the KRG statistical system, focusing on data collection and handling methodologies and statistical institutions. We conclude by laying out a roadmap for reform.

Kurdistan Regional Government Statistical Institutions

The KRG's overall aim is to meet all of the expectations of the central government of Iraq regarding data collection but to exceed expectations in terms of the amount and quality of data collected and the excellence of data-collection methodologies. The Kurdistan Regional Statistics Office (KRSO), which is responsible for supporting the statistical activities of the KRG, is located within the Ministry of Planning. Among the Ministry of Planning's objectives is preparing indicators for planning in cooperation with other units of the KRG and the private sector. The KRSO also houses the Department of Information and Mapping, which collects and analyzes data from geographic information systems (GIS).

In addition to the Ministry of Planning and the KRSO, every ministry has a statistical office, called either a statistics department or a planning department. These offices send their data upward within their respective ministries, although sometimes not systematically.

The KRSO is a natural repository of statistical information from other ministries and should lead the effort to upgrade the overall quality of KRG statistics. However, there is cur-

rently no legal authority granting the KRSO the mandate to collect statistics from or work with the various ministries, and the KRSO is not a formal recipient of such data at this time.

Available Data and Statistics

The KRG currently collects a large volume of data, but much of it is not usable or not available for policymaking, and there are major gaps. Perspectives on what constitutes “data” vary across organizations and individuals, making it difficult to identify existing data sources and data needs to inform decisionmaking.

Data collection capacity and methods vary across government units. Storage methods also vary, with many agencies entering and storing data on paper, even when electronic means are available. In addition, awareness of data availability is poor: Staff members in one ministry often do not know what data other ministries collect.

There is a need to systematize and coordinate data collection efforts, both within and across ministries. It is not clear that policymakers have timely access to data or an efficient system for identifying and using available data for decisionmaking. The KRG ministry websites are generally not good sources of data, and consistency across sites could be improved. Finally, there is little systematic data collection outside the government—for example, by universities or nonprofit organizations.

Despite these problems, the KRG has made promising progress toward collecting critical data to inform policy. The participation of the KRSO with the central government and the World Bank in the 2007 Iraq Household Socio-Economic Survey (IHSES) was a major accomplishment that has already provided policy-relevant data to help formulate policies to alleviate poverty. A key challenge will be to develop sufficient capacity within the KRSO so that the KRG need not rely primarily on multilateral agencies for large-scale data collection efforts but can instead originate its own data collection to meet policy needs.

Policy Priorities of the Kurdistan Regional Government

To make the best use of data for policymaking, it is important to identify policy priorities and then identify the most supportive data indicators. On the basis of extensive discussions with numerous policymakers and a review of KRG documents, we interpret the overall policy direction of the KRG as follows: (1) to develop a diversified economy that relies on the private sector and is not solely dependent on oil, (2) to support the economy and the well-being of the population with sufficient government and social services, and (3) to provide an education system and labor market opportunities that will improve the standard of living of the population.

Achieving these goals will be a multistage process. As a way to begin, we identified ten priority areas described in this section. We distinguish among short- to medium-term priorities aimed at satisfying the immediate needs of the KRI population; long-term, strategic priorities that aim to put the KRI on a stable path of growth and development; and collection of data that can be used across sectors and policies.

Five Essential Services for the Short to Medium Term

A recurring theme we encountered among KRG policymakers is that certain services—specifically *health, education, water and sewerage, electricity, and roads and transportation*—are

not only viewed as essential for the public but are also areas in which the public expects to see results from the government quickly. Given population growth, the demand for these services is increasing; nearly all officials we met mentioned effective provision of these services as top policy priorities.

Four Economic and Governance Issues for the Longer Term

Encouraging the *private sector* and reducing the government payroll are high on the list of KRG priorities, and instituting business-friendly reforms is a key item on the policy agenda. *Agriculture* is the sector most singled out for attention, followed by *tourism*. *Good governance and civil-service reform* is also a priority.

An Urgent Data Priority

A final priority related directly to data, specifically establishing *regional accounts* for the reporting of gross regional product. This would benefit from instituting regular household surveys to monitor labor market conditions and establishing regular agriculture and business surveys.

Data Requirements to Address Policy Priorities

We recommend collection of a comprehensive set of indicators to support policymaking in the priority areas.¹ The indicators, which we have categorized as higher and lower priority, appear in a set of ten Excel spreadsheets that accompany the main monograph on a compact disc. The complete set of indicators is unlikely to be necessary or even useful for top policymakers. Therefore, we have drawn from the larger list a smaller set of “critical indicators” for each sector—the indicators that should be the highest priority for collection and dissemination, not only to senior levels of the KRG but also to the public. These critical indicators are listed in Table S.1. These indicators represent the information that the Prime Minister, the Council of Ministers, senior advisors of the Prime Minister and other ministers, and other top-level units, such as the KRG Economic Council, should be able to consult when making strategic planning decisions in the KRI.

Crosscutting Data-Collection Issues

Several common issues emerged from our development of the indicators for the ten priority areas:

- Data will have to come from different sources, including administrative data, surveys, and even units of the Iraqi central government.
- Data will often be applicable across policy areas. For example, labor statistics and an index of industrial production are relevant for both macroeconomic (regional accounts) and private-sector indicators.
- Relevant ministries, in collaboration with the KRSO, would potentially be responsible for data collection. However, the KRSO has the methodological expertise and should lead the collection efforts.

¹ These indicators are intended solely to support policymaking and not to also be used to evaluate the work of ministries. These indicators may constitute a subset of the data needed for evaluation; however, more data are needed to evaluate ministry performance fairly.

Table S.1
Critical Indicators to Inform Policymaking

Indicator	Data-Collection Frequency
Agriculture	
Production of staple crops (wheat, rice)	Seasonal and annual
Production of high-value crops (grapes, pomegranates)	Seasonal and annual
Land in use for agricultural production	5–10 years
Water used for irrigation	Annual
Education	
Number of new schools completed during the year	Annual
Percentage of teachers trained during the year	Annual
Gross student enrollment in secondary education	Annual
Net student enrollment in secondary education	Annual
Completion rate in secondary education	Annual
Electricity	
Unit nameplate capacity	Annual
Unit feasible capacity	Annual
Peak demand (load)	Semiannual
Governance	
Code of conduct implemented (de jure)	Annual
Public access to laws	Annual
Public access to regulations	Annual
Time to start a business (domestic enterprise)	Annual
Health	
Infant mortality (0–11 months)	Annual
Number and density of physicians per 10,000 population	Annual
Density of hospital beds per 10,000 population	Annual
Percentage of districts meeting standards for number of main public health centers (1 per 10,000 population)	Annual
Percentage of districts meeting standards for number of branch public health centers (1 per 5,000 population)	Annual
DPT3: Percentage vaccination coverage among 1-year-olds (12–23 months) with three doses of DPT	Annual
Macroeconomics	
Total government expenditures	Monthly
Personal expenditures on goods and services	Quarterly
Exports of goods	Quarterly

Table S.1—Continued

Indicator	Data-Collection Frequency
Imports of goods	Quarterly
Unemployment rate	Quarterly
Consumer price index	Monthly
Private sector	
Number of enterprises by economic activity	Annual
Number of persons employed by economic activity	Quarterly
Foreign direct investment inflow	Quarterly
Fixed investment by firms	Quarterly
Mobile phones per 1,000 people	Annual
Internet users per 100 people	Annual
Tourism	
Arrivals by class of visitor (overnight, same day)	Quarterly
Average length of stay (all types of establishments)	Annual
Average expenditure per day	Annual
Transportation	
Extent of paved roads	Annual
Passenger vehicles traveling between major cities	Annual
Goods transported by road (tons/hour)	Annual
Injury collision	Annual
Water	
Surface water stocks	Annual
Flows of water from inland water resources to economy	Annual
Losses of water in distribution	Annual
Population using improved water sources	Annual

NOTE: DPT = diphtheria-pertussis-tetanus.

- Broad collaboration is especially essential for household surveys, which typically cover multiple areas, such as health, education, and employment.
- Data not collected by the KRSO might be shared with the KRSO less frequently than they are collected.

Data-Collection Methodologies

Identifying, gathering, and disseminating comprehensive, high-quality, and policy-relevant data requires using appropriate data collection methods and instituting procedures for ensur-

ing quality along many dimensions. The major types of data used for policy and planning purposes include *administrative data*, *census data*, and *surveys*. Each of these data types has benefits and costs.

Administrative data comprise information that is collected by the government or other entities for their own purposes. These data generally reflect the administration of programs, policies, or services; the data are not collected from the entire population. In contrast, a census is a count of all members of a specific population, whether individuals or other entities. Examples include people, enterprises, housing units, or even livestock.

Survey data are collected only from a sample of the population of interest. Survey data are usually collected in a way that enables statistical inferences to be made about the whole population.

Using these types of mechanisms to collect comprehensive, policy-relevant data is a multi-step process. Getting the essential elements right will help ensure that the final data products are accurate and useful. These elements include designing data-gathering instruments and protocols, sampling for survey data collection, implementing data collection, ensuring quality during the collection process, storing and disseminating data, and protecting the confidentiality of human subjects.

A comprehensive and integrated statistical system includes all three types of data collection. Population and other censuses usually form the central pillar of the system; in the KRI, censuses of enterprises and other nonpopulation censuses are likely to be the system's core in the short to medium term.

Censuses support surveys by providing information about the population to be surveyed, statistical infrastructure, statistical capacity, and benchmarks, and census data are often used as auxiliary information for dividing members of the population into homogeneous subgroups. Survey data complement the census by providing detailed information on complex topics. Because censuses cannot practicably be repeated frequently, surveys provide intermediate statistical updates. Data from surveys and administrative records can also be used to check census coverage and content and to determine the size and direction of any errors. Similarly, data from administrative records can be used to check and evaluate results from surveys and censuses. Combining these data sources is also useful analytically—for instance, census data and administrative data can be combined with survey data to produce inferences about small geographic areas or subpopulations.

In Chapter Six of this monograph, we provide an overview of how a comprehensive data-collection program can be linked to the critical indicators listed in Table S.1. For example, for the priority area of agriculture, data for the four critical indicators (production of staple crops, production of high-value crops, land in use for agricultural production, and water used for irrigation) can be collected via an agriculture census, agriculture surveys, and household surveys. In another example, for the priority area of tourism, information on arrivals can be gathered via administrative data, and data on tourists' average length of stay and average expenditures can be collected through a combination of organization surveys (in this case, of hotels) and special-purpose surveys.

Human Capital for Data Collection and Management

Key to creating a high-quality data-collection system is the development of a skilled workforce. Developing a workforce with the skills necessary to collect, manage, and disseminate data in the KRI will be challenging. The KRSO can acquire additional capacity by hiring private- or

nonprofit-sector firms on a contract basis, work with international organizations that have data expertise, or hire employees with existing skill sets. Hiring outside firms gives the KRG the flexibility to access specialty skills as needed. But it could lead to higher management costs for the KRG and lower-quality data products if contractors are not vetted or managed well. The alternative is to train existing ministry or KRSO staff to give them additional skills.

Integrating Data Collection Methodologies into a Work Plan for the Kurdistan Region Statistics Office

We recommend that the KRSO take the following steps to improve its data-collection methods:

- Plan and oversee an integrated work program that includes censuses of agriculture and enterprises, conducted every five to ten years. Multitopic household, farm, and enterprise surveys should be conducted at shorter intervals. Annual or semiannual collection of administrative data should be organized.
- Adopt consistent geographic units for collecting and reporting statistics.
- Adopt common definitions, concepts, and classifications across different data sources, including administrative records.
- Adopt electronic data collection methodologies and electronic recordkeeping, where possible.
- Adopt and disseminate quality guidelines for data collection and handling.
- Adopt and disseminate protocols and procedures for cleaning and storing datasets, especially protocols and procedures for handling sensitive data.
- Help develop institutions to protect the rights and welfare of survey participants.
- Create an online repository of data sources, including complete documentation, to facilitate use and analysis of data. The repository should be publicly accessible, and it should be regularly maintained and updated.
- Systematically monitor how data are used in order to improve collection, dissemination, and service.

In tandem with this work plan, an essential part of successful data collection is a high-quality information and communications technology (ICT) infrastructure. To move toward this goal, the KRSO should coordinate closely with the Department of Information Technology (DoIT), which is currently designing and implementing an ICT strategy for the KRG.

Institutional Arrangements for Statistical Systems

As important as knowing what data to collect and how to collect them are the institutional arrangements of the statistics program. A data collection system comprises the institutions, procedures, and mechanisms that interact with each other and the population in order to execute the statistical program. Actors in the system derive their authority from legislation defining their relationships. At a minimum, the legislation defines the statistical agency's authority to collect data, the nature of government oversight over the collection process, the structure of the agency responsible for data collection, the mechanism by which the agency's efforts are overseen, the expectations for agency capacity, and the agency's relationships with external and internal actors relevant to the execution of its mission.

The KRG has a unique opportunity to define its statistical system clearly through robust legislation that lays the foundation for the long-term development of a strong system of statistical collection and analysis. Passage of a statistics law should be among the KRG's highest priorities. Moreover, the KRG should institute technical and policy oversight boards. We also recommend that the KRG consider afresh whether the KRSO should be an office within the Ministry of Planning or independent. There are valid arguments in both directions, and countries around the world do not follow a single practice. Transparency in collection and dissemination will be important to ensure data integrity.

Relations between the KRSO and the Iraqi Central Organization for Statistics and Information Technology (COSIT) will also be important. Various institutional arrangements are possible, including a formal council of the senior leadership of each organization. Because a core value of statistical systems is based on legitimacy and there is a need for public support for data collection efforts, the KRSO rather than an agency of the federal Iraqi government is the appropriate organization to collect data within the KRI. However, these data must be comparable to data collected from the rest of Iraq. Comparability will add credibility to the KRI data and reduce uncertainty among users, signaling to a global audience the reliability and stability of the investment environment.

A Recommended Roadmap to Policy-Relevant Data Collection

We have described the current status of data and data institutions in the KRG, recommended which indicators to collect and suggested the priority to assign to each, and highlighted institutional issues for ensuring a high-quality statistical system. Our recommendations can be implemented by following a step-by-step roadmap that reflects the time needed for each recommendation and the priority each recommendation should have in building a high-quality statistical system. The KRG should take the following steps:

- **Enact a statistics law.** A statistics law formalizes the organizational structure of the KRSO and its interactions with other KRG ministries and agencies, especially as they relate to data sharing. This law needs to be cognizant of the federal statistics law.
- **Convene stakeholder meetings.** The KRSO should convene a meeting of relevant policymakers to promote coordination and effective planning. This meeting can be used to communicate the KRSO's short- and medium-term plans, solicit feedback, cement cooperation in conducting surveys that cut across ministries, and get general buy-in from stakeholders.
- **Decide the composition of the policy and technical oversight boards.** We have recommended that the KRG institute a technical oversight board to advise the KRSO on matters of data collection techniques and methodology and a policy oversight board to ensure that KRSO's data-collection efforts focus on the KRG's policy priorities. Members of the technical oversight board could come from current and retired academics within the KRI and from the Kurdish diaspora; other researchers, including international researchers with expertise in the KRI and data collection; and individuals from the private sector with technical expertise. Policy board candidates would include senior policymakers (typically at the level of general directors) from the ministries responsible for high-priority policy areas, high-level civil servants or policymakers from the indi-

vidual governorates, and representatives from the Council of Ministers, the Parliament, and the DoIT.

- **Identify a data contact within each ministry.** The KRSO should work with the appropriate ministry in each of the priority policy areas to appoint a KRSO liaison who would be responsible for collecting the critical indicators and transmitting them to the KRSO at specified intervals.
- **Collect the critical indicators.** The relevant ministries should collect the critical indicators; however, the KRSO should monitor this process and provide technical assistance as needed. This is especially important given that most critical indicators are based on component data items that must be collected before the critical indicators can be calculated.
- **Implement the organograms.** The KRSO has developed organization charts (organograms) for reorganizing its offices in its headquarters and the three governorates. We have provided a few recommendations for modifications, mainly to ensure consistency across the offices and with the draft statistics law. The organization charts need to be revised, and the modified structure should be implemented.
- **Improve human resources in the KRSO.** Our analysis identified several state-of-the-art techniques and procedures that the KRSO should institute, as well as data collection steps it must oversee. To implement these recommendations, the KRSO will need to recruit new staff and upgrade the qualifications of the current staff through training courses and hands-on exercises. We recommend that the KRSO seek the services of outside experts to provide training courses and hands-on training to its staff, perhaps by jointly conducting a data collection exercise, such as a survey. Alternatives include engaging high-quality foreign universities to design short courses to be given in Kurdistan or sending staff abroad for such courses.
- **Upgrade and install ICT infrastructure.** To establish a centralized database and facilitate data sharing with the ministries, the KRSO requires a sophisticated ICT infrastructure. The KRSO should work with the DoIT and external information technology consultants, as needed, to implement an ICT infrastructure in its headquarters and governorate offices. The KRSO should also give the ministries the requirements for data-sharing ICT infrastructure.
- **Decide whether to improve current indicators or collect new ones.** Several KRG agencies are currently collecting data components, including some of the data indicators we identified as high-priority in our spreadsheets. However, such efforts tend to be fragmented rather than part of a unified strategy. The KRSO needs to decide, in consultation with the relevant ministries, whether to improve collection of existing high-priority indicators or spend the resources on collecting indicators not currently collected, even if they are of a lower priority.
- **Collect the high-priority indicators.** The process of identifying data contacts within each ministry and collecting critical indicators will also pave the way for collecting indicators of a slightly lower priority. As with the critical indicators, data collection for priority indicators would be done by the relevant ministries. However, the KRSO would have to monitor this process and provide technical assistance as needed.
- **Conduct one-off surveys.** An annual household and business survey forms the backbone of data collection efforts (especially to get macroeconomic indicators) in many countries. However, conducting these surveys would require that the KRSO build sufficient capacity for these complex undertakings. The KRSO could begin by conducting one-off

surveys—surveys designed to be conducted for a specified purpose—especially for specific districts or topics for which there is a high data need. Over time, these surveys could be converted to be regular and periodic.

- **Conduct routine surveys.** Conducting the above-mentioned one-off surveys would position the KRSO to conduct annual household and business surveys. In addition to providing macroeconomic information, these surveys will produce useful microlevel information. However, larger, routine surveys will require the cooperation of multiple ministries. Therefore, both the technical and the process experience that the KRSO will gain from the earlier steps would be useful here.

The roadmap steps will help the KRSO and the KRG to assemble the core elements of a quality data system. This, in turn, will increase the availability of data to help KRG leaders achieve their most important policy goals.

Acknowledgments

We are grateful to the Kurdistan Regional Government for supporting this research. Although we have benefited immensely from the feedback and support we have received from numerous KRG officials, we are particularly indebted to His Excellency Dr. Ali Sindi, Minister of Planning; Mr. Serwan Mohamed, Head, Kurdistan Regional Statistics Office; Mr. Zagros Fatah, General Director, Ministry of Planning; and Dr. Jamal Ameen, Senior Advisor, Ministry of Planning. We could not have met as many of the KRG officials as we did during our visits to the KRI without the unceasing efforts of and translation services provided by Mr. Omar Abit, Mr. Bakhtyar Karim, Mr. Hoshyar Tahsin, Mr. Farhad Borhan Qadir, and Mr. Wiryah Mahmood. We are also grateful for the advice and input we received from the teams of other studies RAND is conducting for the KRG. These are led by Dr. C. Ross Anthony, Dr. Michael Hansen, and Dr. Georges Vernez. We received useful comments from Dr. Benjamin Dennis, Mr. Lloyd Mendes, and two anonymous referees.

At RAND, we benefited from the guidance and support of Amb. Robert Blackwill (a former Senior Fellow at RAND); the director of RAND Labor and Population, Dr. Arie Kapteyn; the assistant director, Dr. David Loughran; and the unit administrator, Ms. Tania Gutsche. We are also grateful to Ms. Robin Meili, who coordinated the suite of RAND studies, and to Ms. Joy Moini, who assisted her.

Abbreviations

BHAS	Agency for Statistics of Bosnia and Herzegovina
BiH	Bosnia and Herzegovina
BLS	U.S. Bureau of Labor Statistics
CAPI	computer-assisted personal interviewing
COSIT	Central Organization for Statistics and Information Technology
CPI	consumer price index
DIM	Department of Information and Mapping
DoIT	Department of Information Technology
DPT	vaccine against diphtheria, tetanus, and pertussis
DSD	Data Source Database
FBiH	Muslim-Croat Federation of Bosnia and Herzegovina
FDI	foreign direct investment
GDP	gross domestic product
GIS	geographic information system
GNI	gross national income
GPS	Global Positioning System
ICT	information and communications technology
IHSES	Iraq Household Socio-Economic Survey
IMF	International Monetary Fund
IT	information technology
KRG	Kurdistan Regional Government
KRI	Kurdistan Region—Iraq
KRSO	Kurdistan Regional Statistics Office
LSMS	World Bank Living Standards Measurement Study
MICS	Multiple Indicator Cluster Survey
OECD	Organisation for Economic Co-operation and Development
PISA	Programme for International Student Assessment

UAE	United Arab Emirates
UN	United Nations
UNDP	United Nations Development Programme
UNECE	United Nations Economic Commission for Europe
UNICEF	United Nations Children’s Fund
UNWTO	United Nations World Tourism Organization
WHO	World Health Organization

Introduction

Comprehensive and reliable statistics are crucial for policy formulation in any region or country. Statistics make it possible to identify the most pressing needs, track the progress of policies and initiatives currently in place, and plan future development. Most important, statistics form the foundation upon which successful policy planning in many areas rests. The Kurdistan Region—Iraq (KRI) is hampered by the lack of such statistics as it aims to improve infrastructure, encourage private-sector development, attract foreign investment, and create a sustainable economy.

An efficient data-collection system lies at the core of effective data-driven policy making. For instance, if a government is interested in developing a nascent private sector, having data that capture the number of enterprises in the economy, the number of workers they employ, the amount they invest, and their geographical distribution would allow policymakers to identify challenges and opportunities and devise policies to address them.

The overall objectives of this project were to survey the availability of reliable policy-relevant data in the KRI, identify the high-priority areas for which the Kurdistan Regional Government (KRG) requires more data and indicators, and design a system for collecting these data on an ongoing basis. This monograph documents our efforts. It is also intended to serve as a “user manual” to the officials and staff of the KRG as they design and develop their data-collection capabilities.

Methods Used

We relied on the following approaches during the course of the project:

- **Conversations with KRG Officials:** We met with officials from many KRG ministries and agencies, including the Ministries of Planning, Agriculture and Water Resources, Education, Electricity, Finance and the Economy, Health, Higher Education and Scientific Research, Housing and Reconstruction, Labor and Social Affairs, Municipalities and Tourism, Trade and Industry, and Transportation and Communications; the Board of Investment; the Kurdistan Regional Statistics Office (KRSO) (including headquarters and the directorates in Erbil, Duhok, and Sulaimaniyah); the Council of Ministers; and other senior officials. This approach was particularly useful in identifying those policy priorities that received repeated mention and those that were perceived differently by different officials. It was also useful in assessing whether the policy priorities of the KRG are

percolating into all levels and areas of the government and the extent of data availability in each ministry.¹

- **Data and Document Analysis:** During our visits to the region, we collected data that are already available or being collected in the KRI. We conducted a fairly high-level analysis of the data and documents made available to us by the KRG.
- **Review of Publicly Available Online Information:** The RAND team reviewed each of the following online sources of information:
 - KRG websites²
 - websites for universities in the KRI
 - non-KRG websites, including those of the Economist Intelligence Unit, the Food and Agriculture Organization, the International Monetary Fund (IMF), the United Nations Children’s Fund, the United Nations Development Programme (UNDP), the World Food Program, the World Health Organization (WHO), and the World Bank Group.
- **Meetings with Non-KRG Organizations:** The RAND team also met with nongovernmental organizations and private entities. The goal of these meetings was to identify how these organizations use data, what types of data they access, the extent to which they obtain data from the government, and their data needs. The questions we asked these individuals were similar to the questions asked of KRG officials.
- **Review of International Standards:** Where available, we consulted standards that have been developed by international bodies, such as the United Nations (UN), the World Bank, and the Organisation for Economic Co-operation and Development (OECD). Although standards in certain areas (for example, data indicators needed for water and agriculture) are well developed and there is close to a consensus on the data that should be collected, in other areas (such as data indicators for governance), standards are still being developed. Conforming to the latest existing standards, to the extent possible, ensures that the KRG is close to global best practices in terms of the data that are needed to address its policy priorities and the statistics law and other institutional features necessary for a well-functioning data-collection system. Following international guidelines also allows the KRG to collect standardized data that can feed into international benchmarking efforts, such as those assessing progress toward the United Nations Millennium Development Goals (United Nations, 2010) and the United Nations Development Assistance Framework (United Nations Development Group, no date; United Nations Country Team Iraq, 2010).
- **Adaptation of Standards to the Priority Needs of the KRG:** Although international standards on data and institutional features are useful, adapting these standards to local needs is equally important. For instance, for a landlocked region such as the KRI, road and air transport data are more important than seaport statistics, and water indicators that capture flows to the ocean are less relevant. Therefore, we adapted the standards we surveyed by modifying them to fit the KRI context.
- **Consultation with Experts:** Although our team includes a diverse group of researchers with expertise in many of the components of a data-collection system, we consulted

¹ Appendix A catalogs the KRG ministries and agencies with whom we had conversations.

² We include in Appendix B a summary of the ministry websites visited and information available on those sites.

subject-area experts within and outside RAND to ensure that we did not miss any crucial elements of best practices followed around the world. This was particularly true of the data indicators we recommend for priority areas. Since there were concurrent RAND projects being carried out in the areas of health, education, and private-sector development, we consulted these projects to ensure that our recommendations were consistent with those made by the other projects.

Organization of This Monograph

This monograph is organized as follows. The first two chapters are aimed at understanding the current situation in the KRI. Toward this end, in Chapter Two, we summarize our understanding of the KRG institutions and data interactions. Chapter Three discusses the current state of data availability in the KRI. The next two chapters are aimed at making the data-collection efforts relevant to policymaking. Chapter Four discusses the policy priorities of the KRG, and Chapter Five maps these priorities into data items that need to be collected to serve these priorities. The next four chapters delve into the components of the data-collection system that would be needed to deliver the data items listed in Chapter Five. Chapter Six discusses data-collection methodologies, Chapter Seven discusses institutional arrangements, and Chapter Eight synthesizes the recommendations made in the earlier chapters into an implementation roadmap. Chapter Nine concludes.

Each chapter begins with a set of objectives, a brief summary, and a list of specific methods not covered above before delving into the relevant details. Materials of a highly technical or detailed nature are presented in appendixes.

Kurdistan Regional Government Institutions and Data Interactions

Objectives

The objectives of this chapter are to summarize

1. the organizational structure of the KRG
2. the purposes and structure of the KRSO
3. the interactions among the various KRG agencies that are relevant for data collection and information flow
4. the role of a statistics law.

The chapter notes that the KRSO, which is located within the KRG Ministry of Planning, is the body with overall responsibility for statistics for the KRI. However, the current absence of a statistics law hampers coordination among the various entities collecting data and the effective functioning of the KRSO.

Organizational Structure of the Kurdistan Regional Government

It is beyond the scope of this monograph to discuss the structure of the KRG in detail. Rather, we focus on the entities relevant for data collection and utilization.

The sixth cabinet of the KRG, led by Prime Minister Barham Salih, is composed of 19 ministries. Each ministry is headed by a minister (the government also has a deputy prime minister and four other senior officials with ministerial rank). Directors general, who are responsible for specific areas of focus within each ministry, report to the minister.

Many individual ministries currently generate statistics, but coordination across the ministries and the availability of a central repository of statistics that would allow a ministry to use data generated by others in its policymaking are lacking. For example, data on births recorded by the Ministry of Health could be used by the Ministry of Education to plan for schooling needs.

The ministry with overall responsibility for statistics for the KRG as a whole is the Ministry of Planning. One of its objectives is to prepare “indicators for long, medium and short term plans with all its goals and policies in cooperation with other ministries, government entities and the private sector” (Kurdistan Regional Government, Ministry of Planning, 2011).¹ The overall aim of the KRG is to do all that the central government expects regarding data collec-

¹ The quoted objective is first on a list of ten of the ministry’s main goals.

tion, but to exceed expectations in terms of the quantity and quality of actual data collected as well as in terms of data-collection methodologies.

The KRSO, located within the Ministry of Planning, is responsible for supporting the statistical activities of the KRI. Broadly, the role envisioned for the KRSO is to conduct surveys, gather administrative and survey data collected by other agencies, manage and disseminate data, and develop guidelines for data-collection efforts.

Purposes of the Kurdistan Regional Statistics Office and Its Structure

The overall aims of the KRSO are to

1. promote the use of data as a basis for decisionmaking in the KRG
2. inject transparency into data and information
3. build a statistical agency that benefits from the expertise and experience on best practices for regional statistics from other parts of the world
4. encourage joint projects between academics in Kurdistan and other researchers around the world to improve research based on Kurdistan data.

The KRSO has directorates responsible for Erbil, Sulaimaniyah, Duhok, and Garmiyan. The Department of Information and Mapping (DIM), which collects and analyzes geographical information system (GIS) information, used to be a separate office but is now part of the KRSO. The structure of the KRSO as of February 2011 is shown in Figure 2.1.²

Interactions Among Government Agencies for Collecting Data

We present our understanding of how KRG agencies currently interact among themselves on data collection, storage, and dissemination, and how the KRG interacts with the central government.

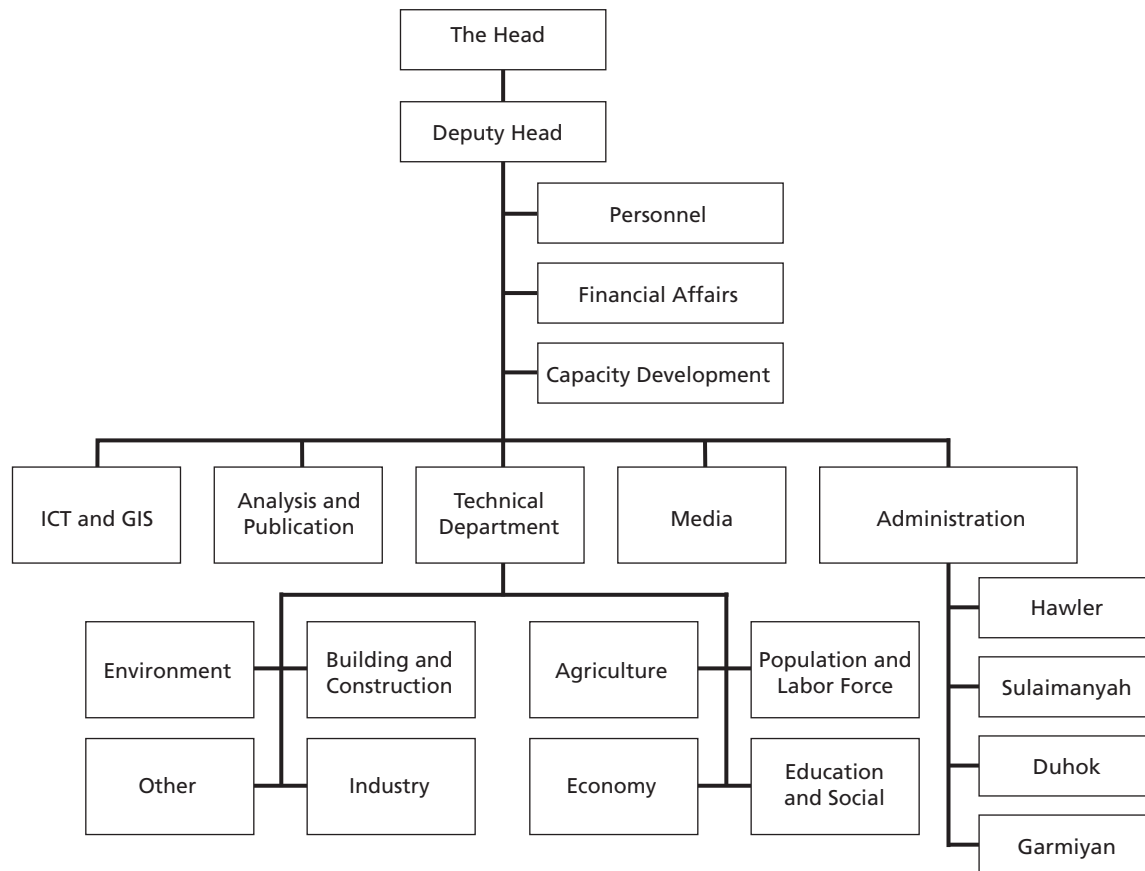
Intragovernmental Collection and Cooperation Within the Kurdistan Regional Government

Every ministry has a statistical office of some form, called either a statistics department or a planning department, and these offices send their data upward within their respective ministries, although sometimes in a nonsystematic way. Sources of data and information are mixed. Most agencies have entered data on paper. Some agencies have modernized, although the degree to which they have done so is not uniform.

The KRSO is not at this time a formal recipient of data from the ministries, since the KRG has not yet enacted a statistics law to formally institutionalize coordination across ministries or establish the KRSO as a central depository. In the absence of such a law, the KRSO has approached other ministries diplomatically, with the aim of having them add their data to a KRSO database while allowing the originating ministry to remain the owner of the data. Such an approach has not succeeded with all ministries.

² The KRSO has proposed a reorganization of this structure. This is discussed in Chapter Seven.

Figure 2.1
Organizational Structure of the Kurdistan Regional Statistics Office



SOURCE: Kurdistan Regional Statistics Office, no date-b.

NOTES: "Hawler" is the Kurdish name for Erbil. ICT = information and communications technology.

RAND MG1184-2.1

Greater KRSO involvement with the collection, storage, and dissemination of data has the potential to improve the methods used to collect data and the overall quality of the KRG statistical effort. Such involvement may also focus collection efforts on data that support policymaking in the KRG's highest-priority policy areas. Policymakers currently do not appear to have data readily available for purposes of policymaking. Policy priorities need to drive data requirements, rather than data availability dictating the policy areas that can be approached in a scientific manner.

In some cases, coordination is lacking even within the KRSO. For instance, the KRG has good GIS capabilities through the DIM, which has a directorate in each governorate. However, the DIM has not yet been fully integrated into the KRSO.

Federal-Regional Relations

While the heads of the KRSO and the Iraqi Central Organization for Statistics and Information Technology (COSIT) have had a good working relationship, the challenge is to institutionalize this relationship for the long term so that it does not depend on specific individuals.

Part of navigating this relationship will include remaining cognizant of any new statistics law the Iraqi federal government adopts and the effect such a law might have on the operations of the KRSO. Although there had been a draft of a federal law under discussion in 2010 and 2011, it had been withdrawn as of late 2011.

The Statistics Law

The Ministry of Planning in general, and the KRSO in particular, is a natural repository of statistical information from other ministries. However, there is currently no statistics law that gives the KRSO the mandate to collect statistics from the various ministries. The statistics law is a legal mandate that binds the various institutional components of the statistics system together, and such a law is therefore a critical component of the statistics system of a region or a nation.

The version of the draft law available as of spring 2011 goes very far toward ensuring the collection of appropriate data and their quality and toward giving the KRSO the authority to obtain data. Enshrining these principles in KRG law would be a major achievement and would be a further step in the development of the KRI as a dynamic economy.³

³ In Chapter Seven, we provide a detailed assessment of the draft of the proposed new KRG statistics law and undertake an effort to benchmark the draft law relative to the laws of other countries.

Available Data and Statistics

Objective

The goal of this chapter is to summarize RAND’s understanding of the various types of data and statistics currently collected and available in the KRI.

Overall, we find that some important policy-relevant data are being collected in the KRI, but there are significant gaps in data collection, and existing data are not effectively shared across ministries and between users.

Information Collection and Management Approach

The RAND team endeavored to access all available sources of information about how data and statistics are used within the KRG and what data are available for policymakers. We reviewed the following online resources: KRG websites (Appendix B catalogs ministry websites visited), websites for KRI universities, and non-KRG websites (e.g., those of the Economist Intelligence Unit, the Food and Agriculture Organization, IMF, the United Nations Children’s Fund, UNDP, the World Food Program, WHO, and the World Bank Group).

RAND’s Data Management System

As we collected information on available data, we catalogued the data sources using a custom data-management system that RAND created, the “Data Source Database” (DSD). The DSD classifies each data source according to its characteristics, such as topics covered, collection source, and time period covered.

The data sources listed in the DSD include survey data and administrative data, although we note that from a policy perspective these two types of data often have different but complementary uses. We discuss the differences between data types in more detail in Chapter Five. An example of survey data is the 2007 Iraq Household Socio-Economic Survey (IHSES) (COSIT, KRSO, and World Bank, 2008), which contains information on household characteristics; this could be used, for example, to assess household well-being or the use of public services in order to design more effective policies for residents of the KRI. An example of administrative data is the number of health clinics in each district in the KRI; this could be used, for example, to compare future health service capacity that would be needed to existing capacity in order to design policies to improve access to basic health services.

The DSD was designed to be a “living document.” It can be changed or adapted to better suit the needs of the KRG and this project, and we expanded it throughout the project as the

RAND team learned of new data sources. We hope that the DSD will continue to be useful to the KRSO, the Ministry of Planning, and the KRG more generally, beyond this project, as a repository of available data. We have included a copy of the DSD in the CD attached to this monograph.

We also received or identified documents that did not include quantitative or qualitative data but nevertheless contained important information. For those information sources that do not fit into the DSD classification system—for example, a document that includes secondary school final examinations—we created a “Log of Available Documents” to allow us to track such documents and use them to inform our research. We have included this log in Appendix C as Table C.1.

Available Data

In this section, we summarize the existing data sources in the KRI that RAND has identified. We begin with a summary of the data sources RAND has obtained. Next, we discuss data sources that we have been told exist but that we have not been able to verify directly. For both categories of existing data, the DSD contains more extensive and detailed information than we present here. Finally, we identify some key challenges to identifying data sources.

We also note that, in our experience, some KRG staff members are reluctant to share data resources. We stress that this is an observation based on the meetings we conducted and on conversations with KRG officials; we cannot conclude the extent to which this is a general issue. However, we were told by some individuals that data sharing within the KRG could be improved. This is important because the lack of effective, transparent data sharing can slow the policymaking process.

Data RAND Has Obtained

We summarize here key data sources RAND has identified in the KRI. For a complete list, see the DSD in the attached CD and the Log of Available Documents in Appendix C.

- **The 2007 Iraq Household Socio-Economic Survey:** The IHSES constitutes a rich source of data on household-level income, consumption, education, health, employment, and housing.
- **Agriculture:** Production and consumption of local and imported fruits and vegetables (summary statistics only) for 2008 and 2009 and food prices for 2008 and 2009; agricultural projects from *The Strategic Plan for Agriculture Sector for the Kurdistan Regional Government, 2009–2013* (Kurdistan Regional Government, Ministry of Agriculture and Water Resources, no date); basic agricultural data from the *Ministry of Agriculture Profiles 2007* (Kurdistan Regional Government, Ministry of Agriculture and Water Resources, 2007); production data (1996–2006) and monthly rainfall (1975–2007) from CountryStat Iraq; livestock and animal populations (2001 and 2006) at the governorate level.
- **Census Frame Data:** Estimates of number of housing units, number of families, and number of individuals at the district and subdistrict level.
- **Demographics:** General demographic summary statistics from IHSES; summary tables on the distribution of the KRI population by income group, compared with other Iraq governorates, from the *Kurdistan Region—Iraq Council of Ministers Ministry of Planning*

Statistical Office Yearbook 2008 (Kurdistan Regional Government, 2008); Iraq's 2009 National Youth Survey (Iraq Ministry of Youth and Sports et al., 2009); demographic data on the KRISO website (Kurdistan Regional Statistics Office, no date-a).

- **Development Assistance:** Data on development assistance to the KRI.
- **Education:** Survey data from the Multiple Indicator Cluster Surveys (MICS) rounds two and three (2000 and 2006) on education activities and outcomes for children (Republic of Iraq, Council of Ministers, Planning Commission, the Central Statistical Organization; and United Nations Children's Fund, 2001; Central Organization for Statistics and Information Technology et al., 2007); preliminary Ministry of Education data on counts of students, teachers, and schools for 2010 and 2011.
- **Health:** Survey data from the MICS rounds two and three describing health outcomes in Iraq; 2008 administrative data on health facilities in KRI; the 2006 and 2008 Iraqi Food Security and Vulnerability Survey (United Nations World Food Programme, Iraq Country Office et al., 2006; Central Organization for Statistics and Information Technology et al., 2008); the 2006–2007 Iraqi Mental Health Survey (Iraqi Ministry of Health et al., 2009).
- **Industry Registration:** List of Law 25 factory registrations (1961 to early 2010).
- **Investment:** Board of Investment licensed projects in the KRI (2006–2011).
- **KRG Budget and Personnel:** Projects in the KRI Investment Budget (ongoing in 2009 and proposed for 2010); personnel by ministry (2009 and proposed 2010); budget by broad category (2008, 2009, and proposed 2010); proposed 2010 budget.
- **Labor Force:** Summary data on employment by ministry (2009 and proposed 2010); aggregate statistics on economic activity rates by governorate, employment levels among children, and distribution of workers by occupation from the IHSES.
- **Electricity:** The 2009 electricity master plan; data on generation, transmission, and distribution and on the activities of the Ministry of Electricity.
- **Macroeconomic Data:** Preliminary estimates of regional gross domestic product (GDP) for 2008 using Bayesian methods; consumer price index (CPI) data for the KRI and its governorates for 2008, 2009, and part of 2010.
- **GIS:** Nearly all of these data reside with DIM. They include base maps for each governorate; a gazetteer, updated to 2009, containing all coordinates of locations of interest within the KRI; subdistrict, district, and governorate profiles containing information by sector (such as water, education, health, roads); specialized data for topical reports (such as a 2009 assessment of all projects carried out in Halabja from 2003 to 2009).

Data RAND Has Identified But Not Verified

- **Agriculture:** We have been told there are detailed production and consumption (crops and livestock) data by district or subdistrict, but we have not been able to locate these data.
- **Population Surveys:** We have summary data for the following surveys but lack raw data to verify coverage, quality, and other characteristics: Iraq Family Health Survey, Iraq Living Conditions Survey.
- **Geographical Information Systems:** We have been told that the KRI has mapping data (for example, through the Ministry of Municipalities and Tourism and the DIM);

aside from the data mentioned above, we were not able to verify the geographic or topical extent of these data.

- **Health:** MICS 1 (1996) survey data.
- **Industry:** We have been told that the Ministry of Trade and Industry has industrial production data.
- **Water Resources:** We have seen references to water resource statistics, but we have not been able to find the detailed data.
- **Trade:** We have been told that the Ministry of Trade and Industry has detailed import and export data based on import and export licenses and information from chambers of commerce, but we have not seen these data.
- **Companies:** We are aware of a comprehensive list of all companies registered under Law 21, but we have not seen these data.
- **KRG Budget and Personnel:** We have received a detailed version of the proposed 2010 budget and a briefing with highlights of the approved 2010 budget. However, we have not gained a complete understanding of how government budget data are stored and made available to policymakers; likewise, although we have received employment by ministry, we do not know the comprehensiveness or level of detail of the data.
- **Enterprise Surveys:** We have been told that the KRSO has the enterprise surveys that formed the heart of the 2008 Bayesian GDP estimates, but we have not reviewed this material.
- **Other:** From our discussions with KRG officials, we understand that the following data exist: the number of tourists in each governorate, both foreign and domestic; the number of cars and other vehicles; the number of driver licenses; vehicle accidents; and crime statistics. However, we have not reviewed these data.

Summary of Data Availability and Key Challenges

The KRG has made progress toward collecting critical data to inform policy. The IHSES is a major accomplishment that will provide policy-relevant data across many sectors and has already provided policy-relevant data to help formulate anti-poverty programs. Planned 2011 versions of both the IHSES and MICS 4 are sure to provide more useful data. However, despite these important successes, the data available to policymakers are limited and the data-collection capacity in the KRG is inconsistent across agencies. Later in the monograph, we present detailed recommendations for improving data collection in the KRG, but here we provide a general assessment.

The definition of “data” varies across KRI organizations and individuals, making it difficult to identify existing data sources and data needs to inform decisionmaking. In meetings with ministry staff, there appeared to be a lack of distinction made between raw data and statistics. This is important because many documents we have found refer to raw data but present only summary statistics (for example, *The Strategic Plan for Agriculture Sector for Kurdistan Regional Government, 2009–2013* [Kurdistan Regional Government, Ministry of Agriculture

and Water Resources, no date)).¹ Resolving this issue will require increasing policymakers' knowledge and understanding of different types of data and their uses.

Data-collection capacity, capability, and methods vary across government entities. There is capacity within the KRG to do surveys with a quick turnaround and provide the requisite training for surveyors. However, data gathering is often conducted inconsistently. Many agencies enter and store data on paper, even when electronic means are available. Some agencies have modernized, although the degree to which they have done so is not uniform. There are large gaps in data collection and storage. For example, a unified database of government personnel appears not to exist, which makes it difficult for the government to get information on the number of government employees. As is well known, population data are especially lacking.

We also found that awareness of data and data-gathering activities varies considerably across ministry staff. For example, staff members in one ministry are typically not aware of what types of data other ministries collect. In addition, data management generally does not appear to be systematic: It is challenging to identify who within each ministry is responsible for gathering and managing data sources, especially in cases where organization charts are not well defined or published.

The KRG ministry websites are generally not good sources of data, and consistency across sites could be improved. KRG websites are inconsistent in terms of listing available data and providing links to data sources. When data are reported online, they often are not labeled sufficiently, do not include variable definitions, and do not include units. Standardized reporting requirements could help improve data accessibility.

Finally, there appears to be little systematic data collection outside the KRG ministries and directorates. For example, our conversations with university staff suggest that universities do not have significant data-gathering capacity or activities. Such data collection can prove a useful addition to official data collection should private entities have the necessary freedom to develop and implement data programs.

One challenge is to develop enough capacity within the KRSO so that the KRG does not need to rely primarily on multilateral agencies, such as the World Bank or the United Nations, for large-scale data-collection efforts. Another challenge will be to ensure that data collected are shared among key policymakers in an efficient and effective manner. The KRG has also made important commitments to not only gathering data required by the central government in Baghdad but also going above and beyond to have an exceptional data-collection system.

¹ Presenting only summary statistics is natural and not unexpected in ministry reports or other, similar documents; however, such reports do not allow us to assess the extent and quality of underlying data.

Policy and Data Priorities of the Kurdistan Regional Government

Objectives

The objectives of this chapter are to:

- Summarize the policy priorities articulated by policymakers in the KRG. Since the final goal is to collect data that can be used for making policy decisions, identifying these priorities is a crucial intermediate step.
- Summarize the data priorities of the KRG, where policymakers express a *direct* need for certain types of data.
- Provide a brief rationale articulated by KRG officials for these priorities.

These priorities include shorter-term improvements of public services—including health, education, water and sewerage, electricity, and roads and transportation—and meeting longer-term challenges of private-sector development (with a focus on agriculture and tourism), improved governance, and collection of data that can be used across sectors and policies.

Key Policy Priorities

We interpret the overall policy direction of the KRG to be the development of a diversified economy that is not dependent solely on oil and that relies on the private sector, with sufficient government and social services, and with an education system and labor market opportunities that will improve the standard of living of the people of the KRI.

Achieving these goals will involve many steps along the way. We distinguish between short- to medium-term priorities aimed at satisfying the urgent needs of the population of the KRI and long-term, strategic priorities to put the KRI on a stable path of growth and development. Under long-term priorities, we include specific sectors that are viewed as having strategic interest. Both sets of priorities would require ongoing, periodic data collection, but the short-term priorities might also require special one-time data collection to address immediate requirements.

It is important to note that this chapter summarizes policy and data priorities as articulated by the *KRG policymakers* during our meetings. These are not our own recommendations on what the KRG's policies should be.

Essential Services for the Short to Medium Term

A recurring theme we encountered among KRG policymakers is that certain services—such as health, education, water, electricity, and roads—are not only viewed as essential for the public but are areas in which the public expects to see results from the government quickly. Given population growth, the demand for these services is increasing, and nearly all officials we met mentioned effective provision of these services as top policy priorities.

A related mention was that these services need to be provided uniformly across regions, since eliminating regional disparities is not only important for regional cohesion but also for ensuring development across the region and for satisfying other priorities. For instance, repopulating villages and encouraging agriculture emerged as a top policy priority. But, as one official noted, unless rural services in health, education, and infrastructure are comparable to those in urban areas, few will move to the rural areas.

We briefly discuss the priorities we gathered for each of the specific services:

- **Health.** This was mentioned as a great need by most policymakers. In particular, they noted a need for uniform service across rural and urban areas (the need to get doctors out of the center of town) and the need to upgrade not only facilities but also the skills of nurses and pharmacists. There is also a need for health insurance. While the per capita gross national income (GNI) of the KRI of around \$5,800 compares favorably with that of many developing countries, unanticipated health expenditure can be calamitous even to middle-income households.¹ Privatization of health care is also a possibility, although policymakers felt that primary health care might have to be provided by the government.
- **Education.** While many policymakers highlighted education as a key policy priority, they differed in the emphasis on the level of education. One view was that general education, focusing on skills relevant for the private labor market, was the main need, rather than more universities. Promoting university education might merely increase those seeking, and perhaps even demanding, government positions. A second view held that primary and secondary education are being improved, but universities have become a hindrance to development because they are not producing enough people with skills required for the private sector.² Those with this view held that a major emphasis is required on scholarship programs that will allow a broad cross-section of students to attend universities. A third camp emphasized the need for vocational and technical education, noting that many skills in short demand or missing entirely from the labor market could be provided by postsecondary education, but need not be provided by full university education. One way to reconcile these different positions is to view the need for basic education and vocational education as short-term priorities, and the need for higher education as a longer-term priority required to fuel more advanced private-sector-led growth.
- **Water and Sewerage.** Providing clean drinking water is viewed as a top priority. Improving water and sewerage will also create benefits for other sectors that depend on them, such as tourism. Susceptibility to droughts and dependence on foreign water sources are viewed as major problems. Only about 32 percent of the available river water through the KRI originates from within the region, with the rest originating outside, from Iran and

¹ The per capita GNI estimate is from Van Tongeren and Bartlema, 2010.

² More specifically, people with this view said that skills of graduates are not up to date, and the universities are not linked with businesses, neither providing direct assistance nor keeping pace with the requirements of the economy.

Turkey (United Nations Development Programme—Iraq Recovery and Crisis Prevention Program, 2008, p. 10).

- **Electricity.** Electricity generation is viewed as a success story in the KRI. Its privatization was credited by many for the more stable availability of power relative to the rest of Iraq. The challenges that remain are to rationalize tariffs to prevent wastage and shortage, improve transmission, and improve distribution, which may involve privatizing some aspects of it.
- **Roads and Transportation.** Building roads that conform to high standards is another priority. Although roads are being constructed, they are not always up to standards, and policymakers identified problems in writing specifications, design, management, and financial regulation as a reason for this. Data of a local nature—such as current road conditions, traffic flow, and local terrain—are collected by specialized contractors through feasibility studies, but policymakers noted the need for more comprehensive and systematic data at the regional level—such as data on population and industrial centers—to facilitate strategic planning.

A Well-Functioning Private Sector to Provide Jobs and Economic Opportunity

Encouraging the private sector and reducing the government payroll are high on the list of KRG priorities. A related priority is increasing investment, including foreign investment. Indeed, a few policymakers noted that although there are large foreign investments in construction, there were few KRI engineering companies to form linkages and create a “multiplier” effect of foreign investment. Some went further, arguing that the foreign investment in the KRI was not long-term, but mainly construction projects.

A need was expressed for a business and industry survey to take stock of and track the progress of the agro-business, housing, construction, and manufacturing sectors. There is also a need for the collection and publication of trade data by year, by commodity, and by partner country.

Agriculture

Agriculture is the sector most singled out for attention in the meetings we had.³ Improving this sector is seen to be consistent with a host of other priorities: increasing employment opportunities outside the government, repopulating villages that were destroyed during years of conflict, increasing food security, and, indeed, restoring the prominence the KRI enjoyed as a food basket of Iraq prior to the 1960s. Given the soil conditions, climate, and relative abundance of water, the KRI is thought to have a “comparative advantage” in agriculture. That is, when compared with other sectors, agriculture may be more promising in the KRI than it is in other areas of Iraq or the Middle East.

A recurring theme within agriculture was the desire for self-sufficiency, although policymakers interpreted this idea in different ways. One interpretation was that the KRI should grow all agricultural goods it needs locally and import little, presumably by implementing import duties and restrictions. In addition to the vulnerability that could arise from the dependence on hostile foreign powers for critical goods—the embargo prior to 2003 and the resulting food shortage is still fresh in people’s minds—reported concerns include the low

³ This is reflected in *The Strategic Plan for Agriculture Sector for the Kurdistan Regional Government, 2009–2013* (Kurdistan Regional Government, Ministry of Agriculture and Water Resources, no date).

quality of foreign products, the inability of local producers to compete with low prices, and job losses that result when foreigners sell products at prices allegedly below their production costs.

A different emphasis was on sustainability rather than self-sufficiency, by making more effective use of all available resources. This would involve improving the management of land and water; using agricultural engineers to map out land, soil, and water so that crops can be matched to the best location; improving agricultural research and technology; and commercializing agricultural production. Irrigation systems are also crucial for agriculture, and a few mentioned the need for dams, if not for power generation then at least for irrigation. In this approach, food security would be achieved by increasing productivity and competitiveness and improving storage and preservation, rather than by banning imports.

Improving agro-industry is a related priority, and the challenges here are transportation logistics (especially to the south), the lack of cold storage, and the lack of marketing skills. Most policymakers believe there is a need for the government to help farmers—such as by extending credit, increasing skills, and improving technology and infrastructure. One possibility that was suggested is for the government to develop prototype farms; efforts to provide assistance for developing greenhouses have resulted in a proliferation of greenhouses.

Officials connected with the Ministry of Agriculture and Water Resources noted a lack of data, which hampers the ability to develop strategic plans and ensure the provision of assistance to farmers who need it. For instance, nearly 100 varieties of grapes are grown in the KRI, but a lack of knowledge of exactly how much is grown and in which locations hampers policy planning. Although gathering crop-level statistics would require periodic surveys, the ministry would also like satellite imagery and such data as the percentage of land covered by forests and the amount of arable land.

Tourism

Another sector that ranked highly among the officials we met is tourism. Here, too, with its rich history and archeological heritage and a climate much cooler than the rest of Iraq and surrounding regions, the KRI is thought to have a comparative advantage that could be exploited. Its location also makes it well placed to serve as a gateway for religious tourism from neighboring countries to middle and southern Iraq. There is already burgeoning tourism from these places to religious sites, such as Najaf and Kerbala, through the KRI.

In addition to contributing to the regional product directly, tourism is viewed as a catalyst for economic activity in construction and infrastructure, including roads, electricity, water and sewerage, airports, hotels, and transportation.

As with roads, local data are available—for instance, the number of tourists, gathered from ports of entry and hotels—but policymakers noted that more regional data are needed for strategic planning, especially for the master plan for tourism currently being developed.⁴

⁴ We examined the allocation of the KRG's budget across the various ministries to determine what priorities are reflected in government spending decisions. From the 2010 Operating Budget, we find a rough correlation between priorities and money spent. From the 2010 Investment Budget, we find that investment expenditures reflect an apparent change in priorities. Although the Ministries of Municipalities and Tourism and Reconstruction and Housing retain large shares of investment expenditures, the share of new projects going to the Ministries of Agriculture and Water Resources, Education, and Higher Education is much larger than their share of ongoing projects. Likewise, the share going to electricity has fallen, perhaps due to the major improvements in the KRI over the past several years.

Governance

Good governance and civil service reform is a priority, as stated on the KRG's website and documents and as articulated by its top officials.⁵ While transparency regarding the data *collected* by the government is crucial for the acceptance and use of statistics by the decisionmaking agencies and the public, KRG officials felt that it is equally important to make the data about the *functioning* of the government transparent. The availability of good information and communications technology (ICT) infrastructure is viewed as essential for the government to make data on its functioning widely available.

Key Data Priorities

In addition to policy priorities, a few of the priorities articulated to us were related directly to data. We summarize these in this section. In general, the opinion was that there is a lack of data for planning and policymaking in the KRI and that the region should benchmark itself against other regions and countries around the world—such as Abu Dhabi and Dubai in the United Arab Emirates, Southeast Australia, British Columbia, and Malaysia—in terms of methods. However, one opposing view was that the KRI was not at a stage where it needed data for policymaking, and much could be done with just a grasp of basic economic intuition. For instance, in housing, it is clear that there is a large unmet need, so data are not immediately needed to know how many houses to construct.

Census

The highest data priority mentioned by the KRSO and the Ministry of Planning is the census, which was to be conducted in 2010. The census is the main source of information on population, students, and the well-being of households, among many other categories. Although data for the “census frame” for the KRI had been collected (essentially head counts at a detailed geographic level), the actual census to collect detailed information ended up being delayed beyond 2010. While we concur with the importance of the census, we consider it to be outside the scope of our study, given that the authority for conducting it lies with the central government. As such, we will not have any recommendations to make on this matter in this monograph.

Regional Accounts and Labor Market Indicators

Apart from the census, the data priority most often mentioned was regional-level data and economic indicators, such as the gross regional product, unemployment, and inflation. Although there are efforts underway to collect some of the components relevant for these indicators, there was a feeling that a more systematic approach, with periodic surveys to track changes, was needed, rather than the current practice of relying on occasional data collection. A related priority often mentioned was the need for standardization and uniformity in classification so that

⁵ As an example of one such KRG statement, then–Prime Minister Nechirvan Barzani noted in May 2006:

Our main task is forming a system of good governance through the participation of all groups, with transparency and accountability, which means a modern, professional government. . . . We have to better understand in more depth the concepts of good governance, transparency, accountability, federalism, democracy, freedom and pluralism, which are urgently needed to develop a new government like ours. (Kurdistan Regional Government, Council of Ministers, 2009)

data collected from different geographical areas of the KRI can be aggregated in a meaningful way to construct regional statistics.

Summary

The KRG is faced with the task of balancing its limited data-collection resources with collecting enough data to transform its policymaking practices into a system that is driven by data. Given these competing goals, a necessary first step is to define policy (and in a few cases, data) priorities. Based on input from officials in the KRG and KRG documents, these priorities include the shorter-term improvements of public services—including health, education, water and sewerage, electricity, and roads and transportation—and meeting the longer-term challenges of private-sector development (with a focus on agriculture and tourism), improved governance, and collection of data that can be used across sectors and policies. Table 4.1 summarizes these priorities.

The necessary next step is to define exactly which data indicators will help most in making policy for these priorities and to identify the types of policy questions such data can answer. The next chapter takes this step.

Table 4.1
Summary of Policy and Data Priorities of the Kurdistan Regional Government

Nature of Priority	Priority Type	Priority Area	
Urgent	Provide access to public services that people urgently need	Health	
		Education	
Longer-term	Data priority	Water	
		Electricity	
		Roads	
		Regional-level macroeconomic indicators, such as gross regional product, unemployment, and inflation	
		Economic development	Private-sector employment
		Priority sector	Agriculture
Priority sector	Tourism		
	Priority sector	Good governance	

Data Requirements to Address Policy Priorities of the Kurdistan Regional Government

Objective

The objective of this chapter is to develop the data indicators that will help address each of the policy priorities identified in Chapter Four. We develop detailed data indicators for ten priority areas and identify a few within each area as “critical”—those that policymakers need to know on a regular basis to guide high-level policymaking. We note that the data need to come from multiple sources, and data will often be applicable across multiple policy areas.

From Policy Priorities to Data

The urgent priorities that emerged based on our discussions with KRG officials include providing public services people urgently need (health, education, water, electricity, and roads) and collecting data that the KRG needs for policy planning (macroeconomic indicators, such as gross regional product, unemployment, and inflation). The overall policy direction of the KRG is developing the KRI into a diversified economy that is not dependent primarily on oil, focusing on sectors in which the KRI has a comparative advantage (such as agriculture and tourism). There are six urgent policy and data priorities and four longer-term priorities, for a total of ten priorities.

We first present a broad overview of our data recommendations. These recommendations appear in a set of ten Excel workbooks, or spreadsheets, that accompany this monograph in a CD. Although it is unlikely to be fruitful to discuss each spreadsheet in detail in this chapter, we discuss in some detail the data we recommend for an urgent priority area (water) and a longer-term priority (private-sector development) in the subsequent subsections to provide a flavor of the contents of the spreadsheets. We then provide a set of policy questions that data from each of the spreadsheets can answer, in order to refocus the discussion from data to the purpose of data collection, which is to improve policymaking. We then highlight a few of the crosscutting data-collection issues that emerge from the data recommendations for all priority areas. The indicators designated for each priority policy area add up to a large amount of data. These indicators are unlikely to be necessary or even useful for top policymakers. Therefore, we next focus on a set of “critical indicators” for each sector—the indicators that should be the highest priority to guide high-level policymaking in the KRG. The final section presents conclusions. Appendix D lists references consulted for each priority area.

A cautionary note on both the critical indicators and the numerous other data indicators we have recommended is that these data items are meant to be used purely for policymaking. There has been concern among ministry officials that the data might be used to evaluate the work of the ministries that generate them or work in the relevant policy areas. We strongly caution against this use. Although these indicators may compose a subset of the data needed for evaluation, much more data are needed to evaluate ministry performance fairly. Such data items include staffing, budget, ministry mandates, other governing laws, and internal guidance documents. Indeed, we recommend that these indicators *not* be used to evaluate ministry performance at this time. Doing so could lead to less sharing of data and reluctance to develop better data-collection and storage systems at a time when the KRI desperately needs them.

An Overview of the Data Spreadsheets

There are ten Excel workbooks—one for each priority area—with recommended data items and a list of available data. There are a total of more than 650 data items across the ten areas. Water and health have the most indicators, with around 120 each. Together, the data items constitute the core data that the government of a productive economy needs to collect to aid effective policymaking in the designated priority policy areas. Not all indicators are equally important. To reflect this, and to recognize that data-collection and analysis resources are scarce, the spreadsheets also indicate whether a data indicator is high-priority or low-priority. High-priority indicators should receive precedence in data-collection efforts.

The data indicator spreadsheets are designed to be a broad resource for the KRG to guide data-collection activities, but they are not designed to be a universe of all possible data indicators that should be collected in the KRI. The goal is to guide data-collection activities for the KRSO in a way that produces policy-relevant information across ministries that will be broadly beneficial. However, the data indicators suggested here are intentionally not exhaustive. That is, we do not include every piece of data that individual ministries will need to operate effectively. For example, the Ministry of Housing and Reconstruction already collects information that is more detailed than is presented in these spreadsheets on how roads are constructed, including materials, construction timelines, and budgets. This type of information is generally not in the data indicator spreadsheets, because it is needed primarily for the ministry's own planning and operations. Instead, the data indicator spreadsheets recommend a range of indicators that will be useful *across* the KRG—and even outside the KRI (for example, to potential investors).

KRG policymakers may also find, upon further reflection, that some of the indicators we recommend will not be useful. Although we are confident we have pinpointed the appropriate indicators, we understand that even with our intensive exploration of the Kurdistan policy and data environment, we may not have full information. Therefore, these Excel spreadsheets can, at a minimum, serve as a useful guide and starting point to further data identification.

Table 5.1 presents a summary of the details contained in the columns of the data spreadsheets. Although the explanation for most of the variables is obvious, two warrant further discussion.

The “source of data” refers to the way in which a specific data item is generated. The ministries and other agencies of the KRG keep administrative records as part of their normal functioning, and these records can be the source of some of the recommended data. For example, records of business start-ups can be useful input into private-sector data. In some cases,

Table 5.1
Summary of Details in Spreadsheets

Variable	Description
Data item	Broad categories and subcategories of data, individual data items, and definitions where needed
Priority	High- or low-priority data
Unit	Natural unit for data item (e.g., Iraqi dinars for gross value of fixed assets)
Source of data	Where data will come from (e.g., administrative data, surveys, or other sources)
Potential data-collection organization	Typically, the KRSO, in collaboration with the relevant ministry, but other agencies as well
Levels at which data should be reported	At district, governorate, or regional level (desired level of aggregation)
Data-collection frequency	Ongoing collection (e.g., health indicators), quarterly, or annually

ministries and agencies may need to collect additional administrative records or adjust the way that existing data are collected to construct particular indicators. But administrative data alone cannot fulfill all needs; periodic surveys would be needed to collect data in some cases. For example, surveys of enterprises and households would be needed to gather employment statistics.

The “levels at which data should be reported” refers to the level of aggregation at which the specified data item should be ideally reported. This is not to be confused with the sampling unit that is relevant for surveys, or the geographic unit at which they are representative. For instance, many of the health indicators would need to be reported at the district or even sub-district level, but that would be overkill for import and export data, which could be reported for the entire region or, at most, at the level of each governorate.

Water: A Detailed Example of an Urgent Priority Sector

In this section, we present details on the recommendations made for the water sector—identified as an urgent priority—to provide a flavor of the contents of the data spreadsheets. As discussed in Chapter Four, improving water and sewerage, developing an integrated water management system, and expanding irrigation infrastructure are important items in the KRG’s policy agenda.

We consulted the standards adopted by the UN Statistics Division, *International Recommendations for Water Statistics* (2010), which have been developed to assist countries in establishing and strengthening a multipurpose information system for water to support integrated water resources management. We combined elements from these standards with the needs expressed by KRG officials. We then consulted with a RAND water expert to gather feedback on our list and made the appropriate modifications. Table 5.2 presents examples of data items that can be found in the spreadsheet for water.

As an example of how to use these indicators, consider one policy question: How can the KRG design an effective water tariff strategy, taking into account constraints, revenue goals, household welfare, and resource supplies?

Table 5.2
Examples of Water Data Items

Major Category	Examples of Subcategories	Examples of Data Items
Inland water stocks	Surface water stocks; groundwater stocks	Surface water stocks in artificial reservoirs, in lakes, in rivers
Environmental flows into and out of the territory	Precipitation; inflows from neighboring territories; evapotranspiration	Water inflows secured through treaties; evaporation
Losses from distribution networks and sewer systems	None	Losses of water in distribution; treatment of disposal in collection
Flows of waterborne emissions from the economy to the environment	From point sources to the environment; from diffuse sources to the environment	From point to inland water resources; from diffuse sources to groundwater
Value and costs of water and sewerage services	Value of shipments/sales/turnover; compensation of employees	Value of water sales; compensation of employees related to supply activities
Tariffs and charges for water supply and sewerage services	None	<i>Volumetric tariffs and charges for water supply; fixed charges for water supply</i>
Main source of drinking water used by populations	Improved water sources; unimproved water sources	Piped water into housing unit; public standpipe; dug wells

One particular item in Table 5.2 can be useful in answering this: “volumetric tariffs and charges for water supply” (italicized in the table). The spreadsheet presents the following information about this indicator:

- *Definition:* Charges to users (in other words, economic units) per unit of water supplied per connection
- *Priority:* High
- *Unit:* Iraqi dinars per cubic meter
- *Source of data:* Administrative records
- *Data-collection organizations:* Ministry of Municipalities and Tourism
- *Data-collection frequency:* Annual.

This indicator would help policymakers understand the current tariff structure and how much money the KRG collects per unit of water supplied. In addition, the spreadsheet would guide policymakers into designating the optimal source of the data, who should collect the data, and how frequently. When combined with information about the costs of supplying water and the distribution of household income and water use, the indicator could help policymakers improve their tariff strategy.

More generally, the recommended water indicators would give the KRG a clear inventory of existing water supplies, how water flows throughout the region, water use and pollutants that enter into water supplies, the existing cost structure for providing and paying for water, and the ways households access and dispose of water for consumption—indicators closely related to the United Nations Millennium Development Goals. The indicators can be used to address numerous policy questions, including the following sample questions:

- How can the KRG address water management so that existing water can be distributed efficiently?

- How can the KRG assess current water use so that appropriate technologies for monitoring water use can be implemented?
- How can the KRG assess alternative approaches to promoting sustainable water use?

Private-Sector Development: A Detailed Example of a Longer-Term Priority

In this section, we present details on the recommendations made for the private sector, the development of which was identified as a longer-term priority. A thriving private sector is not only good for overall economic growth and development—it is also useful for reducing the government payroll, another principal aim of the KRG. Legal reform (of labor and social security laws, for example), increasing foreign and domestic investment, and improving linkages between these investments are components of private-sector development.

We consulted *International Recommendations for Industrial Statistics 2008* (United Nations Statistics Division, 2009) and *Integrated List of Data Items for Use in Basic Economic Statistics* (United Nations Statistics Division, 2007b) as part of our standards-based approach to recommending data. We consulted with the staff of the concurrent RAND project aimed at improving the private sector and decreasing government employment to ensure consistency of the indicators with the recommendations of that project. Table 5.3 presents examples of data items that can be found in the spreadsheet for the private sector.

As an example of how to use these indicators, consider two policy questions: Is the private sector growing? Which sectors are growing more rapidly?

One particular item in Table 5.3 can be an element in answering these questions: “wages and salaries” (italicized in the table). The spreadsheet presents the following information about this indicator:

Table 5.3
Examples of Private-Sector Data Items

Major Category	Examples of Subcategories	Examples of Data Items	Comments
Industrial statistics	Business demography; employment; expenditures; revenues; orders	Number of enterprises, by location, economic activity, and size; hours worked; <i>wages and salaries</i>	Also relevant for macroeconomic indicators
Foreign investment	Inward and outward FDI	FDI capital flow; FDI income	Also relevant for macroeconomic indicators
Trade	Exports; imports; trade with rest of Iraq	Exports of goods and services; imports of goods and services	Also relevant for macroeconomic indicators
Financial sector	Banking; insurance; stock market	Number of banks; number of bank branches; stock market capitalization	Data from Central Bank of Iraq, stock exchange
Labor statistics	None	Economically active population; participation rate	Also relevant for macroeconomic indicators
Short-term indicators	None	Index of industrial production; orders of manufactured goods	Lower priority
Science, technology, and innovation	None	Research and development expenditures; number of researchers	Lower priority
Investment climate	None	Number of days required to obtain a permit	Needs to conform to Doing Business survey

NOTE: FDI = foreign direct investment.

- *Definition:* Total remuneration, in cash or in kind
- *Priority:* High
- *Unit:* Iraqi dinars
- *Source of Data:* Enterprise survey
- *Data-collection organizations:* Ministry of Trade and Industry, in collaboration with the KRSO
- *Administrative unit at which data should be reported:* governorate, entire KRI
- *Data-collection frequency:* Quarterly.

This indicator would help policymakers understand how much private-sector workers are earning. A rising number would be one indicator of a growing private sector. If these data are collected by sector, they would indicate which sectors are growing the fastest, and which are shrinking. When combined with counts of employees, the data can indicate how broad-based the growth is.

More generally, the indicators can be used to address numerous policy questions, including the following sample questions:

- Has employment in the private sector increased, and in which sectors?
- How important is foreign capital? Should the KRG increase efforts to attract foreign investors?
- How globally integrated is the KRI with foreign economies? Who are the main trading partners of the KRI?
- How competitive are companies in the KRI? How has their productivity changed?

Policy Questions That Recommended Data Can Address

The data indicators included in the Excel spreadsheets can answer a large number of policy questions. The following list of questions is intended to provide only a sampling of the issues that can be addressed with the recommended data. The list is not intended to be comprehensive, nor is to be construed as constituting definitive recommendations for policymaking. We have already presented sample questions for water and private-sector development, so in this section we present sample questions for the eight other policy areas.

Health

- Which villages have no health facilities? What are the gaps in health care provision in rural areas?
- Where and how large are the shortages of health care labor supply?
- Is the government providing the minimum standards of health care to the entire population?
- What is the demand for health care in different areas of the KRI? Is it met?
- Are there enough pharmacists and nurses graduating from educational institutions?

Education

- How does the KRI population's educational attainment compare with the rest of Iraq and with other regions?
- What is the quality of vocational education programs?
- What is the demand for education going to be in the coming years?
- Where and how large are the shortages of labor supply in education?
- Where in the KRI is there need for more educational facilities, and how large is the gap between education supply and demand?
- What level of education provision (for example, schools and teachers) is necessary if the rural areas are repopulated?
- How well does the distribution of postsecondary education fields match the jobs being created in different sectors and occupations?
- How many individuals leave the KRI to obtain higher education in other countries, and how does the KRI's higher education system compare with that of neighboring countries to which Kurdistan residents travel to obtain education?
- Is there any gender inequality in education?

Electricity

- How does electricity supply compare with demand? What is the frequency of power loss, and where do losses occur?
- What sectors exhibit the greatest growth in electricity demand, and are existing and planned supplies sufficient to meet demand?
- What are the existing electricity tariffs (for residential, commercial, and industrial users), and are tariffs sufficient to cover generation, transmission, and distribution costs?

Road Transport

- How do road systems vary in terms of vehicular traffic, and which roads suffer from congestion or excess wear and tear?
- Which routes experience longer-than-optimal travel times?
- What factors are correlated with roadway crashes, and how do crash rates vary by district?

Macroeconomic Data

- What is the projected tax revenue for next fiscal year?
- How does fiscal policy affect the performance of the economy?
- How does the KRI's economic performance compare with that of other areas, either within Iraq or in neighboring countries?
- What factors affect labor supply decisions?
- By how much should public-sector salaries be adjusted to account for the cost of living each year?

Agriculture

- Which areas of land are underperforming (in terms of yields) relative to comparable land types and regions?
- What are the limiting resources in the KRI related to agricultural production?
- Which government projects have led to the most notable increases in available agricultural inputs or production yields?

Tourism

- Where do visitors to the KRI travel, and what modes of transportation do they use? How does this compare with domestic visitors?
- How much do visitors spend, on what products and services, and in which parts of the KRI?
- In which parts of the KRI is there unmet demand for tourism? What are the constraints that limit additional tourist activity?
- What types of public infrastructure or transport infrastructure, if any, would support additional tourism to or within the KRI?

Good Governance

- What factors under the government's control most affect the ability of private firms to operate effectively?
- Do households and firms have access to government laws, documents, and public information? What delays do households and firms experience when trying to retrieve these documents?
- How long does it take a prospective firm to start a business? What key inputs to starting a business are abundant and which ones are constrained?
- How do household and firm perceptions of accountability compare with their experiences (for example, informal payments), and what areas can the government focus on to improve household and firm experiences?

Crosscutting Data-Collection Issues

A few common issues applicable across the ten priority areas emerged while developing the data indicators.

- Data will have to come from different sources:
 - Administrative data (for example, death rates from vital records, number of enterprises by economic activity from a registry of businesses, water use by different economic units)
 - Surveys of households and enterprises (for example, access to water and sanitation, number of people employed by business)
 - Although KRG administrative data and KRG surveys will predominate as sources, data will also occasionally come from units of the Iraqi central government (for example, banking data from the Central Bank of Iraq).

- Data will often be applicable across policy areas. For example, labor statistics and an index of industrial production are relevant for both macroeconomic (regional accounts) and private-sector indicators. To avoid duplicating efforts, it will be important to study these overlaps and recommend a streamlined way of collecting data as next steps in the development of a comprehensive data system.
- Relevant ministries, in collaboration with the KRSO, would potentially be responsible for data collection:
 - The KRSO would clearly have the methodological expertise and needs to take the lead in the collection efforts.
 - Ministries would provide input on data items, and involving ministries would get their buy-in on data collection, which is crucial for successful cooperation between the ministries and the KRSO.
 - Iraqi central government agencies (such as the COSIT or the Central Bank of Iraq) might need to be involved for some indicators, and hence cooperation between the KRG and those agencies is also essential.
- Broad collaboration is especially needed for household surveys, which are crosscutting and cover multiple areas, such as health, education, and employment. We recommend channels for such cooperation in Chapters Six and Seven. This point and the previous two points all suggest the importance of transparency and collaboration within the government.
- For data not collected by the KRSO, the frequency with which data shared with the KRSO might be different from frequency of data collection. In other words, the frequency of data *collection* may be disconnected from the frequency of data *dissemination*. The system that structures dissemination might best be housed within the KRSO. For example, health data will be collected on an ongoing basis, but the KRSO might need to receive those data at pre-specified intervals so as to avoid being overwhelmed with coordination efforts.

Critical Indicators

The data sheets discussed earlier cover a wide range of indicators with differing priorities for policymaking for the ten priority policy areas. In many cases, the indicators are most relevant for ministry-level policymaking. However, the most senior leaders of the KRG will also need to monitor progress in the ten priority policy areas for their high-level decisionmaking, but they will not need the multiplicity of indicators available. Instead, they can best be served by receiving a more limited set of indicators periodically and calling on the ministries or the KRSO for more data when necessary.

In this section, we focus in particular on the limited set of indicators that should go to top policymakers regularly; we term these indicators “critical” indicators. This relatively concise set of indicators represents the information that the Prime Minister, the Council of Ministers, senior advisors of the Prime Minister and other ministers, and other top-level units, such as the KRG Economic Council, should be able to consult when making strategic planning decisions in the KRI. Beyond this circle of policymakers, it would also be valuable to disseminate these indicators to the public so they have a better sense of the KRI’s progress.

We suggest that these critical indicators should have the highest priority for collection and dissemination. The high-priority indicators would then be next in collection order, with the low-priority indicators collected last.

The critical indicators for the ten policy areas were selected from within the broader list already identified based on (1) RAND researcher expertise, (2) international best practices, and (3) feedback from KRG officials working within each sector. Table 5.4 lists the critical indicators by sector and indicates the frequency at which the data should be reported. The sector spreadsheets that accompany this report provide more detailed information about each indicator.

Collecting the Critical Indicators

Some of the critical indicators listed in Table 5.4 are currently being collected but are not widely disseminated. Others are not being collected but can be collected relatively easily. Still others are complex statistics that can be derived only through combining other indicators or through sophisticated collection efforts.

We recommend three immediate steps regarding the critical indicators:

- First, the KRSO or the Ministry of Planning should endeavor to find out which of these indicators are currently being collected.
- Second, the KRSO should undertake arrangements for receiving these indicators on a regular basis.
- Third, the KRSO should at the same time institute a system for transmitting them regularly to the Minister of Planning, the Council of Ministers, and the Prime Minister, and for publicly disseminating them. In this process, the collecting ministries should get full credit for their efforts—the disseminated indicators should not be presented as solely a KRSO initiative. A dedicated website is the easiest way to do this, with critical indicators personally transmitted to the Minister of Planning, the Council of Ministers, and the Prime Minister and then posted to the web shortly afterward, for example within two days.

Longer-range steps will include working with ministries to develop the collection of the more complex indicators.

Summary

The KRG can use hundreds of data indicators to improve policymaking in its most pressing policy areas. However, there is no need for it to embark on an effort to collect all of these indicators at once. Some are more important than others. And some will be more important to specific policymakers than to all policymakers in general.

It is important to remember that the data indicators we have recommended are useful for policymaking, but not necessarily for the evaluation of the ministries executing a given policy. Although the data indicators we defined could form part of that effort, far more information would be needed. Therefore, in developing data systems, we suggest that the Ministry of Planning and the KRSO assure the ministries that the indicators will be used solely for policy development and not for evaluation.

Table 5.4
Critical Indicators to Inform Policymaking

Indicator	Data-Collection Frequency
Agriculture	
Production of staple crops (wheat, rice)	Seasonal and annual
Production of high-value crops (grapes, pomegranates)	Seasonal and annual
Land in use for agricultural production	5–10 years
Water used for irrigation	Annual
Education	
Number of new schools completed during the year	Annual
Percentage of teachers trained during the year	Annual
Gross student enrollment in secondary education	Annual
Net student enrollment in secondary education	Annual
Completion rate in secondary education	Annual
Electricity	
Unit nameplate capacity	Annual
Unit feasible capacity	Annual
Peak demand (load)	Semiannual
Governance	
Code of conduct implemented (de jure)	Annual
Public access to laws	Annual
Public access to regulations	Annual
Time to start a business (domestic enterprise)	Annual
Health	
Infant mortality (0–11 months)	Annual
Number and density of physicians per 10,000 population	Annual
Density of hospital beds per 10,000 population	Annual
Percentage of districts meeting standards for number of main public health centers (1 per 10,000 population)	Annual
Percentage of districts meeting standards for number of branch public health centers (1 per 5,000 population)	Annual
DPT3: Percentage vaccination coverage among 1-year-olds (12–23 months) with three doses of DPT	Annual
Macroeconomics	
Total government expenditures	Monthly
Personal expenditures on goods and services	Quarterly
Exports of goods	Quarterly

Table 5.4—Continued

Indicator	Data-Collection Frequency
Imports of goods	Quarterly
Unemployment rate	Quarterly
Consumer price index	Monthly
Private sector	
Number of enterprises by economic activity	Annual
Number of persons employed by economic activity	Quarterly
Foreign direct investment inflow	Quarterly
Fixed investment by firms	Quarterly
Mobile phones per 1,000 people	Annual
Internet users per 100 people	Annual
Tourism	
Arrivals by class of visitor (overnight, same day)	Quarterly
Average length of stay (all types of establishments)	Annual
Average expenditure per day	Annual
Transportation	
Extent of paved roads	Annual
Passenger vehicles traveling between major cities	Annual
Goods transported by road (tons/hour)	Annual
Injury collision	Annual
Water	
Surface water stocks	Annual
Flows of water from inland water resources to economy	Annual
Losses of water in distribution	Annual
Population using improved water sources	Annual

NOTE: DPT = diphtheria-pertussis-tetanus.

Among all the indicators we defined, a smaller set is of high priority. These are the indicators that the individual ministries and the KRSO should concentrate on as they expand and improve their data-collection efforts. However, these indicators will not necessarily be useful to the highest level of policymakers or the public. Instead, given the KRI's pressing needs, we have defined a restricted set of *critical* indicators that should be disseminated to top-level policymakers and to the public. Dissemination to policymakers will ensure that they understand the current conditions of the region and use them for decisionmaking. Dissemination to the public will go far in fulfilling the KRG's policy priority of improving good governance and transparency.

Methodologies for Data Collection and Handling

Objective

The objectives of this chapter are to

- Discuss the key components and activities involved in identifying, gathering, and disseminating comprehensive, high-quality, and policy-relevant economic and social data.
- Review key data-collection methods and the steps necessary to ensure quality in data processing.
- Highlight data-gathering activities that are relevant to the KRI's future data-collection priorities.
- Essentially provide a “mini user's manual” for data collection and management, although we do not intend it to replace formal training in data-collection methodology.

Types of Data Collection

In this section, we briefly review the major types of data collection used for policy and planning purposes—administrative data, census data, and surveys—and the merits and limitations of each. We provide examples from existing activities in the KRI and from key international data-collection initiatives.

Administrative Data

Administrative data broadly describes information that is collected by government or other entities for their own purposes. Such data generally include only the individuals or businesses that are involved with the administration of programs, policies, or services, as opposed to data collected from the entire population. Administrative data are typically compiled from records at ministries or agencies, and the information is usually generated by government offices or facilities as part of their normal functions. Examples of administrative data include facility, manpower, and usage data compiled from the regular reports of hospitals and primary health centers submitted to the Ministry of Health; data on births, deaths, and other vital statistics compiled from the civil registration system; data on daily electricity generation compiled from power plants; and data on school activities and enrollment compiled from school reports to the Ministry of Education.

Census Data

At the most general level, a *census* is a count of all members of a specific population, whether individuals or other entities, such as enterprises, housing units, or even livestock. In addition to a count, a census may also collect information about location and other key characteristics. The United Nations Statistics Division (2008) defines the essential features of a census as the following: counting of individual units, all of them within defined boundaries, at the same point in time at predetermined intervals (for example, every ten years). A census can be of great value, not only to provide information collected as part of the census, but also to provide a framework and information for the design and weighting of sample surveys of various kinds.

Population censuses are the most well-known example of this type of data-collection exercise, in which governments attempt to count all citizens at the same time. Traditional censuses of this nature are among the largest operations that governments undertake, requiring mapping the entire country, recruiting and training teams of interviewers, conducting public campaigns, canvassing all households, conducting and compiling vast amounts of information, and analyzing and disseminating the data. All of this is usually done at recommended intervals of ten years (United Nations Statistics Division, 2008). Perhaps more relevant to the current legal and constitutional situation faced by the KRI are other types of important census activity. For example, an agricultural census provides policymakers with a complete count of agricultural enterprises, their ownership, and land use and production practices. Another example is an enterprise or establishment census, which provides a similarly comprehensive account of businesses.

Surveys

Unlike census data, *survey data* are collected only from a sample of the population of interest, usually in a manner that enables statistical inferences to be made about the whole population. Sampling is a technical exercise; we refer to it throughout this chapter and cover it in detail in a later section in this chapter. The various types of surveys include specialized surveys covering single subjects; multisubject surveys, in which multiple subjects are covered in a single survey; and multiphase surveys, in which an initial phase is used to screen sample units for subsequent phases. Surveys that are repeated over time may be implemented either as repeated cross-sections, where new samples are drawn in each round, or longitudinally, where data are collected from the same sample units over a period of time, allowing the surveyor to measure changes over time for the same person or entity. In some cases, it may be a mixture of both, such that a longitudinal panel is “refreshed” with new cases from cross-sectional surveys at specific intervals.

Examples of specialized surveys include surveys of users of a particular service, such as tourists, or a particular demographic group, such as young people. For instance, the OECD Programme for International Student Assessment (PISA) student surveys are highly specialized internationally standardized student assessments administered to between 4,500 and 10,000 school students of age 15 (PISA, no date). The survey is designed to answer specific questions about the students’ skills and their capacity for learning. Other examples include the Iraqi Mental Health Survey, which focuses specifically on issues of mental health and well-being.

A more comprehensive and flexible—albeit more resource-intensive—approach is to invest in large, multisubject surveys that are representative of the population, such as the World Bank Living Standards Measurement Study (LSMS) (World Bank, 2011b). The LSMS surveys originated in an initiative established by the World Bank in 1980 to explore ways of improving

the type and quality of household data collected by statistical offices in developing countries. They are designed to produce rich datasets on small national samples with high standards of quality control and to allow cross-country comparisons for features. The IHSES of 2007 has some of these features. Another example is the MICS (Multiple Indicator Cluster Surveys) Round 4, which was being conducted in Iraq in 2011. Other specific variations include the Living Standards Measurement Study: Integrated Surveys on Agriculture (LSMS-ISA), which generate nationally representative household panel data with a strong focus on agriculture and rural development (World Bank, 2011c). The data allow policymakers to ask questions about multiple aspects of household economic life, health, education, and overall welfare, controlling for a wide array of demographics. Another well-known example of multitopic household surveys, the RAND Family Life Surveys, collect longitudinal data for all or some of the survey sample, tracking families over decades and enabling policymakers to analyze issues that evolve over time, such as the dynamics of poverty transitions and migration (RAND Corporation, 2010).

An important example of a survey that looks at firms rather than households is the World Bank Enterprise Surveys. An enterprise survey is a firm-level survey of a representative sample of registered firms in an economy's private sector, primarily focusing on manufacturing and services sectors, covering a broad range of business environment topics including access to finance, corruption, infrastructure, crime, competition, and performance measures.¹ *Doing Business*, another World Bank Group initiative, is also a firm-level survey, albeit one that focuses on domestic small and medium-size companies to obtain objective measures of business regulations and their enforcement (*Doing Business*, 2011). Both surveys are repeated regularly, annually or every few years. Such initiatives allow policymakers to ask questions about entrepreneurship, regulation, and economic growth at a micro level.

Choosing Among Data-Collection Options

Each type of data collection described above has benefits and drawbacks, and here we describe in more detail the relative merits of each.

- **For policy analysis, using administrative data has several benefits.** Data gathering through internal reporting mechanisms usually means that additional costs of using the data are generally low, and the depth of information can be very rich. For certain outcomes, such as budget allocations, administrative records may provide the best source and most objective measures. However, cleaning and storing this information is often a secondary concern for the collecting agency relative to its primary organizational mission, and compromises in quality and standardization relative to the rest of the government have to be made. The reliability of data can be very idiosyncratic, depending on the level of recordkeeping and the consistency of definitions and concepts. Even when data are of good quality, the scope may be limited by their intended use for specific legal or administrative purposes.
- **Census data are accurate but costly and difficult to collect.** Properly obtained census data are the most authoritative source of information on the size, composition, and spatial distribution of the population of interest, as a census is unaffected by sampling error. For statistics related to small areas or groups, a census is often the only option. However, due

¹ See World Bank (2011c) for the Enterprise Survey methodology.

to time and resource constraints and the need to establish a universal count, data may often be filled by proxies (individuals who are not the desired respondent but who are available when site visits are made).

- **Survey data share desirable properties with other types of data.** Survey data are often a cheaper and timelier alternative to census data, and a more relevant and convenient alternative to administrative record systems. Designing a survey offers the greatest scope and flexibility in content. However, collecting and using survey data requires adequate knowledge of statistical methodology in order to first draw appropriate samples and then make correct inferences. With smaller sample sizes, analysis of small geographic areas or subpopulations is often an issue.

Elements of High-Quality Data Collection and Data Management

Because collecting comprehensive, policy-relevant data is a multistep process, getting the essential elements right will help ensure that the final data products are accurate and useful. These components include designing data-gathering instruments and protocols, sampling for survey data collection, implementing data collection, ensuring quality during the collection process, storing and disseminating data, and protecting the confidentiality of human subjects. We outline the critical elements and provide references to more detailed treatments of the topic when possible.

Instrument and Protocol Design

Before the actual data collection can begin, pre-collection activities should be completed to ensure that the data-collection process is effective and runs smoothly. Designing the data-collection instrument (for example, a survey questionnaire or “form” or an administrative data checklist) is one such activity. The steps involved in this design are as follows:

- **Designing the data-collection instrument:** Data collectors should ensure that they have enough information about the nature of the data to be collected to design an informed instrument. This is especially true when the subject matter is complex, or the anticipated respondents are unfamiliar. Gathering qualitative data, using focus groups or expert or stakeholder interviews, before constructing the data-collection instrument is recommended. These are effective ways of collecting rich information that can inform instrument design.
- **Choosing the types of questions:** One of the most challenging parts of conducting a survey is designing the questionnaire. Poorly chosen or poorly written questions can produce low-quality or even biased data. Given the cost of administering surveys, it is important to choose questions carefully and get the survey design correct before the survey is implemented. There are different types of questions that survey designers can use:
 - *Enumerator-observed versus self-reported data:* One way of collecting survey data is through enumerators, who ask respondents to provide answers to questions verbally. An alternative method is to ask respondents to provide self-reported data—for example, through a mail or an Internet survey—without human interaction. Self-reported data gathered this way can be less expensive and may avoid the biases listed above. However, live enumerators can help identify potential response errors and may be better at

- answering questions that the respondent might have about the data-collection process. Self-reported data are generally used for repeated data collection, where the respondent understands the survey instrument and repeated visits by enumerators would be costly, or in situations where the respondent may be reluctant to provide answers to another person.
- *Open-ended or closed-ended:* Survey questions are typically classified into two types: open-ended or closed-ended. Within each type, there are many options available for structure and language. An open-ended question allows respondents to provide a verbal or written response of their choice, while closed-ended questions require the respondent to choose from pre-specified answers. Each type of question has benefits and drawbacks, and the appropriateness of each type will depend on the context, time constraints, budget, and data-gathering goals. Open-ended questions allow the respondent more freedom in answering a question, allowing for a richer set of responses. Closed-ended questions, though restrictive, are generally easier to code, clean, and analyze. For a more detailed discussion of choosing questions for a data-collection instrument, see Glewwe (2005a), “An Overview of Questionnaire Design for Household Surveys in Developing Countries.”
 - **Uniformity and standards:** For data to be widely accessible and useful, the collected data should conform to basic standards of collection and reporting. For example, data should be collected throughout the KRI using consistent units, measures, and collection techniques, and, where possible, data-collection methods should be consistent over time. Moreover, the KRG should also ensure, wherever feasible, that data collected in the region are consistent with those collected in the rest of Iraq and that the data conform to international guidelines. Standardizing data collection as early as the instrument-design stage will make the data easier to share, aggregate, and use.
 - **Minimizing biases:** A “bias” in data collection reflects the deviation of collected data from reality. The most effective data are those that accurately capture the phenomenon being measured, without bias. While biases can occur in all forms of data collection, they are especially common in household or firm surveys. Common sources of bias in data collection include the following:
 - *Respondent fatigue:* The longer a survey, the more likely respondents are to provide less accurate answers. In general, this type of bias increases with the length of a survey instrument.
 - *Response bias:* Respondents may try to answer survey questions in the way they think the questioner or an observer wants them to answer; in some settings, this can be minimized through confidentiality protocols (see below).
 - *Recall bias:* Respondents may not remember information accurately, especially when they are being asked to recall activities or actions conducted long in the past. Recall bias should be considered when designing surveys, to balance the need for information about the past with the potential for erroneous data.
 - *Identity of respondents within households:* Different members of a household will respond to the same question differently. Often, it is important to attempt to contact the head of the household, or the person who is most likely to be informed about the subject at hand. If it is important that data collection does focus on one type of household member, such as the head of household, this should be specified in all data-collection documentation.

It may not be possible to avoid biases entirely, but being aware of the types of biases can aid survey instrument design and implementation with an aim of reducing these biases. For a detailed discussion of biases, see Kasprzyk (2005), “Measurement Error in Household Surveys: Sources and Measurement.”

- **Need for documentation:** Data-gathering instruments and final data products should be accompanied by detailed information describing how the survey and sampling plan were developed, the variables included and their definitions, and any other information about the data that allow users to interpret and, if desired, reproduce the data collection. Such data about the data are known as metadata. Including such documentation provides data users with the information they need to use the data effectively and accurately. This type of documentation is also useful to the data creators in keeping track of the critical decisions they make. For additional information on preparing data documentation, see Glewwe (2005b), “Overview of the Implementation of Household Surveys in Developing Countries.”
- **Recording geographic locations:** Many, or even most, surveys now collect data on the precise geographic coordinates of the respondent, typically using Global Positioning System (GPS) information. These data allow more accurate measurement and analysis of geographic locations, and they feed directly into mapping and analysis done through GIS. The adoption of this technology within the KRSO is a notable and promising development. Accurate, fast, and inexpensive data are also particularly beneficial when measuring health characteristics. Recent advances in field-data-gathering technology provide the opportunity to collect advanced health data, especially biomarkers, more efficiently.

Sampling

For most types of data collection, other than censuses and some types of administrative data, the data collector’s goal is not to collect information on every person or firm (or other observational unit). Instead, statistical methods allow one to collect information on only a subset of the population (a sample) and still draw population conclusions based on this much smaller number of observational units. The process of selecting units, such as individuals or organizations, from a population of interest in a way that can be generalized to the entire population of interest is called sampling. Sampling is a powerful technique, but also one of the most challenging aspects of data collection. There are a number of ways to select a sample, and we outline key points about choosing effective samples here.

- **Probability or random samples:** The best way to approach sampling is to draw individuals randomly from a population of interest. To construct a probability sample, the surveyor would first define the population of interest and then draw units (for example, individuals or organizations) from a list of individuals in the population, with a known, nonzero probability of selection. This list is known as the “sampling frame.” For example, for a representative household survey, a list of all households based on the most recent population census can serve as the sampling frame; for a representative survey of formal enterprises, the sampling frame may be a list of all firms registered with the government. A sampling frame is simply a complete list of observational units from which one can draw a representative sample, although, in practice, obtaining such a list is not always straightforward. Random draws from the sampling frame produce a survey sample that

is likely to represent the characteristics of the larger population closely, thereby providing more accurate data in a cost-effective way.

- **Convenience samples:** Probably the most basic approach to sampling is a convenience sample, also known as a grab sample, in which the surveyor draws the sample from an easy-to-access population. This could involve conducting a health assessment by visiting a few large hospitals and surveying people waiting for care or interviewing people at a market to assess demand for food products. In most settings, this approach, while inexpensive, can produce unreliable data. For instance, a visit to the market in the middle of the day might yield no information on wage earners, who are likely to be at work at that time of day. Unless cost and time are the only factors driving sample selection, convenience samples should be avoided.

We next review important features of the sampling process:

- **Sample size:** The size of the sample used in a survey has direct bearing on the cost of the survey and on the usefulness of the resulting data. Larger samples allow for greater representativeness and an increase in statistical power—that is, the likelihood of being able to make statistically precise inferences about the population of interest or about subgroups within the larger population (for example, men compared with women). Too small a sample would preclude meaningful analysis, but larger samples are more costly in terms of time and resources.
- **Cluster sampling:** Because costs are almost always a limiting factor when implementing surveys, cluster sampling can offer important advantages over simple random sampling, especially when data collectors need to travel to individual households or businesses. When using a cluster sampling method, groups of households, such as villages or neighborhoods, are first chosen through a random sample, and then observational units are randomly sampled from within those clusters. This is a form of multistage probability sampling. The benefit of cluster sampling is that observational units within the clusters, as well as the clusters themselves, may be less costly to access; the drawback is that units within each cluster may have correlated outcomes, reducing the usefulness of the data from the sample. Thus, it is generally best to have more clusters that are smaller in size than the reverse.
- **Stratification:** There are a number of ways to modify a basic, random sample to provide desirable characteristics that aid data analysis or balance data quality with data-collection costs. One can “stratify” the sample, by dividing the population into certain subpopulations or categories of interest and then randomly sampling from within those subgroups. This allows data users to examine small subpopulations that might otherwise be ignored in a simple, random sample and increases efficiency by allowing the survey to focus on populations of interest more directly. However, because a stratified sample by design will likely not mirror the characteristics of the overall population, during analysis, the resulting data typically must be “weighted” to allow the population characteristics to be recovered. Weighting means that the answers of certain individuals would have more statistical influence than the answers of others when population characteristics are calculated. There are a variety of mathematical techniques for weighting data.

We next review a number of common issues and concerns with sampling:

- **Sampling error:** This refers to the error related to making estimates based on a sample instead of the entire population. Sampling error is readily calculated and is usually a small factor in the overall accuracy of estimates from surveys.
- **Nonsampling error:** This type of error results from factors other than sample selection, such as errors in coverage that result from including or excluding observational units incorrectly, measurement error, or nonresponse. Nonresponse refers to the rate at which potential respondents refuse to participate or answer certain questions. This can be especially important to note if certain types of respondents are more prone to nonresponse; for instance, if women typically prefer not to participate due to social or cultural reasons.
 - If not properly documented and accounted for, these types of errors can bias data analysis and produce erroneous results. This kind of error is harder to quantify and is typically larger than sampling error.
- **Attrition:** In multiwave surveys, in which the same observational unit is sampled repeatedly over time, a special type of nonresponse can occur when observational units fall out of the sample between survey waves. For example, a household might move out of a geographic area. Known as attrition, this loss of sample over time is particularly problematic because it can bias survey results if certain types of households are more likely to drop out of the survey than other types. It is also difficult to correct, since any units added during later survey waves will lack information from the initial waves.

The choice of a sample therefore almost always requires balancing considerations of cost, time, and survey complexity. Similarly, more complex sampling methods have important benefits, such as better population coverage or favorable statistical properties, but complex samples are more difficult to design and implement. There is no single best sampling approach for all surveys and situations. The process of sampling should be approached carefully in every survey. For more detailed information on sampling techniques, see Pettersson (2005), “Design of Master Sampling Frames and Master Samples for Household Surveys in Developing Countries.”

Ethics and Human Subjects Protection

An important part of conducting quality data collection is adherence to proper ethical standards when human subject research is involved, especially with respect to voluntariness, privacy, and confidentiality. Data-collection activities in which human beings are exposed to manipulation, intervention, observation, or interaction with investigators, directly or indirectly, qualify as human subject research, as do any activities where it is possible to identify individuals through the collection or use of data. There is clearly an obligation to uphold internationally recognized codes of conduct to preserve the rights of others. Moreover, the quality of data itself often depends on the cooperation of respondents and the trust they have that the confidentiality of the information they provide will not be compromised. We discuss a few issues on human subjects protection here:

- **Voluntariness:** In many countries, including the most advanced, providing information to the statistical agency in some instances is mandatory (e.g., with respect to census data). In these cases, additional care regarding ethics and human subjects protection will have to be taken, since there will be no individual right of refusal.

- However, participation in most data collection is usually voluntary. Voluntary cooperation is generally viewed as producing better-quality data and leading to citizens viewing government data-collection efforts as being in the national interest and, therefore, worthy of cooperation. Generally, only a national population census and perhaps a few other very important data-collection efforts require mandatory participation. Even when this is required, however, penalties for noncompliance are not severe. Therefore, it is best to minimize mandatory participation in data collection.
- **Ethical best practices:** It is incumbent upon data-collection teams to protect the well-being of research participants, to minimize all known risks as far as possible, and to honestly disclose benefits and risks to participants. As such, prior to data collection, survey instruments and data-collection protocols should be reviewed carefully to be sensitive to the well-being of respondents and to exclude questions or procedures that could result directly or indirectly in unjustifiable harm to respondents, including undue intrusion or personal harassment.
- **Human subjects review committees:** In many countries, there is a regulatory requirement that studies be reviewed for ethical issues by an independent board that is separate from the staff of the data-collection effort. This kind of review may be conducted within an agency but follows common guidelines across all agencies. This review is conducted to ensure that data-collection efforts minimize risks and communicate risks and benefits to participants in data collection.
- **Risk transparency:** In some instances, unavoidable tradeoffs between ethical principles may occur. For example, while interviewing women in some settings, having other family members present during the interview for reasons of cultural sensitivity may conflict with the need to protect individual privacy. It is important to note the ultimate goal is not to eliminate risks altogether, but rather to articulate and achieve an acceptable standard of risk, balanced against the benefits of the data collection.
- **Ensuring valid informed consent:** Individual rights of refusal or early termination from a survey should be honored when possible, and obtaining and documenting voluntary informed consent is an important part of this process. This process includes clear and truthful provision of information about the data collection, including the affiliation of the entity collecting the data, length and nature of participation, the purpose of the study and how the data would be used, an explanation of how the respondent was selected, an explicit indication that participation is voluntary, and an explanation of benefits and risks, including confidentiality procedures. Consent may be implied or given in oral or written form, depending on the context, but should be obtained from an appropriately responsible adult, such as a parent in the case of a survey of children or young people.
- **Minimizing risk prior to any data-collection activity:** In many voluntary data-collection settings, participants receive only indirect benefits, such as from future research and analysis and from better government policies, whereas the risks can be direct. The most obvious risks are often to privacy and confidentiality; other risks include inconvenience or time costs, emotional or psychological risk, reputational risk or stigma, financial or legal risk, and, in some cases, even physical risk (for instance, in studies of domestic violence).
- **Safeguarding confidentiality:** To ensure that confidentiality is protected, adequate protocols should be made explicitly and maintained consistently. Institutional procedures to uphold confidentiality include eliminating linkage of data to unique identifiers; employ-

ing statistical strategies, such as deliberately adding noise to GPS coordinates; and putting into place legal protections and agreements about data sharing, secondary analysis, and audit of data. Staff should be trained to keep identifying material secure, or be required to formally provide assurances that confidentiality will be maintained. Access to data may be limited to staff who have the appropriate qualifications (we discuss storage and handling in more detail later in the chapter). In addition, there should be clear procedures in place for reporting any breach of confidentiality according to policies of the ethics review board as well as government regulations.

- **Maintaining appropriate records of ethical conduct:** Finally, materials and procedures related to the ethical conduct of the study need to be documented, including informed consent materials, correspondence with ethics review boards, and reports of confidentiality procedures.

For further reference, see Groves et al. (2009), *Survey Methodology*, and Alcser et al. (2010), “Ethical Considerations in Surveys.”

Quality Control During Field Implementation

Even a well-designed survey can produce poor-quality data if the survey is not implemented properly. Survey implementation includes everything from choosing the individuals who will conduct the survey, to testing the survey instrument carefully, to ensuring that effective quality-control mechanisms are in place.

- **Adequate consideration of who collects the data:** Depending on the nature of data collection, a specific government agency or ministry, the KRSO, or an outside consultancy may be best suited to the task. There are multiple factors that should influence which organization is responsible for data collection: knowledge of data-collection methodologies, experience in the relevant topic, contribution to local capacity building, specific local knowledge, the ability to coordinate with other local bodies in the field, and cost of collection. The intended use of the collected data can also affect this decision. For example, if the intention is to evaluate a specific program or organization, the need for objectivity may require that the data be collected by an independent third party.
- **Attention to the mode of data collection:** The choice of data-collection mode in the field also affects data quality. Common modes of data collection are self-reporting via mail-in paper forms, telephone interviews, face-to-face interviews, and online surveys. Access to respondents via mail, telephone, face-to-face interviews, and the Internet may also vary significantly in different settings, and this can lead to sample selection bias, as described above.
 - Mail-in forms are often the cheapest to generate and allow individuals privacy for providing sensitive data, but they result in low response rates. Furthermore, given the state of the postal service in the KRI, such surveys are unlikely to generate any useful data for the KRG. Telephone or face-to-face interviews allow the interviewer to interact and motivate response but can also affect the information, since some people may give answers that they think are socially desirable (response bias, discussed earlier). Internet surveys are often relatively inexpensive, but the identity of the true respondent can be hard to verify, and discerning the level of engagement of respondents is problematic, unlike a face-to-face interview. As with postal surveys, the low level of Internet pen-

etration in the KRI makes it unlikely that Internet household surveys at this time will generate useful information for the KRG, but some types of surveys, such as those of businesses where Internet penetration is high, may be effective. The optimal choice often depends on the purpose for which the data are being collected.

- **Appropriate piloting:** Typically, fieldwork requires managing a large team, including enumerators, supervisors, programmers, data-entry operators, support staff, and others. Getting this team ready to conduct a survey typically requires a series of preparatory steps known as piloting. Prior to launching any field operations, preparing and finalizing an overall work plan ahead of time with all participants is a key part of ensuring smooth coordination. Following the development of the work plan, a training and field manual for the staff should be prepared. The instrument's format, length, and the phrasing of questions should be tested on a group that resembles the target respondents as closely as possible. This group subsequently will not be part of the sample for the survey implementation that follows.
- **Sufficient quality-control mechanisms and incentives:** Proper oversight and management of the logistics during fieldwork is an essential part of assuring data quality and minimizing the magnitude of nonsampling errors. For instance, insufficient effort by the enumerators can affect rates of nonresponse and attrition and increase the level of errors in measurement. Quality standards should be articulated clearly, and quality-assurance procedures put into place before the survey begins.
 - The best practice in data collection is to aim for high levels of survey completion. Explicit incentives, such as compensation and bonuses for respondents and enumerators, may be used to elicit such outcomes. Other procedures include frequent random quality checks at multiple levels of supervision, and protocols for revisiting and verifying nonresponse units and persuading reluctant respondents to cooperate by addressing their specific concerns.
 - To decrease measurement error, spot checks and cross-checks, including limited redundant data collection, can be used. Protocols to minimize transcription errors often include physical procedures, such the use of a reliable data-entry software program and double-blind data entry by two members of the team whose identity is not known to one another, and tying compensation to a pre-specified error rate.
 - The use of paper-based forms can result in recording and transcription errors. In general, electronic data entry and transmission encourage accuracy. A recent innovation is computer-assisted personal interviewing (CAPI), in which enumerators travel with lightweight computer laptops or personal digital assistants. In field tests, CAPI has been shown to result in much higher quality of data due to automatic error-checking and fewer transcription errors.
 - Finally, once all data are collected, all sampled units must be accounted for and summary statistics generated for review. Final datasets should include detailed documentation, including codebooks and data dictionaries, which describe the way in which data have been coded and made available to users.

Storage and Dissemination

Once the data are collected, it is equally important that proper measures be taken to store data effectively and ensure that they can be disseminated to key data users. We discuss infrastructure for data collection and management in greater detail in Appendix E, but here we

outline some key processes that need to be in place to ensure proper data handling, including approaches to support the protection of human subjects.

- **Install hardware and software systems to warehouse data systematically and securely:** Data systems, both hardware and software, are critical to effective data management and control. Data systems should include adequate storage capacity, effective peripheral equipment to interface with data storage systems, and software compatible with KRSO's needs and the technology used throughout the KRI. The data system should include processes to ensure that data are backed up on a regular basis, with backup copies stored in a secure location, separate from the production data. Hardware systems should be planned to include adequate electrical power and cooling capacity to ensure reliable and continuous operation. If possible, the central elements of the data system should have redundant or replacement parts on hand in the event that a critical component fails. These should allow for integration with the data-collection systems that is as seamless as possible. For more detail, see Appendix E.
- **Establish accessible, effective, and transparent dissemination channels:** Reliable and secure data storage is imperative, but the only useful data are those shared with policymakers and the data-using public. Protocols that guide how data should be made available, whether publicly or for limited distribution, should be developed. There should be standard channels through which data are disseminated. For example, the KRSO should maintain an easy-to-use web portal through which data, whether collected by the KRSO or shared with it by other government organizations, can be accessed. This system can allow different classes of users with different access levels. For example, the KRSO and the relevant line ministry might have full access, such as to the raw data, whereas university researchers might have lower levels of access, such as access to only summary statistics or tables. However, for each class of user, maximum access should be allowed within best practices of data protection.
- **Ensure consistent access to underlying data:** All users should obtain results from the same underlying data to ensure consistency, regardless of the means by which they access the data. Reports obtained from the system should be marked to indicate the date and time, exact source of the data, and the version of the database and software used to create the report.
- **Protocols and procedures for access to individually identifiable data:**² All data involving human subjects should be collected in accordance with strict guidelines that limit improper use of confidential and individually identifiable data, as described in more detail in the next section. Part of appropriate management of such individually identifiable data is having in place the protocols and procedures for storing, transferring, and accessing such data. All organizations that collect data on human subjects should ensure that secure storage facilities are available and used for data storage. When individually identifiable data are to be shared, data users must have proper authority to access those data, data managers must be responsible for verifying credentials of users, and data-transfer systems should be secure.

² We discussed the importance of human subjects protection more generally earlier in the chapter, but we address two data-management-related issues here.

- **All data should be stored in a way that minimizes the use of individual identifying information:** Where possible, individual information, such as government-issued identification numbers, should be replaced by record identifiers that cannot be linked to an individual. In most cases, individually identifiable data should not be made available unless users go through a clearly defined process that verifies their need to access such data and a demonstrated capacity for appropriate data handling and a record is retained of all users that have such access.
- **Record and document any data processing or “cleaning”:** Raw data—those inputted directly from survey forms or administrative records—often need to be “cleaned” before they can be used for analysis or policymaking. Removing individual identifying information, as noted before, is one example of data processing. However, all processing or cleaning should be documented, and that documentation should be stored with the data. This ensures that data users are able to effectively and accurately work with the data and be aware of any limitations or assumptions made by data collectors.
- **Implement methods for tracking use of data:** Part of the KRSO’s responsibility is to monitor how data are used, when they are accessed and by whom, and to what extent data-gathering activities are meeting user needs. This can be accomplished through a variety of methods, including free registration of data-access web portals (to identify user classes), incentives for reporting use, web tracking of citations, and surveys of government organizations to ask about their data use and data needs. Effective data tracking will allow those who generate data to respond to the needs of users and minimize costs by eliminating data collection that is not useful to the broad class of data users.

For more information about computing security, see Lehtinen, Russell, and Gangemi (2006), *Computer Security Basics*.

Human Capital for Data Collection and Management

Carrying out data collection, management, and dissemination requires a workforce with the requisite skills, and developing such a workforce in the KRI will be an important and challenging process. Some capacity exists already in the KRSO and ministries, but existing capacity will need to be expanded. There are multiple ways to ensure this. We first consider the benefits and drawbacks of developing in-house skills versus hiring experts on a contractual basis, and we then assess the type of human capital needed for each step of the data-collection process. We also note that while some data-gathering and analysis capacity could exist within individual ministries, the KRI will be served well by relying heavily on the KRSO for major statistical analysis. As such, we focus here on human capital within the KRSO.

The KRSO can acquire additional capacity by hiring private- or nonprofit-sector firms on a contractual basis, working with international organizations that have data expertise (for example, the World Bank), or hiring employees with existing skill sets. The alternative is to develop capacity internally, by training existing ministry or KRSO staff to give them additional skills. These options are not mutually exclusive, and a combination of hiring outside expertise and developing internal capacity will likely serve the KRSO well.

There are benefits and drawbacks to relying on external versus internal staff for data collection, management, and dissemination. Hiring outside firms gives the KRG the flexibility to

access specialty skills as and when needed, while avoiding idling of workers who are not continuously needed. The drawback to contracting out data activities is that it can lead to higher management costs within the KRG and lower-quality data products if contractors are not vetted or managed well. Another option is to have the KRSO act as an “internal consultant,” an organization within the KRG that has the required capacity and expertise in data collection and management and can be drawn upon by line ministries as needed, freeing those ministries from hiring large data-gathering and data-management staffs.

One area where the KRSO, and potentially the line ministries, should ensure minimal, internal expertise is in survey design and management. Even if data collection is contracted to an outside firm or organization in some cases, it will be important to have staff within the KRG who have a deep understanding of the technical issues associated with gathering and using data (for example, sampling, questionnaire design, human subject protection, and field-work). The KRSO has some of this capacity currently, as do other KRG offices, but existing capacity could be supplemented through additional training or collaborative data-collection activities with outside organizations. Without minimal internal capacity, it will be hard for KRG offices to effectively hire and manage outside firms.

Choosing the best approach to managing a data-collection workforce will also depend substantially on the type of activity being undertaken. For example, the type of survey will dictate what skills are required and the number of employees necessary. For routine surveys or administrative data collection, the KRSO or the relevant ministry should consider having sufficient in-house expertise for carrying out data collection. In contrast, for one-time or specialty surveys—especially in the short to medium term—it will be more efficient to hire outside staff with the necessary skills, since it will likely not be efficient to have a large, permanent staff. Similarly, activities such as population censuses that require a substantial, relatively low-skill workforce for a short period of time should rely on short-term workers or outside firms, not in-house staff.

Choosing the appropriate internal workforce for data processing and analysis is challenging, because high-quality individuals are hard to find and may not be fully utilized, at least at first. At a minimum, the KRSO and each ministry should have at least one individual who understands proper data handling and basic analysis.³ As the demand for analysis grows, ministries could consider hiring additional staff with more expertise in advanced analysis, or expertise could be concentrated within the KRSO and then drawn upon by the ministries as needed. External firms could be used for data analysis, and this approach has the benefit of adding objectivity and credibility to the analysis.

Finally, data dissemination requires specialized expertise both in proper data handling (for example, setting up data-protection plans to guard sensitive information) and information technology (IT). In the short to medium term, the KRSO and the ministries should rely heavily on the KRG’s Department of Information Technology (DoIT) to set up data-sharing systems and train existing staff on how to store and share data. In the longer term, the KRG should consider contracting or hiring someone to help assess the effectiveness of dissemination activities.

³ For example, someone with a master’s degree in statistics from a reputable institution would suffice.

How to Collect the Data That the Kurdistan Region—Iraq Needs

We started this chapter with a description of three key types of data for policymaking: administrative data, censuses, and surveys. We then discussed in detail the elements of a high-quality data-collection program and reviewed briefly the human capital needs to support data collection and use. We now integrate these considerations in a discussion relevant to the KRSO and its data-collection activities. Because, as we have discussed, administrative, census, and survey data each have their own strengths and limitations, a comprehensive and integrated statistical work program would include all three types of data collection.

In general, a population census—when it is conducted—and other censuses should form the core of KRG’s integrated statistical system. Given current legal and constitutional issues in the KRI, a census of enterprises and other nonpopulation censuses are likely to constitute the core data for the KRG in the short to medium term. Moreover, smaller censuses are more manageable and can help build capacity for larger censuses. Conducting a census can also benefit other data-collection efforts. Censuses support surveys by providing a sampling frame, statistical infrastructure, statistical capacity, and benchmarks, and census data are often used as auxiliary information for stratifying samples.

Survey data should complement census data by providing detailed information on complex topics, and survey data can be used to update some census information more frequently than census data collection allows. In the near term, the KRG should develop additional capacity for specialized surveys. Survey topics should be driven by policy priorities; one option is to work with key ministry officials to develop a list of policy questions that could be informed by focused data collection. Once topics are selected, the KRSO or ministry in charge of data collection should develop a detailed plan for survey design, data collection, data analysis, and dissemination, including an assessment of needed human capital. Outside organizations, such as the Food and Agricultural Organization or World Bank, may be able to provide guidance throughout this process. Once surveys are completed, the KRG should take stock of the data-collection process used, to identify strengths and weaknesses to address in future surveys.

Data-collection entities within the KRG should look for opportunities to take advantage of synergy between different types of data to ease data collection and reduce costs. Census and survey data can be used successfully with data from administrative records to reduce costs of collection—for example, by allowing pre-filling of basic information from administrative records for every member of a household. Data from surveys can also be used to check census coverage and content and determine the size and direction of any errors. Similarly, data from administrative records can be used to check and evaluate results from surveys and censuses. Combining these data sources is also useful analytically—for instance, census data and administrative data can be combined with survey data to produce inferences about small geographic areas or subpopulations.

Some types of data collection will be more relevant to the KRG’s data priorities than others, and it will be important to use the appropriate type of data collection for each priority area. We illustrate in Table 6.1 how different types of data could be used to generate the critical indicators discussed in Chapter Five. Note that, over time, the type of data collection may change. For example, in the near term the KRG may want to conduct enterprise surveys to assess agricultural production and needs, but in the long run a larger household survey could be used to gather more detailed information on small-scale agriculture production. An enterprise survey is relatively less expensive to conduct, largely because the population of firms is

Table 6.1
Data-Collection Options for Critical Data Indicators

Critical Indicator	Administrative Data	Enterprise/ Agriculture Census	Household Survey	Enterprise/ Organization Survey	Agriculture Survey	Special-Purpose Survey
Agriculture						
Production of staple crops (wheat, rice)		x	x		x	
Production of high-value crops (grapes, pomegranates)		x	x		x	
Land in use for agricultural production		x	x		x	
Water used for irrigation		x	x		x	
Education						
Number of new schools completed during the year	x					
Percentage of teachers trained during the year	x			x		x
Gross student enrollment in secondary education	x		x			
Net student enrollment in secondary education	x		x			
Completion rate in secondary education	x		x			
Electricity						
Unit nameplate capacity	x					
Unit feasible capacity	x					
Peak demand (load)	x		x	x		
Governance						
Code of conduct implemented (de jure)	x			x		
Public access to laws	x		x	x		
Public access to regulations	x		x	x		
Time to start a business (domestic enterprise)		x				x

Table 6.1—Continued

Critical Indicator	Administrative Data	Enterprise/ Agriculture Census	Household Survey	Enterprise/ Organization Survey	Agriculture Survey	Special-Purpose Survey
Health						
Infant mortality (0–11 months)	x		x			
Number and density of physicians per 10,000 population	x	x				
Density of hospital beds per 10,000 population	x	x				
Percentage of districts meeting standards for number of main public health centers (1 per 10,000 population)	x			x		
Percentage of districts meeting standards for number of branch public health centers (1 per 5,000 population)	x			x		
DPT3: Percentage vaccination coverage among 1-year-olds (12–23 months) with three doses of DPT	x		x			
Macroeconomics						
Total government expenditures	x					
Personal expenditures on goods and services			x			
Exports of goods		x		x		
Imports of goods		x		x		
Unemployment rate			x			
Consumer price index						x
Private sector						
Number of enterprises by economic activity	x	x				
Number of persons employed by economic activity		x	x	x		
Foreign direct investment inflow	s			x		
Fixed investment by firms		x		x		
Mobile phones per 1,000 people			x	x		x
Internet users per 100 people			x	x		x

Table 6.1—Continued

Critical Indicator	Administrative Data	Enterprise/ Agriculture Census	Household Survey	Enterprise/ Organization Survey	Agriculture Survey	Special-Purpose Survey
Tourism						
Arrivals by class of visitor (overnight, same day)	x					
Average length of stay (all types of establishments)				x		x
Average expenditure per day						x
Transportation						
Extent of paved roads	x					
Passenger vehicles traveling between major cities	x					
Goods transported by road (tons/hour)	x			x		
Injury collision	x					
Water						
Surface water stocks	x					
Flows of water from inland water resources to economy	x				x	x
Losses of water in distribution	x					
Population using improved water sources			x			

smaller than that of households. In addition, an agriculture firm survey can gather data (e.g., employment) that will support other policy priorities.

Data-collection activities should be coupled with effective data sharing and dissemination, and plans for sharing and dissemination should be outlined at the formative stage of every statistical project, especially in the near term. In particular, the KRG should strive to ensure that all data-collection activities lead to at least some publicly available data, while maintaining responsible data-management policies. Someone on the data-management team in the KRSO or line ministry should be tasked with ensuring that data are made available to other users after data collection is complete. Data that are publicly available should be accessible (or access procedures should be clearly described), and the data-collection project should be assessed based on whether data-dissemination goals are met.

Recommendations

Quality data collection is a complex undertaking, but advance preparation driven by a clear sense of overall purpose can greatly increase the usefulness and reliability of data-collection efforts. We therefore recommend that the KRG and the KRSO take the following steps:

- **Plan and oversee an integrated work program that includes censuses of agriculture and enterprises, conducted every five to ten years.** Multitopic household, farm, and enterprise surveys should be conducted at shorter intervals, and the annual or semiannual collection of administrative data should be organized. The timing and scope of these activities should be coordinated as far as possible to maximize complementarities (e.g., conducting surveys in intercensal years). Other data-collection activities should be scheduled based on resources and policy priorities. Important examples of this include comprehensive family health surveys, labor force surveys, and surveys of consumers.
 - In coordination with the central government, a census of population and housing may eventually be part of this work program, but given political, legal, and constitutional uncertainties, we cannot provide a recommendation regarding such a census.
- **Adopt consistent geographic units for collecting and reporting statistics.** The KRSO should take the lead in coordinating standards for geographic data collection across KRG ministries.
- **Adopt common definitions, concepts, and classifications across different sources of data, including administrative records.** The KRSO should coordinate and, where needed, develop standards for data collection and management across the KRG.
- **Adopt electronic data-collection methodologies and electronic record-keeping, where possible.**
- **Adopt and disseminate quality guidelines for data-collection practices and proper data handling.**
- **Adopt and disseminate protocols and procedures for cleaning and storing datasets, especially protocols and procedures for handling sensitive data.**
- **Help develop institutions to protect the rights and welfare of research subjects.** The KRSO should adopt and disseminate protocols and procedures for ethical behavior and appropriate treatment of human subjects. To implement these protocols, the KRSO should create an institutional ethics review board at the KRSO and potentially facilitate

creation of similar boards at other ministries. Consideration of whether the KRSO itself should serve as a government-wide ethics review board should take into account the benefits of consistency and capability, but also potentially the administrative burden on the KRSO and the creation of bottlenecks for approval.

- **Create an online repository of data sources, including complete documentation, to facilitate use and analysis of data.** The repository should be publicly accessible, and it should be regularly maintained and updated.
- **Systematically monitor how data are used.** The KRSO should put in place mechanisms to track the use of key data products to understand how data are used by their target audiences as well as the general public, such as keeping records of public data access via the Internet, media coverage of statistical reports, academic publications that use the data, and government reports that draw on specific data sources. The KRSO should also survey data users to measure their satisfaction. Such users include the other government ministries and agencies, researchers, and the public.

Institutional Arrangements to Meet Policy Priorities

Objective

The objectives of this chapter are to

- Survey the international standards and procedures for statistical collection and the design of statistical information-gathering systems.
- Take stock of the current efforts by the KRG in this domain in light of that information.

We note the urgent need for a statistics law and boards to oversee the functioning of the KRSO.

The Statistical System

A system for collecting statistical information consists of institutions, procedures, and mechanisms that interact with each other and the population in order to execute the statistical program. These institutions, procedures, and mechanisms can be concretely defined in six categories:

- legislation
- agency infrastructure: details about the specific agency or agencies responsible for statistics
- coordination mechanisms
- system and agency oversight
- technical capacity
- external relations.

It is within this *statistical system* that iterative parts of the *statistical process* take place: planning and programming, collection and analysis, and production and redefinition of statistical needs. These parts of the process are described throughout this monograph. We now provide a more detailed discussion of the statistical system.

The actors within the system derive their authority from specifically tailored **legislation** that defines their relationships. The United Nations provides a guideline for the minimum

standards of legislation quality, but there is considerable variation in the statistical legislation around the world.¹

At a minimum, the legislation outlines the structure of the agencies tasked with executing the statistical collection process, defines the nature of oversight over this process, sets the expectations for agency capacity, and defines the agency's relationships with external and internal actors. Legislation also defines the agency's authority to collect data, obligates public- and private-sector entities to provide the necessary information, and requires the agency to protect the confidentiality and integrity of the data provided. Because such legislation is usually passed by elected representatives, the process of writing the legislation and its amendments represents the most fundamental vehicle by which various stakeholders can affect the process of statistical collection. These stakeholders can be internal to the region or nation, such as various governmental agencies and ministries, the general public, civil society, academic and business communities, as well as external, such as international organizations (the UN, the World Bank, or the IMF), various donors, foreign investors, and researchers.

Official statistics are broad in scope and are usually produced by a variety of government **agencies**. In many countries, there is a central statistical agency that produces the greater share of official statistics, whereas in other countries there is more than one statistical agency handling different areas of statistics. Many official statistics are produced by government departments as a by-product of their activities, sometimes by separate internal statistical units. The statistics agency is sometimes an independent entity and is sometimes subordinated to another ministry, usually that of planning or the economy.

No matter what the organizational arrangements for producing statistics are, **coordination** of statistical activities should be undertaken to avoid duplication in order to minimize the reporting burden of respondents, to facilitate the integration of data from different sources through the use of statistical standards, and to participate in international initiatives (United Nations Statistics Division, 1994).

One of the critical elements of any statistical system is the process by which the broader government and by extension the public **oversee** the activities of the statistical agency, usually facilitated by the creation of one or more oversight boards. While the specific arrangements for this process vary among various statistical systems, the formal vehicle for oversight is almost universally a process of defining the periodic statistical plans and programs. In this process, the oversight authority requires the agency to answer two fundamental questions: First, are we collecting and analyzing information that best supports our national policy objectives? And second, are we collecting that information in a legal, technically competent manner that preserves the integrity of the data and minimizes the reporting burden on the respondent?

One of the frequent models involves the establishment of two types of boards or commissions. The first, composed of stakeholder representatives of government agencies and political leadership, is tasked to ensure the policy relevance of the statistical collection program. The second, composed of subject-matter experts from the government, and sometimes academia, civil society, and the private sector, is tasked with ensuring the technical competence and validity of the program. This option is advocated by the UN Statistics Division in its model statistics legislation (United Nations Statistics Division, 2003, Appendix 1). Governments choose other oversight arrangements as well.

¹ United Nations–recommended standards are outlined in *Handbook of Statistical Organization* (United Nations Statistics Division, 2003), available in both English and Arabic.

Even the best-designed statistical program fades into irrelevance if the statistical agency does not have the required **technical capacity** to implement it. This capacity includes adequately trained and educated staff, secure and sufficient analytic and storage capacity, and sufficient funding to conduct its operations.

For any government, relationships with international organizations form one pillar of **external relationships**. At a minimum, this membership often entails a data-reporting requirement, and the ability to provide these data is a fundamental element in becoming a part of the international community. For a subnational government or autonomous region, the relationship with the central government forms the other pillar of its external relationships. This relationship may drive the requirement for collecting certain types of information, but the relationship will require coordination and mutual cooperation to make it equitable and mutually beneficial. The coordination between levels generally consists of complementarity, reliability, access to resources, and standardization of classification (United Nations Statistics Division, 2003).

Statistical System Models and Organizational Considerations

Statistical collection systems are organized under a number of different models. For the purposes of this study, we reviewed the statistical systems of three sets of economies: (1) those in the Middle East and North Africa, done so at the request of project sponsors; (2) economies with per capita GDP in the \$3,000–\$5,000 range, the range that most likely encompasses the KRI; and (3) countries with a federalized organization, applicable due to Iraq’s federalized system. A key result is that no country we reviewed has a single agency that collects all statistics.

National Statistical Systems of the Middle East and North Africa

We reviewed the organizational structure of institutes and the statistical laws governing them for 17 different Middle Eastern and North African political entities: Algeria, Bahrain, Dubai, Egypt, Jordan, Kuwait, Lebanon, Morocco, Oman, The Palestinian Authority, Qatar, Saudi Arabia, Syria, Tunisia, Turkey, the United Arab Emirates (UAE), and Yemen (Table 7.1). The statistical systems of seven of these entities are subordinated to other agencies or ministries, generally those holding the planning portfolio, while nine are independent agencies responsible to the head of government. One, that of Turkey, is under the prime minister but may be subordinated to another minister at his discretion. The general trend has been toward more independence of the statistical institutes. For example, until recently, the UAE statistics agency was subordinated to the Ministry of Economy, but it is now an independent agency.

The oversight and planning of statistical collection and analysis was overseen by an independent board of trustees or advisors in ten of the 17 cases, while in five cases that function was conducted by the head of government or delegated to the minister overseeing the department. In one case, that of Lebanon, the oversight responsibility could not be determined, even though the agency was an independent body. The boards were in most cases a collection of representatives of stakeholder ministries or agencies, often at the deputy minister or director-general (ranking civil servant) level. In one of the cases, that of the Palestinian Authority, policy oversight is the responsibility of the president. For this purpose, however, he has an advisory board with much the same composition as an oversight board would have.

Table 7.1
Statistical Organizations Across the Middle East and North Africa

Country	Statistical Organization	Organizational Independence ^a	Oversight of Statistics
Algeria	National Office of Statistics	Independent agency	National Council of Statistics appointed by the cabinet
Bahrain	Central Informatics Organization	Department of Statistics is a portion of a unified organization responsible for statistics, identity cards, GIS, and government IT	The director of the organization
Dubai	Dubai Statistics Center	Cabinet-level independent agency	Board of directors appointed by the Ruler
Egypt	Central Agency for Public Mobilization and Statistics	Independent agency adjunct to the President of the Republic	Consultative Committee for Planning and Statistical Coordination, which includes members representing the different statistical sectors or the private sector and statistics experts
Jordan	Department of Statistics	Subordinate to Minister of Planning	Minister of Planning
Kuwait	Central Statistical Office	Subordinate to the Supreme Council for Planning	Chairman of the Planning Board is responsible for oversight
Lebanon	Central Administration for Statistics	Independent agency within the Council of Ministers	Unknown
Morocco	Direction de la Statistique	Subordinate to the High Commissioner for Planning	High Commissioner for Planning
Oman	General Director of Statistics, Ministry of National Economy	Subordinate to the Ministry of National Economy and the Undersecretary for Development Affairs	Statistical Advisory Committee composed of undersecretaries of stakeholder ministers
The Palestinian Authority	Palestinian Central Bureau of Statistics	Independent central bureau of statistics	Advisory Council composed of governmental, nongovernmental, and academic stakeholders—only advisory with no oversight role
Qatar	Statistics Authority	Independent agency	The cabinet and the Emir
Saudi Arabia	Central Department of Statistics and Information	Subordinate to the Ministry of Economy and Planning	Minister of Economy and Planning
Syria	Central Bureau of Statistics	Independent agency directly responsible to the Prime Minister	National Council of Statistics appointed by the prime minister, composed of stakeholder deputy ministers and a technical commission of experts
Tunisia	National Statistics Institute	Subordinate to the Ministry of Development	Board of directors composed of directors-general of various stakeholder ministries
Turkey	Turkish Statistical Institute (TURKSTAT)	Set up under the Prime Minister, who may delegate management to a State Minister	Statistical Council composed of undersecretaries of various ministries, as well as representatives from academia, business, and statistics-oriented nongovernmental organizations

Table 7.1—Continued

Country	Statistical Organization	Organizational Independence ^a	Oversight of Statistics
UAE	National Bureau of Statistics	Cabinet-level independent agency	Board of directors composed of representative from individual Emirates
Yemen	Central Statistical Organization	Subordinate to the Minister of Planning	Minister of Planning

SOURCES: Websites of the listed national statistical organizations. As of December 15, 2011:

Algeria (<http://www.ons.dz/index-en.php>), Bahrain (<http://www.cio.gov.bh/>), Dubai (<http://www.dsc.gov.ae/en/pages/home.aspx>), Egypt (<http://www.capmas.gov.eg/>), Jordan (http://www.dos.gov.jo/dos_home_e/main/index.htm), Kuwait (<http://www.cso.gov.kw/>), Lebanon (<http://www.cas.gov.lb/>), Morocco (<http://www.hcp.ma>), Oman (<http://www.mone.gov.om/>), The Palestinian Authority (<http://www.pcbs.gov.ps/>), Qatar (<http://www.qsa.gov.qa/Eng/index.htm>), Saudi Arabia (<http://www.cdsi.gov.sa/english/index.php>), Syria (<http://www.cbssyr.org/index-EN.htm>), Tunisia (<http://www.ins.nat.tn/indexen.php>), Turkey (<http://www.turkstat.gov.tr/Start.do>), UAE (<http://www.uaestatistics.gov.ae/>), and Yemen (<http://www.cso-yemen.org/>).

^a The organization to which the statistical office is subordinate is the organization that has administrative and day-to-day policy control of the office.

Some countries include representatives from the business community, academia, and nongovernmental organizations on the boards (for example, Oman and Turkey). Others have separate technical advisory boards that bring statistical experts from stakeholder agencies together with those from academia and nongovernmental organizations to provide advice on the validity of policy choices and expert opinion on board-generated statistical plans and programs. In general, the statistics laws specify that the statistical organization, regardless of its organizational location, is the primary agency responsible for all statistics collection, setting of standards, and planning and programming of statistics. Specific types of statistics are often collected by statistical units of other ministries; for example, finance, tourism, or security. However, the central statistical office serves as the hub of these efforts due to its reporting obligations to national and international bodies. The advisory and planning boards are therefore often used to coordinate and smooth this collaboration across the bureaucratic boundaries and serve as a useful tool for ensuring a unity of effort across the government.

Although we have presented information about statistical systems in the Middle East and North Africa, we suggest that most of these are not the best models for the KRG. To establish the world-class statistical system that is its stated goal, the KRG would best be served by looking elsewhere. Accordingly, the next two sections describe statistical systems that may serve as better models.

Economies with Similar Per Capita Gross Domestic Product: Focus on Bosnia and Herzegovina

Countries with nominal per capita GDP of between \$3,000 and \$5,000 are similar in income levels to the KRI. This similarity in income levels is a useful comparison because it reflects the amount of resources a government can put toward its statistical efforts and therefore the details and complexity of a potential statistical system. Countries with similar income levels include

a number of regional countries: Syria (\$2,892), Tunisia (\$4,159), and Jordan (\$4,434).² Given that we have already reviewed systems in the Middle East and North Africa, we searched for comparison countries in this income range that were outside the region and that have experienced recent conflict and economic and political transition. One example in particular stood out in this overview—Bosnia and Herzegovina (BiH), with a per capita GDP of \$4,157. This example is particularly useful to the KRG because it illustrates the organization and activities of statistical systems in political subdivisions of a larger country. We therefore discuss this example in some detail.

BiH is a loosely coupled federal state with two highly autonomous regions, or *entities*, the Muslim-Croat Federation of Bosnia and Herzegovina (FBiH), and Republika Srpska. Each has a full-service statistical system, one of which, that of Republika Srpska, developed out of a regional statistical office upon partition. The country has a joint statistical system at the national level. Since both entities aspire toward membership in the European Union, their statistical systems reflect the high standards expected of an applicant and are thus a good guide for the KRSO as to what can reasonably be achieved in a similar economy.

Currently, there are three statistical institutes within BiH:

- The state-level institution is the Agency for Statistics of Bosnia and Herzegovina (BHAS). An independent, professional organization, directly accountable to the BiH Council of Ministers, BHAS has nine organizational units and is required to have a minimum of 74 workers for regular operation.
- The Federal Institute of Statistics of the Federation of BiH serves the FBiH. In addition, as of January 1, 2006, the Statistical Bureau of Brcko District became a branch office of the BHAS. The FBiH inherited the infrastructure of the former, prewar state statistical institute in BiH that used to cooperate with the former federal institute of Yugoslavia. As of 1997, this institute has acted in the capacity of an entity statistical institute, with around 180 employees.
- The Republika Srpska Institute of Statistics serves Republika Srpska. The institute was established in 1992 from the Banja Luka regional office of the state institute, and as of early 2011 the institute had six departments with around 100 employees.

In addition to the three statistical institutions, the Central Bank of BiH compiles monetary and balance of payments and financial statistics for all of Bosnia and Herzegovina.

BHAS was established in 1998 according to a Decision of the BiH Council of Ministers. BiH's Law on Statistics came into effect in 2004 at the state level, obliging the entities to harmonize their statistical laws with the state law. The law designated BHAS to determine statistical standards and perform international representation (Parliamentary Assembly of Bosnia and Herzegovina, 2004). In addition to the law, a November 2005 agreement among the Ministry of Finance and Treasury, the entities' Ministries of Finance, and the three statistical institutes outlines the mechanisms for coordination and gives BHAS the authority to coordinate and disseminate statistical data at the state level.

Entity laws on statistics are mostly harmonized with the state Law on Statistics. Laws clearly stipulated obligation of entity institutes to harmonize their methodologies, standards, and practice with referent regulations defined by the BHAS. Entity statistical institutes are in

² GDP data are from International Monetary Fund, 2010.

charge of collection, processing, and distribution of data at the entity level. Provision of data to the BHAS is a legally binding task. Entity statistical institutes are financed by their entities' budgets.

The statistical system of Republika Srpska may be highly relevant to the KRSO, since the Republika Srpska is a highly autonomous region within a loose federal state. Within Republika Srpska, statistics are collected, processed, and disseminated by the following authorities:

- the Republika Srpska Institute of Statistics, the main competent authority for organizing, producing and disseminating statistics in the entity
- other agencies authorized to collect statistics in their own fields, as determined by the Republika Srpska statistics law and the Republika Srpska statistical program, including the Ministry of Finance, the Ministry of Internal Affairs, the Ministry of Justice, the Ministry of Labor and Veterans Affairs, the Health Insurance Fund, the Institute for Health Care of Republika Srpska, the Banking Agency, the Pension and Disabled Person's Fund, and the Hydro-Meteorological Institute.

Relations between the Republika Srpska Institute of Statistics and the authorized bodies and organizations are based on mutual cooperation as laid down by the entity law on statistics and intragovernmental cooperation agreements. According to these fundamental principles, the authorized producers have to allocate the tasks of official statistics to specific organizational units, with no conflicting tasks assigned to the same unit.

The entity law also establishes the Statistical Council of Republika Srpska. The council, as the professional and advisory body for strategic and development issues of organization and the production of statistics, gives opinions in relation to the preparation and implementation of the Republika Srpska statistical program, the functioning of the Statistical Council, and further development of statistics in Republika Srpska. The council consists of the director of the Republika Srpska Institute of Statistics and four members appointed by the government of Republika Srpska for four years in accordance with their qualifications, reputation, and professional knowledge in the field of statistics. The director of the Republika Srpska Institute of Statistics is the chairman of the Statistical Council. Details of the organization of the Republika Srpska Institute of Statistics are shown in Figure 7.1.

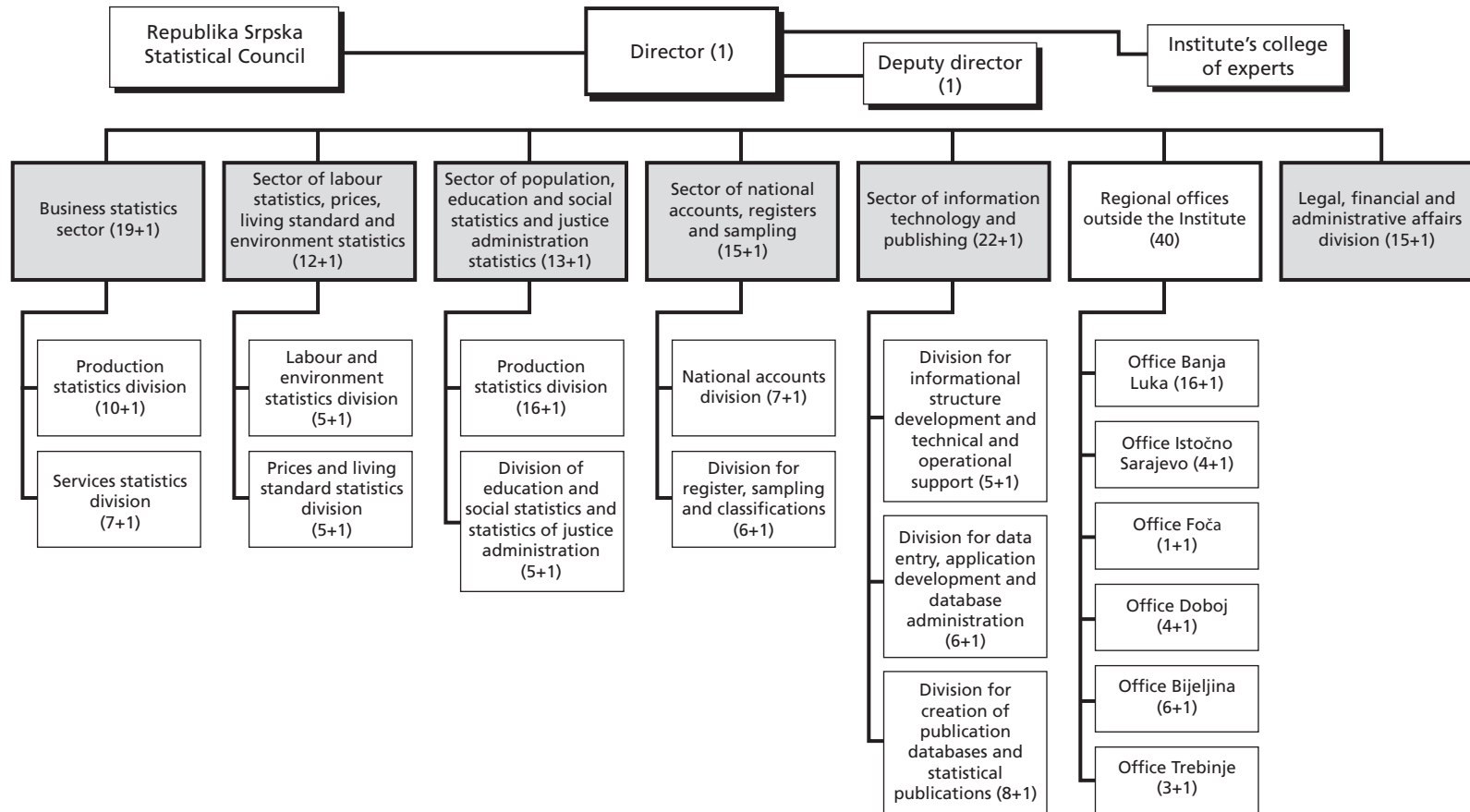
Federalized Statistical Systems

In countries that are federal systems politically, statistical authority may come from the top down or the bottom up. We discuss federal systems because this information can provide a basis upon which the KRG can order its statistical relations with Iraq as a whole.

In the top-down case, the legal framework at the federal level forms the basis on which the distribution of authority and cooperation between the various levels of government rest. The authority for this distribution stems from the constitution and is then specified in detail by a national statistics law, a process that clearly stipulates the roles for each individual agency and prevents costly overlaps.

The bottom-up approach is most often found in situations where both sovereignty and regional institutions first exist and are combined subsequently at a higher level for the purpose of greater efficiency, integration, and comparability. For example, in the UAE, the individual emirates collect their own data and then combine their endeavors to provide the data for national-level accounts or as requested by international organizations, such as the IMF

Figure 7.1
Organization and Staffing of the Republika Srpska Institute of Statistics



SOURCE: Republika Srpska Institute of Statistics, no date.
 NOTE: The number in parentheses refers to the number of employees in each section.

RAND MG1184-7.1

(Dziobek and Tanase, 2007). Similarly, the countries of the European Union combine and coordinate the efforts of their national statistical agencies through the common framework of Eurostat.

Regardless of whether the arrangement is top-down or bottom-up, in a federal system, once the roles and authorities are established through the relevant legislation, the statistical agencies at different levels of government engage in a negotiation among themselves to define the structure of the relationship. This negotiation is usually carried out directly between the chief statisticians on the national and regional levels and can result in any or all of the following types of agreements: (1) a formalized comprehensive compact, (2) a series of service agreements for activities conducted by one level on behalf of the other, (3) standardization frameworks, which define data standards or formats, or (4) memoranda of understanding, which cover general issues such as the delineation of responsibilities and personnel exchanges. We present examples from Canada, Spain, Germany, and the United Kingdom to illustrate the different ways that federal statistical systems can be organized.

In Canada, Statistics Canada—the national statistical coordination agency—is authorized by the Statistics Act to enter into a joint collection and data-sharing agreement with the statistical agency of a province that has confidentiality protection laws comparable to the national confidentiality protection law. In addition, in areas of major provincial jurisdiction, such as health, education, and justice, the Canadian Chief Statistician has a forum for discussing statistical issues with the appropriate provincial official. These forums also allow for the harmonization of administrative records so that national and regional statistics can be consistent. Moreover, each province appoints a senior official to interact with Statistics Canada. The Chief Statistician and the provincial officials, known as focal points, constitute a federal-provincial council overseeing more than ten federal-provincial committees dealing with different issues (Statistics Canada, 2010).

In Spain, each of 17 autonomous regions has its own statistical office, but provincial offices below the level of the autonomous regions are operated directly by the central system. The Spanish statistical system conducts its coordination activity through a set of three overlapping councils. The High Council on Statistics is staffed with experts and stakeholders and is responsible for the harmonization of statistics and ensuring their comparability and standardization across the regions while minimizing the burden on the respondents, such as businesses and households. The Interministerial Statistics Commission is a body of policymaker representatives that works on defining data needs and setting investment priorities across functions. The Interterritorial Statistics Committee works as an expert body integrating the national and regional statistical plans (Instituto Nacional de Estadística, 2007).

Aside from this coordination, the statistical capacity of regional institutes in Spain varies greatly, often mirroring the level of autonomy in various regions. The institutes of certain regions, such as Catalonia, have significant institutional capacity and produce considerable amounts of data on their own, whereas institutions in other regions, such as Aragon, mostly use data produced by the national institute when they consider regional issues.

In Germany, the federation shares the statistical tasks with the individual states. The collection and processing of regional data is the responsibility of the states, and they then pass the data to the federal agency for compilation and dissemination. The federal agency, however, sets the methodological and technical standards and is responsible for communicating them internationally. Regional institutes are funded and organized by states and are free to conduct any work above and beyond that set out by the federal requirements, continuing to abide by federal

law. Each federal statistics plan requires a new legislative authorization, resulting in formal and informal coordination mechanisms between the states and the federation to balance the burden on respondents and adequate representation of regional interests. Formally the process is conducted through the committee work in the chamber of the parliament representing the states and informally through the statistical advisory committee, which balances statistical roles across different levels (Kopsch, 2002).

Issues that cannot be resolved by the advisory panel are tasked to specifically established expert committees, which in turn report back to the advisory committee or the parliamentary committee. The advisory committee is composed of heads of statistical offices and representatives of various ministries. It can meet in three formats: in joint session; as heads of statistical offices to resolve issues of vertical cooperation and coordination between different levels of government; or as an interministerial committee to resolve issues of horizontal cooperation between different functional areas of government.

The United Kingdom has a similar coordinating mechanism between the National Statistics Office and the semi-independent bureaus in Scotland, Wales, and Northern Ireland. There are two elements of the British system that may provide additional insights regarding federal-regional cooperation. First, the United Kingdom had a single statistical system prior to the 1997 devolution of executive authority. Under the devolution settlement, responsibility for the production of statistics relating to Scotland and Wales passed to the respective devolved administration—but only for areas for which they had policy responsibility. The statistics for the largest part of the country, England, still remained the full responsibility of the National Statistics Office. Second, the arrangements for ensuring coherence between statistics produced by the UK government and statistics produced by the three regional administrations were negotiated in a comprehensive manner, rather than through separate frameworks of agreements. They are set out in the “Statistics Concordat,” which was agreed upon between the UK government and the regional administrations in 2001 (UK Office of National Statistics, no date).

Links Between Statistics and Geographic Information

One of the most striking statistical developments of the past several decades has been the development and growth of GIS, or geographic, data. Because the KRG currently has separate statistical and GIS agencies—the KRSO and the DIM—we evaluated international practices regarding these two statistical domains.

GIS adds value to the various stages of the statistical process by optimizing data collection and enhancing the accuracy and timeliness of statistical data. GIS also enhances data dissemination through the visual impact of maps. Its use in national statistical offices has greatly expanded and has allowed for easier planning of statistical activities, as well as the visualization of findings and more tangible presentation of policy implications to decisionmakers. In 2005, the UN surveyed a number of national statistical offices in the developing world on their integration of GIS in statistical operations (United Nations Economic Commission for Africa—Economic and Social Policy Division, 2005).

This survey found that, by and large, the statistical offices and the national mapping agencies remained separate. Nonetheless, 82 percent of responding statistical offices had an internal capability to produce maps and GIS information. In the remainder, GIS information and maps

were prepared exclusively by the mapping authority or other national or foreign sources. Even in situations where the two are legally part of the same institution, for example in Brazil and Mexico, effective integration is limited, and the geography divisions are, in practical terms, often isolated from the various statistical divisions. A major reason for this separation is that statistical agencies are governed by formal legislation on national statistical activities, whereas the mapping authorities have different and often broader legal and policy mandates, and these differences constrain the effective sharing of information. A particular concern is the different approach to privacy between the two sets of authorities. The national statistical organizations have very strict requirements to protect personal privacy, whereas the mapping authorities are usually not as constrained. Moreover, the two types of organizations deal with very different types of data, very different data-collection techniques, and very different data-collection time-lines, making cooperation and the merging of their datasets difficult.

Nonetheless, the issue of merging the functions or keeping them separate is not at all settled, especially given the relatively young age of GIS compared with more standard statistics. The UN has recognized the benefits of sharing and integrating geospatial and statistical information and has recently launched its Global Geographic Information Management Initiative, which aims to develop the standards and recommendations for these issues as well establish a formal United Nations Committee on Global Geographic Information Management to deal with, among other things, cooperation between statistical and geospatial agencies and further data-integration issues (United Nations Statistics Division, 2011). At the second preparatory meeting, in May 2010 in New York, the presentations suggested that nothing is inherently prohibiting the closer cooperation and integration of statistics and mapping information and organizations (Taylor, 2010). Although individual countries can find the best organizational solution for their own purposes, cooperation should be encouraged and bureaucratically and legislatively supported to the maximum extent possible due to the large, potential benefits of integration.

Findings for Kurdistan Regional Government Statistical Institutions

The analysis of the variety of statistical institutions suggests that the KRG has a unique opportunity to define its statistical system clearly through robust legislation that will lay the foundation for the long-term development of a strong system of statistical collection and analysis. We suggest that passage of a statistics law is among the KRG's highest priorities in relation to the creation of a data system for policymaking. Although there are many options regarding how the KRG statistical system can be structured, the message is that its success depends on establishing clear policy guidance that meets the international norms for statistics. Throughout all of this, the KRSO should ensure that the lines of communication, both within and outside the government, remain open and that its work is conducted in a spirit of cooperation and sharing of information. Ultimately, a transparent system will ensure the integrity and usefulness of the collected data. In the remainder of this section, we provide specific policy guidance regarding the KRG statistics law, the institutional arrangements between the KRSO and the DIM, and the institutional arrangements between the KRG and Iraq regarding statistics.

The Kurdistan Regional Government Statistics Law

A statistics law is a legal mandate that binds the various institutional components of the statistics system together, and such a law is therefore a critical component of the statistics system of a region or a nation. In this section, we provide highlights of our findings regarding the most recent draft law made available to us, which we received in October 2010, especially in light of the UN database of good practices of national statistics offices, a draft of representative statistics legislation that follows those practices, and the *Fundamental Principles of Official Statistics* that are also published and defined by the United Nations Statistics Division.³

The draft law goes very far toward ensuring the collection of appropriate data, the quality of the data, and the distribution of the data. Enshrining these principles in KRG law would be a major achievement and would be a further step in the development of the KRI as a dynamic economy. A number of areas can be strengthened, however.

Statistical Office Governance. In general, the law specifies well the rights of the office and its head. However, more elaboration is needed on their duties and responsibilities, and the limits on their authority. In parallel, yearly work plans and annual reporting can promote credibility and accountability, ensure that the office gets appropriate feedback and advice, and help prevent politically motivated activities. Following existing examples of other statistical systems, it might be useful to require two oversight bodies that meet a stipulated number of times every year: (1) a board comprising statistical and other experts from academic as well as nonacademic institutions, business leaders, and high-level civil servants to ensure standards, best practices, and relevance and (2) a board comprising policymakers to ensure that the statistics gathered aid in policymaking and support the KRG's priorities.

Location of the Office Within the Ministry of Planning. The office is placed under the Ministry of Planning for budget and oversight. There are a few potential implications of such a placement, including perceived lack of independence, diminished status, and difficulty gaining access to other ministries. There could also be advantages, such as having a top-level ministry that can protect the institution and ensure proper funding. Our review of statistical agencies above indicates that both arrangements exist in the Middle East and North Africa region. Nonetheless, we recommend that the placement of the KRSO be considered afresh, since such an analysis might reveal currently relevant reasons for its independence or its continued existence within the Ministry of Planning.

Dissemination of Statistical Products. The current version of the law envisions the sale of office publications. Many statistical and economic agencies and organizations, including most recently the World Bank, allow free downloads of much of their detailed data in electronic form. Free distribution through the Internet should be strongly considered by the KRG, either in the law or in KRSO policy. First, free distribution will help the dissemination of KRSO publications, which is useful for economic and social development. Second, the cost of paying someone or a department to fulfill orders for products could exceed the revenue of those sales. Having a sales office just adds to the staffing burden and organizational size. Third, free distribution will enhance transparency and agency credibility, encouraging greater public support.

³ The database of good practices can be found in United Nations Statistics Division, 2007a. The representative statistics law can be found in United Nations Statistics Division, 2003. The UN's list of fundamental principles of official statistics topics include (1) relevance, impartiality, and equal access, (2) professionalism, (3) accountability, (4) prevention of misuse, (5) cost-effectiveness, (6) confidentiality, (7) legislation, (8) national coordination, (9) international coordination, (10) international statistical cooperation, and (11) references. Within the database are national submissions about each of these topics. The notes on coordination for the two cases are taken from the national submissions to this database.

Guidance Regarding the Kurdistan Regional Statistics Office and the Department of Information and Mapping

One institutional issue that emerged during our discussions with the Ministry of Planning is whether the KRSO and the DIM should be merged. The most sensitive issue in merging these two organizations will be defining new positions and authorities for the merged staff and new lines of control and reporting within the organization. It must also be clarified whether the merger is between the DIM and the KRSO GIS department specifically or the KRSO as a whole. Resolving this matter is crucial to staffing decisions. For instance, if the merger is with the KRSO as a whole, there would be greater flexibility of placing senior as well as junior staff in the merged organization.

As the discussion above in the section on general statistics and geographic statistics makes clear, the international trend is one of greater cooperation and integration between statistical and mapping agencies, but these organizations need not be housed under one roof. In fact, there is as yet no global best practice. What does appear to be apparent is that whether they are housed in one organization or two, there is an advantage to having adequate and well-defined legislation or formal memoranda of understanding that clearly outline policies and methods of cooperation.

Although a merger between the KRSO and the DIM appears to have merit at face value, further investigation on the relative skills of the staff in the two offices, the potential synergies between them, and the impact of the merger on performance, efficiency, and staff morale would be needed before concrete recommendations can be made. On the basis of the information available to us, and given that there is no internationally accepted standard, we suggest that the KRG wait on such a merger for the time being. Instead, it could establish formal mechanisms of cooperation between the entities.

The relationship between the KRSO and the DIM is one aspect of the larger organizational issues regarding the KRSO. A new structure for the KRSO is currently being considered and captured in detailed organograms (organizational charts). We assessed this reorganization in a memo, which we present in Appendix F.

Specific Recommendations Regarding Cooperation Between the Iraqi Federal Government and the Kurdistan Regional Government

There are strong reasons for formalizing cooperation and coordination between the KRSO and COSIT.

- Since the federal Iraqi authorities are likely to publish data about the KRI, the KRG likely would be better off if it supplied the data collected according to its own standards.
- Analysts outside the country are also likely to consider Iraq as a whole, and so comparable data collected cooperatively and in coordination would give them confidence in the KRG's data.
- Finally, the KRG itself may want to draw comparisons between characteristics in the KRI and characteristics in the rest of Iraq, and comparable data will build credibility into its comparisons. At the end of this chapter, we suggest one pathway for cooperation.

A core value of statistical systems is legitimacy, meaning “a social judgment that the activity of the statistical system is in the interest of the country, that it indeed serves an essential purpose” (Fellegi, 1995). The success of a statistical system depends not only on legislative

support and appropriate budgets, but also on the cooperation of thousands of households and businesses.

Given the need for legitimacy and public support, the KRSO is an appropriate organization to collect data from within the KRI. However, it is also important that KRI data be comparable with data collected from the rest of Iraq. This will add to the credibility of KRI data and reduce uncertainty among users, signaling the reliability and stability of the KRI's investment environment to a global audience.

In addition, coordination issues within regionally decentralized statistical systems tend to be challenging. We therefore present one way to proceed, recognizing that there may be other options that serve the needs of both jurisdictions:

Kurdistan and national law can designate the KRSO as the primary data-collection agency in the KRI. This will increase the legitimacy of data collection among the residents of the KRI and maximize the chance of successful data collection. This will also make the data from the KRI more reliable for KRG policymakers, thereby aiding data-driven policymaking.

COSIT can coordinate with a constitutionally designated region such as the KRI and its statistical organization, the KRSO, through a formal council. The council could be designated by law to comprise the head of COSIT and his deputy or chief statistician and the head of the KRSO and his deputy or chief statistician.

In a manner similar to the German model, this formal council can then direct the formation of specialized technical groups of experts to define specific ongoing and one-off data-collection efforts.

The KRSO would be obligated to conduct the same data-collection efforts as those that take place in the rest of Iraq, but would not be prohibited from additional collection efforts. This would allow the KRSO to reach a goal of “Baghdad Plus” and would mirror the design of the UK statistical system described above.

Finally, to build trust and institutionalize cooperation, the KRSO and COSIT could build one of the following two options into law: (1) COSIT officials could accompany KRSO officials—and vice versa—in a random sample of data-collection areas or (2) COSIT officials could duplicate the efforts of KRSO officials in parts of the KRI, KRSO officials could duplicate the efforts of COSIT officials in parts of the rest of Iraq, and the two agencies could compare data to make sure they are compatible.

Similarly, data-sharing agreements or frameworks can be specified such that both the KRSO and COSIT have adequate information on each other's activities. These agreements would define the right of access to each other's data. In addition, these agreements would deal with questions of common formatting and presentation of data. Again, there would be considerable benefits to the KRG from ensuring comparability and complementarity of data between the KRI and the rest of Iraq.

A Recommended Roadmap to Policy-Relevant Data Collection

Objectives

The objectives of this chapter are to

- Provide a sequenced and prioritized list of recommended steps for the KRG, and in particular the KRSO, given the recommendations made in the previous chapters.
- Serve as a first reference for implementing the recommendations made in this monograph. For each step, the relevant chapter, which we reference, can be consulted for more detail.

This chapter elaborates on the following steps of the roadmap:

- Enact a statistics law.
- Convene stakeholder meetings.
- Decide the composition of the policy and technical oversight boards.
- Identify a data contact within each ministry.
- Collect the critical data items.
- Implement the organograms.
- Improve human resources in the KRSO.
- Upgrade and install ICT infrastructure.
- Decide whether to improve current indicators or collect new ones.
- Collect the high-priority data items.
- Conduct one-off surveys.
- Conduct routine surveys.

Considerations and Criteria Used in Preparing the Roadmap

For a roadmap to be effective, it must have a few high-level steps that aid strategy implementation, rather than being a mere collation of recommendations. We first discuss the considerations and criteria that have guided how we developed the implementation roadmap.

A Roadmap Should Reflect Priorities and Ease of Implementation

Given the KRG's limited resources, it is helpful to identify those recommendations that need to be implemented earlier than others to address crucial bottlenecks and facilitate further development of the data-collection system. Similarly, some recommendations might be easier

to implement than others, and focusing on them would provide crucial momentum to the process of building the data-collection system and capacity within the KRSO.

For example, there is an urgent need for a statistics law in the KRG to ensure that the KRSO has the necessary authority to request data from the relevant agencies. Consequently, passing the statistics law is listed higher in the roadmap. Some aspects of training and capacity building within the KRSO can be implemented at relatively low cost and without the involvement of other agencies, and we have listed these higher as well.

A Roadmap Should List Processes That Aid Implementation

Just as important as the technical aspects of building a data-collection system are the processes needed to bring together stakeholders, who might have conflicting priorities. It is especially important to forge agreement for the data-collection vision, establish the channels of communications needed for data sharing, create recommended oversight boards, and identify the agents responsible for implementing recommendations.

For instance, the process of forming technical and oversight boards and finalizing their composition may require deliberations and meetings among policymakers at the general director level and higher from KRG ministries, making it easier to obtain the cooperation of stakeholders.

A Roadmap Should Aid Capacity Building

To implement the recommendations provided in this report, the KRG will need to develop human, physical, and IT capacity in parallel with or even before implementing actual data-collection activities. For example, creating a unified, central, and widely accessible database rests on the availability of sophisticated information, communication, and computing technology, such as servers, networks, and database software.

In some cases, the act of collecting data, even if it does not conform to best practices, can help develop capacity within the KRSO. For example, the KRSO can start conducting ad-hoc surveys to fill urgent data needs, which will build human capital and provide useful information to policymakers.

The Roadmap

We present the roadmap using three different perspectives. The first presents a single list of steps that are ordered based on priority and the ease of implementation. This provides a specific route for policymakers to follow in implementing the roadmap.

The next perspective presents the same steps in the form of a table, with priority and ease of implementation as the two dimensions. This approach identifies clearly whether a high-priority step in the roadmap is expected to be easy or difficult to implement and whether a step in the roadmap that is easy to implement is high- or low-priority. Faced with time and budget constraints, policymakers could choose to implement easy steps, even if they are not high-priority, to establish momentum for reform. Policymakers could also choose to implement a high-priority step, even if it is difficult, to overcome a major obstacle and make the future path easier. The grid we provide embodies this perspective and should aid decisionmaking.

We classify a step as easier to implement if it involves fewer agencies, the tasks are simpler, and the step builds on processes or institutions already in place. Needless to say, the classifica-

tion of a step as a higher-priority or relatively easier one is subjective and is based on our judgment as well as experience gained from our visits to the region.

Finally, we present the same steps grouped according to the type of activity being undertaken. This shows whether a step deals with *institution building*, *data collection*, or *capacity building*. All three are important, but policymakers might prioritize one of these areas above another, and this perspective will pinpoint the steps needed in each specific area.

Prioritized Steps in the Roadmap

We briefly describe each step of the roadmap, ordered based on a combination of priority and ease of implementation.

- **Enact a statistics law.** A statistics law formalizes the organizational structure of the KRSO and its interactions with other KRG ministries and agencies, especially as they relate to data sharing. The KRG has a draft of this statistics law, to which we have recommended modifications based on a benchmarking of similar laws across countries. The law needs to be revised and enacted by the KRG so that it grants the KRSO the appropriate authority it needs to carry out its responsibilities effectively. This process needs to be cognizant of the federal statistics law. Refer to Chapter Seven for details.
- **Convene stakeholder meetings.** It would be useful to convene a meeting of relevant policymakers to promote coordination and effective planning. For example, the meeting could include the general directors of planning from the ministries for the priority data areas, senior KRSO headquarters staff, the directors from the governorate statistical offices, and senior staff from the Ministry of Planning (should the KRSO remain within the Ministry of Planning). This meeting can be used to communicate the short- and medium-term plans for the KRSO, including how and in what format it would disseminate and publish collected data; solicit feedback; cement cooperation in conducting surveys that cut across ministries; and in general get a “buy-in” for its plans from the stakeholders. This meeting can also be used as an opportunity to identify “data champions,” those officials who could be candidates for the oversight boards discussed below.
- **Decide the composition of the policy and technical oversight boards.** We have recommended (in Chapter Seven) that the KRG institute a technical oversight board to advise the KRSO on matters of data-collection techniques and methodology, and a policy oversight board to ensure that KRSO’s data-collection efforts are geared toward the KRG’s policy priorities. The KRSO (and the Ministry of Planning, should the KRSO remain within the ministry) should decide the composition of these boards. If the KRSO were to become independent, then the Council of Ministers should be involved in deciding the composition of these boards. The technical oversight board could come from current and retired academics within the region and from the Kurdish diaspora; other researchers, including potentially international researchers with expertise in the KRI and data collection; and individuals from the private sector with technical expertise. Policy board candidates would include senior policymakers (typically at the level of general directors) from the Ministries of Finance and the Economy, Agriculture and Water Resources, Housing and Reconstruction, Municipalities and Tourism, Health, Education, and Electricity; high-level civil servants or policymakers from the individual governorates; and representatives from the Council of Ministers, the Parliament, and the DoIT. Because constituting these boards is likely to be time consuming, it would be good to start the process

early. Each committee should not exceed 15 members, to encourage active participation by all members and to keep coordination costs to a minimum.

- **Identify a data contact within each ministry.** The most urgent data items to be collected in the spreadsheets we have developed are those termed “critical.” The KRSO should work with the ministry relevant for each of the critical data areas to appoint a KRSO liaison (a “point person”) who is responsible for collecting these critical indicators and transmitting them to the KRSO periodically. We suggest that these indicators be transmitted semianually initially (even if some of the indicators may be collected only annually), and once adequate capacity is developed, on a quarterly basis. Although the initial focus needs to be on critical indicators, the identified contacts could later be entrusted with the responsibility of transmitting the other indicators as well.
- **Collect the critical data items.** The collection of the critical data items would be done by the relevant ministries (the “source” column in our spreadsheets refers to the agency that would have or collect the data). However, the KRSO would have to monitor this process and provide technical assistance as needed. This is especially important given that most critical data items are based on component indicators that must be collected before the critical indicators can be calculated. For example, net student enrollment in secondary education (a critical indicator in education) requires the number of children in the secondary age group *and* the number in that group attending secondary school. Refer to Chapter Five for details.
- **Implement the organograms.** The KRSO has developed organization charts (organograms) for reorganizing its offices in its headquarters and the three governorates. We have provided a few recommendations for modifications, mainly to ensure consistency across the offices and with the draft statistics law. The organization charts need to be revised, and the structure they embody needs to be implemented. Refer to Chapter Seven for details.
- **Improve human resources in the KRSO.** This monograph has identified several state-of-the-art techniques and procedures that the KRSO needs to institute and data-collection steps it must oversee. To implement these steps, the KRSO needs a staff that is technically capable of handling these challenges. The KRSO would need to recruit new qualified staff and upgrade the qualifications of the current staff through training courses and hands-on exercises. We recommend that the KRG seek the services of outside experts to provide training courses and impart hands-on training to its staff, perhaps by jointly conducting a data-collection exercise, such as a survey. Alternatives include engaging high-quality foreign universities to design short courses in the KRI or sending staff abroad for such courses.
- **Upgrade and install ICT infrastructure.** Implementing a centralized database and facilitating data sharing between the ministries and the KRSO requires a sophisticated ICT infrastructure. The KRSO should work with the KRG DoIT and external IT consultants, as needed, to implement an ICT infrastructure in its headquarters and governorate offices. Although the KRSO may need to customize some of the efforts of the DoIT, it is likely that the DoIT can provide most of the expertise the KRSO needs for creating a useful ICT architecture. A closer relationship could be formalized by regular meetings between staffs or a contractual relationship between the KRSO and the DoIT for consulting services. It should also provide the requirements for data-sharing ICT infrastructure to the ministries. See Appendix E for details.

- **Decide whether to improve current indicators or collect new ones.** Several KRG agencies are currently collecting data components, including some of the data indicators identified as high-priority in our spreadsheets. However, as we have noted in this monograph, such efforts tend to be fragmented rather than part of a consistent and unified strategy. The KRSO needs to decide, in consultation with the relevant ministry, whether to improve the quality of collection of existing high-priority indicators or spend the resources on collecting those indicators not currently collected, even if they are of a lower priority. Since this decision has to be made on a case-by-case basis, we note that the tradeoff must be made but are unable to provide a uniform recommendation here. However, criteria include the cost of collecting a specific indicator, the capacity of the ministry to collect that indicator, the extent to which that indicator is used to calculate other data items, and the level of importance of the policy area to which the indicator relates.
- **Collect the high-priority data items.** We discussed identifying data contacts within each ministry and collecting critical data items above. This process is likely to improve relations between the KRSO and the ministries and build capacity within the KRSO by exposing KRSO officers to the activities conducted by the ministries. This will also pave the way for collecting data items immediately below the critical indicators in terms of priority. As with the critical indicators, data collection for priority data items would be done by the relevant ministries. The “source” column in our spreadsheets refers to the agency that would collect or have the data. However, the KRSO would have to monitor this process and provide technical assistance as needed. This is especially needed given that many high-priority data items are based on component indicators that must be collected before the high-priority indicators can be calculated. Refer to Chapter Five for details.
- **Conduct one-off surveys.** An annual household and business survey form the backbone of data-collection efforts (especially to get macroeconomic indicators) in many countries. However, conducting these surveys would require that the KRSO build sufficient capacity for these complex undertakings. The KRSO could therefore begin by conducting one-off surveys—surveys designed to be conducted once and for a specified purpose—especially for specific districts or topics where there is a high data need. At the same time, the KRSO can continue working on surveys such as IHSES-2011 and MICS-4 with multilateral agencies. The KRSO could also hire outside consultants as needed for designing the surveys and the associated questionnaires. Over time, these surveys could be converted to regular and periodic rather than one-off and ad hoc. See Chapter Five for details.
- **Conduct routine surveys.** Conducting the above-mentioned one-off surveys would place the KRSO in a good position to conduct annual household and business surveys. In addition to providing macroeconomic information, these surveys will produce useful micro-level information. However, larger, routine surveys would need the cooperation of multiple ministries. Therefore, both the technical and the process experience that the KRSO has gained from the earlier steps would be useful here. See Chapter Five for details.

Roadmap Steps by Priority and Ease of Implementation

Table 8.1 presents the roadmap steps as a matrix, organized by priority and ease of implementation. This classification system will help the KRG decide what steps to implement in the near term, assuming that time and resources are scarce. Although the easiest to implement high-

Table 8.1
Roadmap Steps by Priority and Ease of Implementation

	High-Priority Steps	Lower-Priority Steps
Easier to Implement	Identify data contact within each ministry Convene stakeholder meetings Implement the organograms Collect the critical data items	Decide whether to improve current indicators or collect new ones Conduct one-off surveys
Harder to Implement	Enact a statistics law Upgrade and install ICT infrastructure Improve human resources in the KRSO Decide the composition of the policy and technical oversight boards	Collect the high-priority data items Conduct routine surveys

priority items would be the most attractive, this classification should not necessarily be a reason to neglect the lower-priority items that are difficult to implement.

Roadmap Steps by Type of Activity

Finally, Table 8.2 organizes the roadmap steps according to three types of activities: institution building, data collection, and capacity building. The requirements for the tasks in each category are very different: Institution building requires activities that bring together different stakeholders, data collection requires activities of a technical nature, and capacity building involves training. This ordering can be used to guide implementation if policymakers view one of these areas as more important than others or see themselves as having different degrees of capabilities to carry out the various activities within each category.

Table 8.2
Roadmap Steps by Type of Activity

Type of Activity	Roadmap Step
Institution building	Enact a statistics law
	Identify data contact within each ministry
	Convene stakeholder meetings
	Decide the composition of the policy and technical oversight boards
	Implement the organograms
Data collection	Collect the critical data items
	Decide whether to improve current indicators or collect new ones
	Collect the high-priority data items
	Conduct routine surveys
Capacity building	Improve human resources in the KRSO
	Upgrade and install ICT infrastructure
	Conduct one-off surveys

Conclusions and Next Steps

In this monograph, we have documented our efforts at designing a policy-relevant data-collection system for the KRI. Our first step was to understand existing institutions. We then assessed the available data and data-collection methods. Since the aim is to collect data that influences policymaking, we then collected information on the policy priorities of the region. We then mapped these priorities to data that needed to be collected to support decisions made regarding these policies, discussed the data-collection methodologies that are needed to collect these data, and recommended an institutional structure that would best support the data-collection efforts. Finally, we synthesized our recommendations into an implementation roadmap that the KRG and the KRSO could follow.

This monograph could serve as a user manual to the officials and staff of the KRG as they implement the recommended roadmap. Moreover, the Data Source Database, in which we catalogued the data sources using a custom data-management system, was designed for use by the KRSO and the KRG beyond this project as a repository of available data. Likewise, the spreadsheets of indicators we have developed can be expanded or otherwise modified as the data needs of the KRG evolve. For instance, the currently recommended indicators are related to the availability (that is, the “stock”) of key public goods and are less related to the efficiency with which investment and operations are undertaken. Costs and other indicators that would allow the KRG to compute returns on investment could be added in the future once basic public good needs have been met and efficiency considerations loom large.

The KRG and the KRSO have already made great strides in developing a data-collection system. They are in a good position to build on the progress made to date and implement the suggested recommendations on institution building, data collection, and capacity building to take this system to the next level in adopting the best practices followed around the world. Undertaking urgently needed labor market and enterprise surveys would be a good way to begin implementing many of these recommendations. Making these and other data available to policymakers in a transparent and timely manner will allow the region to achieve its policy goals.

RAND Data Team Meetings

Government Entities

Board of Investment

Central Bank of Iraq—Erbil Branch

Council of Ministers (various officials)

Department of Information Technology

Office of the Governor of Duhok Governorate

Kurdistan Regional Statistics Office

Headquarters

Department of Information and Mapping

Duhok Directorate

Erbil Directorate

Sulaimaniyah Statistics Office

Ministry of Agriculture and Water Resources

Office of the Minister

Directorate General of Planning (Agriculture)

Directorate General of Planning (Water Resources)

Directorate General of Agricultural Services

Directorate General of Horticulture and Forestry

Directorate General of Water Resources

Directorate General of Agriculture

Directorate General of Agriculture, Sulaimaniyah

Ministry of Education

General Directorate of Examinations

Directorate of Statistics

Ministry of Electricity

General Directorate of Planning and Projects Implementation

General Directorate of Distribution

Ministry of Finance and the Economy

Office of the Minister

Office of the Deputy Minister

General Directorate of Incomes

Directorate of Customs

Ministry of Health

Office of the Minister

Directorate General of Erbil

Ministry of Higher Education and Scientific Research

Advisor to the Minister

General Directorate of Scholars and Cultural Relations

Vice Presidency for Scientific Affairs, Foundation of Technical Education

Ministry of Housing and Reconstruction

Directorate General of Planning and Technique

Directorate of Follow-Up, Directorate General of Planning and Technique

Ministry of Labour and Social Affairs

Legal Advisor

General Directorate of Labour and Social Insurance

Ministry of Municipalities and Tourism

Office of the Minister

Directorate General of Urban Planning

Directorate General of Water and Sewerage

Directorate of Planning, Directorate General of Water and Sewerage

Ministry of Planning

Office of the Minister

Directorate General for Development Coordination and Cooperation

Directorate General of the Investment Budget

Directorate General of Development Planning

Ministry of Trade and Industry

Office of the Minister

Directorate General of Trade

Directorate of Trade Relations, Directorate General of Trade

Directorate of Export and Import, Directorate General of Trade

Directorate General of Registration of Companies

Ministry of Transport and Communications

Directorate General of Transportation

Director of Planning and Follow-Up, Directorate General of Transportation

General Directorate of Communications

Prime Minister's Office

Office of the Qaimaqan of Sharbazhar District

Office of the Governor of Sulaimaniyah Governorate

Nongovernmental Entities

American University of Iraq—Sulaimani

Cihan University

Erbil Chamber of Commerce and Industry

Salahaddin University, College of Administration and Economics

Sulaimaniyah Chamber of Commerce and Industry

Tatweer, National Capacity Development in Public Management Program

Kurdistan Regional Government Websites Summary

Table B.1
Kurdistan Regional Government Websites Summary

KRG Ministry	URL	Data Available Online?	Type of Data Available Online
Kurdistan Regional Statistics Office (listed on the web page as Kurdistan Information Center Statistical Office)	http://www.krso.net/	Yes (in html format)	Demographics, health, education, agriculture, industry, construction and building, and environment
Ministry of Agriculture and Water Resources (Sixth Cabinet)	http://www.moawr-krq.org (English: http://www.moawr-krq.org/index.php?Itemid=199)	Yes (some reports available online)	Agricultural land (arable area); capacity production; bee-keeping activity; animal production; agriculture research and training; agricultural investment; local and imported fruits and vegetables consumption and prices
Ministry of Culture and Youth (Sixth Cabinet)	No website found	N/A	N/A
Ministry of Education	http://www.kurdistan-moe.org/ (website only in Kurdish)	N/A	N/A
Ministry of Electricity	http://www.krgelectric.org/	N/A	N/A
Ministry of Endowment and Religious Affairs	No website found	N/A	N/A
Ministry of Finance and the Economy	http://mof-krq.org/english/topics.php?topics=1	N/A	N/A
Ministry of Health	No website found, although there is a website for the Directorate General of Health in Duhok: http://www.duhokhealth.org/en	N/A	N/A
Ministry of Higher Education and Scientific Research	http://www.mhe-krq.org/?q=node/105	No	N/A
Ministry of Housing and Reconstruction	No website found	N/A	N/A
Ministry of Justice	http://www.mojkurdistan.com/English_Malper.aspx	No	N/A
Ministry of the Interior	No website found	N/A	N/A
Ministry of Labour and Social Affairs	No website found	N/A	N/A
Ministry of Martyrs and Anfal Affairs	http://www.momakrg.org/en/	N/A	N/A

Table B.1—Continued

KRG Ministry	URL	Data Available Online?	Type of Data Available Online
Ministry of Municipalities and Tourism	No website found	N/A	N/A
Ministry of Natural Resources	No website found	N/A	N/A
Ministry of Peshmerga Affairs	No website found	N/A	N/A
Ministry of Planning	http://www.mop-krq.org/	Yes (in html format)	Demographics, health, education, agriculture, industry, construction and building, and environment (Primarily from the KRISO; the data sections of the KRISO and Ministry of Planning websites have largely the same structure and content)
Ministry of Trade and Industry	No website found	N/A	N/A
Ministry of Transport and Communications	http://www.moc-krq.com/English/	No	?

NOTE: The table shows our investigation of KRG websites as of March 2, 2011, and all links listed above were active as of that date.

Log of Available Documents

Table C.1 lists all documents that have been formally logged into the RAND system as of March 2011.

Table C.1
Log of Available Documents, as of March 2011

Title or Content	Source	Document Type
2010 Erbil "CAL files"	Erbil Ministry of Health Director-General	Data (some morbidity data on a selection of about 25 health facilities)
2010 Facility-level reports from Duhok	KRG Ministry of Health Statistics Unit	N/A
2010 Investment Budget Allocations by Ministries and Governorates, July 2010	KRG Minister of Planning (Dr. Ali Sindi)	PowerPoint presentation (PDF file)
About Erbil International Airport, 'Claiming the Future, Embracing the World,' updated June 25, 2010	Erbil International Airport	Word document
Aid management in Iraq: Achievements and the way forward, May 2008	UNDP	UNDP brief
Annual Report, Q1 2010	KRG International Bank for Investment and Development	Report
Basic statistics on fruits and vegetable consumption in KRI (prices, amount imported, etc.)	KRG Ministry of Agriculture and Water Resources	KRG Ministry of Agriculture report
Basic statistics on the agriculture sector in the KRI	KRG Ministry of Agriculture and Water Resources	KRG Ministry of Agriculture report
Bright Future Foundation Financial Report, December 31, 2010	Bright Future Foundation	Report
Budget Execution Support in the Kurdistan Regional Government	UNDP	Report
Comprehensive Food Security and Vulnerability Analysis in Iraq	United Nations World Food Programme, Iraq Country Office, Iraq Ministry of Planning and Development Cooperation, KRSO, and Ministry of Health Iraq	Report with summary data
Delivering Modernization: How DoIT is supporting successful government transformation, Issue 1, December 2009	KRG DoIT and PricewaterhouseCoopers	Report (PDF file)
Delivering Modernization: How DoIT is supporting successful government transformation, Issue 2, June 2010	KRG DoIT and PricewaterhouseCoopers	Report (PDF file)

Table C.1—Continued

Title or Content	Source	Document Type
Delivering Modernization: How DoIT is supporting successful government transformation, Issue 3, November 2010	KRG DoIT and PricewaterhouseCoopers	Report (PDF file)
Development of Water and Sanitation Policy for the Kurdistan Regional Government	Ministry of Municipalities and Tourism Kurdistan Regional Government (prepared by Chemonics Egypt)	Report
Doing Business in the Kurdistan Region in Iraq	KRG	KRG report
Duhok Governorate Profile	KRG Ministry of Planning	Report with summary data
Economic Data Sheet for IRAQ	World Bank	Data sheet
Economist Intelligence Unit country profile for Iraq 2008	Economist Intelligence Unit	Economist Intelligence Unit country profile
Economist Intelligence Unit country report for Iraq January 2010	Economist Intelligence Unit	Economist Intelligence Unit country report
Electricity tariff	KRG Ministry of Electricity	KRG Ministry of Electricity document (PDF file)
Employees in Erbil Directorate	N/A	Data sheet (Excel)
Employees Information according to their profession, July 2005	KRG Ministry of Electricity	Data sheet (Excel)
Erbil and Kurdistan Region Tourism Brochures	KRG Ministry of Tourism, General Director of Divan	Brochure
Erbil Governorate Profile	KRG Ministry of Planning	Report with summary data
Erbil Health facility codes	Erbil Ministry of Health DG	Data codes
Erbil International Airport	Erbil International Airport	CD
Examination results for 8th (2007–2008) and 9th (2007–2008 and 2008–2009) grade on the national exams	KRG	KRG report
Examination Statistics of Basic Education, 8th grade (2008–2009)	KRG	KRG report
Explanation of Hydrological Data in December 2010	N/A	Data sheet (PDF file)
Flyers for Business Expositions in Erbil, Sulaimaniyah, and Duhok	Exposition Promoters	Flyers
Food Security and Vulnerability Analysis	United Nations World Food Programme; KRSO; COSIT; Nutrition Research Institute	Data
Food Security and Vulnerability Analysis in Iraq 2005	United Nations World Food Programme, Iraq Country Office, and Iraq Ministry of Planning and Development Cooperation	Report with summary data
Good governance and transparency strategy—Summary information, July 2009	Council of Ministers, KRG	PDF file
Governorate (district and subdistrict) boundaries and settlements data—“Gazetteer”	KRG DIM	GIS maps
“Health information” Erbil and partially for Duhok	KRG DIM	GIS maps
Health Statistics 2008	KRG Ministry of Health	Data

Table C.1—Continued

Title or Content	Source	Document Type
The Human Cost of Tyranny in Kurdistan: A Bayesian Dynamic Estimation Model	KRSO	Paper by Jamal Rasul M. Ameen
The Human Cost of Tyranny in Kurdistan: A Bayesian Dynamic Estimation Model	KRSO	PowerPoint presentation of paper by Jamal Rasul M. Ameen (PDF file)
IMF Executive Board Concludes 2009—Article IV Consultation with Iraq	IMF	IMF Public Information Notice
Investment Opportunities in Agriculture Sector	KRI, Ministry of Agriculture and Water Resources, General Director of Planning and Follow-Up	Report
Iraq Family Health Survey	WHO; Ministry of Health/Iraq and Ministry of Health/Kurdistan; COSIT; KRSO	Data
Iraq Family Health Survey Questionnaire	KRSO	PDF file
Iraq Family Health Survey Report 2006/7	WHO, Iraq Ministry of Health, and Iraq Ministry of Planning and Development Cooperation	Report with summary data
Iraq Household Socio-Economic Survey	COSIT; KRSO; World Bank	Data
Iraq Household Socio-Economic Survey Questionnaire	KRSO	Excel file
Iraq Household Socio-Economic Survey—IHSES 2007 Tabulation Report	KRSO; COSIT; World Bank	Report with summary data
Iraq Household Socio-Economic Survey—IHSES 2007 Tabulation Report Volume II: Data Tables	KRSO; COSIT; World Bank	Report with summary data
Iraq Household Socio-Economic Survey—IHSES 2007 Tabulation Report Volume III: Annexes	KRSO; COSIT; World Bank	Report with summary data
Iraq: Letter of Intent, Memorandum of Economic and Financial Policies, and Technical Memorandum of Understanding, February 9, 2010	IMF	IMF memorandum of understanding
Iraq Living Conditions Survey 2004. Volume I: Tabulation Report	UNDP and Iraq Ministry of Planning and Development Cooperation	Report with summary data
Iraq Living Conditions Survey 2004. Volume II: Analytical Report	UNDP and Iraq Ministry of Planning and Development Cooperation	Report with summary data
Iraq Living Conditions Survey 2004. Volume III: Socio Economic Atlas of Iraq	UNDP and Iraq Ministry of Planning and Development Cooperation	Report with summary data
Iraq: Macroeconomic Assessment (October 2003)	IMF	Report
Iraq Mental Health Survey	Iraq Ministry of Health; COSIT; Iraq Ministry of Planning and Development Cooperation; KRG Ministry of Health; KRSO; KRG Ministry of Planning; WHO	Data
Iraq Multiple Indicator Rapid Assessment—Household Questionnaire	Central Statistical Office (Iraq) and Fafo Institute for Applied International Studies	Household survey questionnaire

Table C.1—Continued

Title or Content	Source	Document Type
Iraq: National Report on the Status of Human Development 2008	UNDP, Iraqi Ministry of Planning and COSIT, and KRG Ministry of Planning	PDF file
Iraq National Youth and Adolescents Survey	COSIT; KRSO; KRG (Ministry of Sports and Youth); United Nations Population Fund; PAPFAM (Pan Arab Project for Family Health)	Data
Iraq National Youth and Adolescents Survey 2009 Questionnaire	KRSO	N/A
Iraq National Youth and Adolescents Survey 2009 Summary report (Kurdish)	KRSO	CD
Iraq National Youth and Adolescents Survey 2009 Summary Report	KRG Ministry of Planning	Summary Report
Iraq population demographics and employment data (by governorate) for 2006	COSIT	Data
Iraq Program Note (last updated on February 26, 2010)	IMF	IMF Program Note
Iraq: Staff Report for the 2009 Article IV Consultation and Request for Stand-By Arrangement	IMF	IMF country report No. 10/72
Iraq: Statistical Appendix (August 2007)	IMF	Report with summary data
KBSNA 2008 estimates: Kurdistan GDP Project, Developed in cooperation between AUMMA and KRSO	KRG Ministry of Planning	Briefing by Jan W. Van Tongeren and Jan Bartlema
KRG Budget 2010	Ministry of Planning	Briefing
KRG Budgets 2008, 2009, and proposed 2010	KRG	Data
KRG investment budget by ministry, governorate, district, and subdistrict (actual and proposed)	KRG	Data
KRG personnel by ministry 2009 and proposed 2010	KRG	Data
The KRG Strategic Plan for Agriculture, 2009–2013	KRG Ministry of Agriculture and Water Resources	KRG Ministry of Agriculture report
Kurdistan Region Economic Development Assessment	U.S. Agency for International Development (USAID)	USAID report
The Kurdistan Region: Invest in the Future	KRG	KRG report
KRI Council of Ministers Ministry of Planning Statistical Office Yearbook	KRG Ministry of Planning	KRG KRSO statistical report
Kurdistan Regional Statistics Office Database of Data, October 2010	KRSO	List of data (PDF file)
Kurdistan Rivers and Streams	KRG DIM	GIS maps
Kurdistan Tax Rates and KRG Law 26 of 2007	Ministry of Finance and the Economy	Hard copy
Law 25 spreadsheet for Duhok (list of companies, production rates, capital, # of employees, etc.)	KRG	Data

Table C.1—Continued

Title or Content	Source	Document Type
Law 25 spreadsheet for Erbil (list of companies, production rates, capital, # of employees, etc.)	KRG	Data
Law 25 spreadsheet for Sulaimaniyah (list of companies, their production rate, capital, number of employees, etc.)	KRG	Data
Licensed projects under implementation, 2006–2008	KRG Board of Investment	Data
Master Plan for the Electricity Sector, Final Report, Vol. I, November 2009	Parsons Brinckerhoff for the KRG Ministry of Electricity	Report (PDF file)
Master Plan for the Electricity Sector, Final Report, Vol. II, November 2009	Parsons Brinckerhoff for the KRG Ministry of Electricity	Report (PDF file)
Master Plan for the Electricity Sector, Final Report, Vol. III, November 2009	Parsons Brinckerhoff for the KRG Ministry of Electricity	Report (PDF file)
Memorandum of Understanding signed by KRSO, COSIT, UNICEF for data collaboration for MICS 4	KRSO	Memorandum of Understanding
Ministry of Agriculture Profile 2007	Council of Ministries/Ministry of Agriculture/ General Directorate of Planning/ Directorate of Statistics	KRG report
2009 Ministry of Health Annual Report	Ministry of Health	Report with data
Ministry of Planning's Activity Report in the KRG 5th Cabinet, September 2009	KRG Ministry of Planning	Report
Multiple Indicators Cluster Surveys	COSIT; KRSO; Ministry of Health; UNICEF	Data
Parsons Brinckerhoff, Firm Overview	Parsons Brinckerhoff	Report (PDF file)
Population, Labour Force and Households	KRG	KRG Working Document
Private and government hospitals (number of beds) by governorate	N/A	Data
The Problem of Electricity Shortage in Kurdistan Region and Ways of Solving It	KRG Ministry of Electricity	Report (Word document)
Proposed Annual Plan for the Ministry of Industry of the New Projects for Private Industry 2010	KRG Ministry of Industry	KRG Ministry of Industry report
Report on Donor Contributions to the Kurdistan Region	KRG Ministry of Planning	Report
RMEK Organization Structure, 2011	KRG Ministry of Electricity	Organization organogram
School points 2009 Erbil	KRG DIM	GIS maps
Student enrollment and no. of instructors for the teachers college (basic education)	Department of Education at Salah Al Deen University	Salah Al Deen University report
Sulaimani Governorate Profile 2009 (1)	KRG Ministry of Planning	Report with summary data
Sulaimani Governorate Profile 2009 (2)	KRG Ministry of Planning	Report with summary data
Summary of "Improving Basic Social Services in the Kurdistan Region of Iraq—Collaborative and Cost-Sharing Initiative—14–16 April 2008"—conference organized by KRG in conjunction with UNICEF, WHO, and UNDP	KRG; UNICEF; WHO; UNDP	Conference proceedings

Table C.1—Continued

Title or Content	Source	Document Type
Table of contents of Sulaimani Governorate Profile	KRG Ministry of Planning	Table of contents of report
Training and support needs document	KRG DIM	N/A
UNICEF MICS survey for Iraq	UNICEF	Household data
Unsatisfied Basic Needs Mapping and Living Standards in Iraq, 3 Volumes and Executive Summary	UNDP and COSIT, courtesy of Sulaimaniyah Statistics Office	Bound volumes
Unsatisfied Basic Needs Mapping and Living Standards in Iraq, Executive Summary	UNDP and COSIT	PDF file
Working Arrangements for Kurdistan Regional Development Council, 2006	KRG	KRG Working Document

References Used to Inform the Data Spreadsheets for the Priority Policy Areas

Health

World Health Organization Indicator and Measurement Registry, 2011. As of December 15, 2011:
http://apps.who.int/gho/indicatorregistry/App_Main/browse_indicators.aspx

U.S. Centers for Disease Control Chronic Disease Indicators, 2007. As of December 15, 2011:
<http://apps.nccd.cdc.gov/cdi/Default.aspx>

World Health Organization, *Monitoring the Building Blocks of Health Systems: A Handbook of Indicators and Their Measurement Strategies*, Geneva, Switzerland, 2010. As of December 15, 2011:
<http://www.who.int/healthinfo/systems/monitoring/en/index.html>

Rutstein, Shea Oscar, and Guillermo Rojas, *Guide to DHS Statistics*, Calverton, Md.: ORC Macro, September 2006. As of December 15, 2011:
http://www.measuredhs.com/pubs/pdf/DHSG1/Guide_DHS_Statistics.pdf

Education

Description of the Ministry of Education database (EMIS_database_documentation_AR-SA.doc), RAND project document provided by the RAND Education project.

United Nations Educational, Scientific, and Cultural Organization (UNESCO), *Educational Indicators: Technical Guidelines*, 2009. As of December 15, 2011:
<http://www.uis.unesco.org/Library/Documents/eiguide09-en.pdf>

Electricity

United Nations Statistics Division, Energy Section, 2008 *Energy Statistics Yearbook and Energy Balances and Electricity Profiles*. As of December 15, 2011:
<http://unstats.un.org/unsd/energy/>

United Nations Statistics Division, *Energy Statistics—A Manual for Developing Countries*, 1991. (This is the UN's guide for developing countries on how to organize the collection of this information; also available in Arabic.) As of December 15, 2011:
<http://unstats.un.org/unsd/pubs/gesgrid.asp?ID=51>

Road Transport

U.S. Bureau of Transportation Statistics, *Guide to Good Statistical Practice in the Transportation Field*, May 2003. As of December 15, 2011:
http://www.bts.gov/publications/guide_to_good_statistical_practice_in_the_transportation_field/

U.S. Bureau of Transportation Statistics, National Transportation Statistics 2010: Appendix B—Glossary. As of December 15, 2011:
http://www.bts.gov/publications/national_transportation_statistics/html/appendix_b.html

Transportation Research Board, *Sustainable Transportation Indicators: A Recommended Research Program for Developing Sustainable Transportation Indicators and Data*, 2008. (The Transportation Research Board is a public-private research partnership in the United States.) As of December 15, 2011:
<http://trid.trb.org/view.aspx?id=882256>

Litman, Todd, and David Burwell, “Issues in Sustainable Transportation,” *International Journal of Global Environmental Issues*, Vol. 6, No. 4, 2006, pp. 331–347.

United Nations Economic Commission for Europe, *Handbook of Transport Statistics in the UNECE Region*, 2006. As of December 15, 2011:
<http://www.unece.org/trans/main/wp6/pdfdocs/HTS2006.pdf>

United Nations Economic Commission for Europe, *Illustrated Glossary for Transport Statistics*, Fourth Edition, July 2009. As of December 15, 2011:
http://www.unece.org/trans/main/wp6/publications/stats_glossary.html

World Bank, World Development Indicators 2010. As of December 15, 2011:
<http://data.worldbank.org/data-catalog/world-development-indicators/wdi-2010>

Macroeconomic Data

U.S. Bureau of Economic Analysis, *Concepts and Methods of the U.S. National Income and Product Accounts*, 2009, As of December 15, 2011:
<http://www.bea.gov/national/pdf/NIPAhandbookch1-4.pdf>

Landefeld, J. Steven, Eugene P. Seskin, and Barbara M. Fraumeni, “Taking the Pulse of the Economy: Measuring GDP,” *Journal of Economic Perspectives*, Vol. 22, No. 2, Spring 2008, pp. 193–216. As of December 15, 2011:
http://www.bea.gov/about/pdf/jep_spring2008.pdf

U.S. Bureau of Economic Analysis, *A Guide to the National Income and Product Accounts of the United States*, 2006. As of December 15, 2011:
<http://www.bea.gov/national/pdf/nipaguid.pdf>

U.S. Bureau of Labor Statistics, *BLS Handbook of Methods*, 2009. As of December 15, 2011:
<http://www.bls.gov/pub/hom/homtoc.htm>

Agriculture

Food and Agricultural Organization, FAOSTAT, Glossary and Methodology, 2010. As of December 15, 2011:
<http://faostat.fao.org/site/379/default.aspx>

United Nations, *The Global Strategy to Improve Agricultural and Rural Statistics: Report of the Friends of the Chair on Agricultural Statistics*, United Nations Economic and Social Council Statistical Commission, 41st Session, February 23–26, 2010. As of December 15, 2011:
<http://unstats.un.org/unsd/statcom/doc10/BG-AgriStats.pdf>

World Bank, *Tracking Results in Agriculture and Rural Development in Less Than Ideal Conditions: A Sourcebook of Indicators for Monitoring and Evaluation*, 2008.

World Bank, World Development Indicators 2010. As of December 15, 2011:
<http://data.worldbank.org/data-catalog/world-development-indicators/wdi-2010>

Tourism

United Nations World Tourism Organization, Programme on Statistics and the Tourism Satellite Account, *International Recommendations for Tourism Statistics 2008*, 2010. As of December 15, 2011:
<http://statistics.unwto.org/en/content/international-recommendations-tourism-statistics-2008-irts-2008>

United Nations World Tourism Organization, *Compendium of Tourism Statistics: Data 2005–2009*, 2011. As of December 15, 2011:
<http://statistics.unwto.org/en/content/data-and-indicators>

United Nations World Tourism Organization, *Yearbook of Tourism Statistics: Data 2005–2009*, 2011. As of December 15, 2011:
<http://statistics.unwto.org/en/publication/yearbook-tourism-statistics-2011-edition>

United Nations World Tourism Organization, *Tourism Statistics Metadata Project: General Guidelines for Documenting Tourism Statistics*, 2005. As of December 15, 2011:
<http://www.unwto.org/statistics/metadata/metadata.pdf>

Good Governance

World Bank Enterprise Surveys: Core Questionnaire 2007. As of December 15, 2011:
<http://www.enterprisesurveys.org>

World Bank Doing Business Surveys. As of December 15, 2011:
<http://www.doingbusiness.org>

Transparencia Mexicana (Transparency Mexico), Encuesta Nacional de Corrupcion y Buen Gobierno (National Survey of Corruption and Good Government), 2001, 2003, 2005, and 2007. As of December 15, 2011:
<http://www.transparenciamexicana.org.mx/>

Government Assessment Portal, Library Toolbox: A Tool for Governance Assessment (multiple examples). As of December 15, 2011:
http://gaportal.org/toolbox/tools_of_gov/all

Data-Related Information and Communications Technology and Physical Infrastructure to Meet Policy Needs

The goal of this appendix is to review the existing ICT for data collection, management, and dissemination in the KRI and to identify ways that ICT can be improved and used to meet the policy needs of the KRG. This appendix is based on a review of ICT capacity by RAND, as requested by the KRG. However, in the course of our research we identified the work being undertaken by the DoIT, a large-scale effort to assess and improve IT—including ICT to support data collection and management—in the KRG. Consequently, we provide a more limited review of ICT for data and refer the reader to the DoIT’s efforts for greater detail.

Information-Collection Methodology

Our approach to assessing ICT mirrors our data-assessment strategy outlined in Chapter Two. We also met with the KRG DoIT on multiple occasions to ascertain how DoIT’s services and knowledge could support data collection for policymaking. Our goal was not to determine whether, for example, KRG ministries use specific computing systems; instead, we aimed to assess the general state of data-related ICT and identify ways that ICT systems and infrastructure could be improved to facilitate data collection, management, and dissemination.

Available Information and Communications Technology Infrastructure

In this section, we summarize the RAND team’s assessment of current ICT capacity within the KRG. We describe, when feasible, the general ICT infrastructure in the KRI insofar as it supports data-gathering and data-management activities. We focus on computer hardware, networking, and data-sharing systems. Our summary is based on conversations with KRG officials who are responsible for implementing and managing key ICT systems and officials who rely on ICT systems to do their jobs. We begin with some overall findings:

General

- Basic ICT infrastructure appears to be acceptable but could be improved, and infrastructure quality varies in different parts of the KRI. Moreover, our information is based primarily on observations from major urban areas and for the set of ministries with which we have met. Reports we received varied across ministries.

- The KRG ministry officials with whom we spoke generally did not report having significant problems with accessing computers, email, and the Internet. However, there were concerns about data-transfer speeds and network reliability.
- The major limitation with managing data that we heard was the continued use of paper systems to record and transfer data. Even when computers were available, officials indicated that nonelectronic transfer was still common.
- The KRG is undertaking a strategy through the DoIT to modernize IT systems. This likely will prove a valuable resource for the provision of ICT systems to support policy-relevant data.
- There are privately provided Internet and mobile systems that are relatively high-quality.

Computers

- Within the KRG ministries we visited, there were no reports that the availability of computers was inadequate. Most offices we saw had working, relatively powerful computers. However, we note that we visited only a small number of facilities.
- There are concerns about the lack of computer “literacy” and the need for additional computer training. We heard of isolated examples of ongoing or future plans to improve the knowledge of computers among government staff. We address this issue in greater detail below.

“Logical” Structures and Data Sharing

- KRG intranet and Internet services—including websites, email, and file-sharing capability—appear to be limited.
 - Few KRG employees we met with have or use KRG email addresses. A possible reason for this could be that government email systems are insufficient.
 - Many employees noted that data-sharing and Internet systems were lacking; in multiple cases, we heard reports of data being shared by hard copy when electronic copy would have been more efficient.
- In some cases, data-sharing systems exist but appear to be underused. For example, the Central Bank of Iraq–Erbil Branch reports having the technology to receive data from banks and report financial data to the Central Bank of Iraq in Baghdad electronically, but many of these reports are still sent by mail.
- Most ministries reported *storing* data electronically, although the quality of storage architecture and database systems appears limited.
- There is not an apparent mechanism by which ministry staff can obtain existing data that would support policymaking. We have not yet identified the process, for example, by which a director could identify what relevant data exist in other ministries and then contact someone in another ministry to acquire those data.

Coordinating with the Department of Information Technology

The KRG is undertaking a large-scale effort to develop a government-wide IT strategy, and this effort has the potential to support policy-relevant data collection, management, and dissemi-

nation. The IT strategy is being run by the DoIT, which is assessing current KRG IT infrastructure and creating a roadmap to improve that infrastructure and support effective IT use throughout the KRG. We do not describe in detail the DoIT initiative here, but we note key ways in which the KRSO—and data-management authorities in the KRG ministries—can take advantage of and coordinate with DoIT:¹

- **Align IT systems and protocols:** Part of the DoIT mission is to standardize data hardware and software systems to facilitate communication across the KRG. Data generators and users, such as the KRSO, should work with DoIT to ensure that IT systems are consistent with KRG-wide standards.
- **Take advantage of a central data center:** The DoIT plan calls for centralized data storage systems in the KRG. The KRSO and other data generators should identify how best to use this resource to promote data sharing and make data publicly available. In cases where it might not be appropriate for the KRSO to use centralized storage, it will need to maintain its own data-storage centers.
- **Draw on human capacity–development resources:** DoIT has an initiative that addresses IT capacity, especially for government, which will include staff that can be made available to support KRG ministries and agencies. The KRSO should coordinate with DoIT and, when feasible, draw on the central staff to support capacity building within the KRSO.
- **Coordinate with DoIT on KRG data policies:** Part of the DoIT initiative involves recommending ways the KRG can adjust its policies on making data publicly available. As the principal data-gathering organization within the KRG, the KRSO should seek to coordinate with DoIT efforts to assess and improve the KRG’s laws that govern data provision.

Our recommendations in this section argue for a closer relationship between the KRSO and the DoIT. The DoIT initiative is still being developed, but it has the potential to be an important resource to the KRSO and government ministries as they seek to enhance ICT capacity and efficacy. Although the KRSO may need to customize some of the efforts of the DoIT, it is likely that the DoIT can provide most of the expertise the KRSO needs for creating a useful ICT architecture. A closer relationship could be formalized by regular meetings between staffs or a contractual relationship between the KRSO and the DoIT for consulting services.

Summary of Information and Communications Technology Availability

Basic infrastructure, such as Internet connections and computers, is *available*, but quality may be limited in some cases. Electronic data transfer is largely underutilized, and the systems to store, organize, and transmit data within and across ministries appear to be underdeveloped. The extent to which ICT activities across ministries are coordinated is not clear, especially in terms of data sharing, web standards, and basic Internet services (such as email and websites).

For example, the KRG would benefit from improved internal and external Internet systems. Internally, relevant ministries need reliable, high-capacity data transmission systems—

¹ For more information, see Kurdistan Regional Government, Department of Information Technology, 2011.

intranets—to share data and collaborate on analysis. Externally the KRG could benefit from an effective, standardized website, in part to make data available to the public (or other government ministries).

In other words, there is an overwhelming need for a systems approach to harnessing the existing ICT physical infrastructure into an organized information system that would be most useful to policymakers and the KRSO alike. The DoIT initiative is one step toward a more unified, KRG-wide approach to data IT, and the KRSO should coordinate closely with DoIT for mutual benefit.

Comments on Proposed Organizational Charts for the Kurdistan Regional Statistics Office

Note: This appendix is a slightly revised version of a memorandum originally delivered on January 14, 2011, to Mr. Serwan Mohamed, Head, Kurdistan Regional Statistics Office, with copies to His Excellency Dr. Ali Sindi, Minister of Planning, and Mr. Zagros Fatah, Director General, Development Coordination and Cooperation, Ministry of Planning. The translated organograms that appear here as Figures F.1–F.4 appeared originally as an appendix in the memo when it was delivered. In addition, we have added an additional recommendation that appeared in a briefing presented January 23, 2011, but that was not in the original memo. We note this recommendation as new when it appears.

This memo briefly discusses the proposed organization of the Kurdistan Regional Statistics Office (KRSO) based on the latest draft of the statistics law, the organization chart (diagrams of the proposed organization), and the organization of the Iraqi Central Organization for Statistics and Information Technology (COSIT). We focus on one main issue: consistency across offices and between the organization chart and the draft law. We divide our memo into two parts. The first discusses the substantive areas in which statistics need to be collected. The second discusses the administrative aspects of the organization. Since this memo and our recommendations depend heavily on the translations we used, we include our translated versions of the proposed organization at the end of this appendix in Figures F.1–F.4.

Given the information we have received, it is not possible for us to discuss detailed staffing needs of the KRSO in its head office and the governorate directorates. However, we are willing to provide an assessment of these needs as we receive more information (for example, on current staffing levels and staff qualifications).

The Substantive Statistical Areas

Table F.1 compares the statistical areas as expressed in the draft statistics law with the organization of the KRSO headquarters, the governorate directorates, and COSIT. Since the organization of the KRSO could help or hinder its implementation of the draft law, it is important to discuss the organization of the KRSO in the context of the law.

Article 3, Clause 1, notes that the law is designed to achieve the implementation of statistical processes and surveys related to various activities. Furthermore, Article 6, Clause 4, says

Table F.1
Comparative Statistical Areas

1. Draft Law Article I:7, "Activities"	2. Draft Law Article I:9, "Statistical Data"	3. Head Office Directorates	4. Erbil Departments	5. Duhok Departments	6. Sulaimaniyah Departments	7. COSIT Directorates
Agricultural		Agricultural	Agricultural	Agricultural	Agricultural	Agricultural
Industrial		Industrial	Industrial	Industrial	Industrial	Industrial
Economic	Economic					
Social	Social	Social				
Population	Population	Population				
Environmental	Environmental	Environmental	Environmental	Environmental	Environmental	Environmental
Financial						
Monetary						
Cultural	Cultural					
Building and Construction						Building and Construction
Transportation		Transportation	Transportation	Transportation	Transportation	
Communication						
Trade		Trade	Trade	Trade	Trade	Trade
	Health					
	Services					
	Activities related to society, including license, permission, budgets, final accounts, custom permissions, and related accounting documentations					
		Construction	Construction	Construction	Construction	
		Prices and Records				
		Living Standards				Living Conditions

Table F.1—Continued

1. Draft Law Article I:7, "Activities"	2. Draft Law Article I:9, "Statistical Data"	3. Head Office Directorates	4. Erbil Departments	5. Duhok Departments	6. Sulaimaniyah Departments	7. COSIT Directorates
		National Accounts				National Accounts
			Housing and Living Standards	Housing and Living Standards	Housing and Living Standards	
			Social and Educational	Social and Educational	Social and Educational	Educational and Social
			Prices	Prices	Prices	
						Transport and Communications
						Population and Manpower
						Index Numbers
						Human Development

that the KRSO will establish a databank related to the activities, and Article 6, Clause 6, says that the KRSO will conduct research and studies regarding the activities.

These **activities** are defined in Article 1, Clause 7, as “agricultural, industrial, economic, social, population, environmental, financial, monetary, cultural, building and construction, transportation, communication and trade.” We interpret these to mean the various substantive statistical areas in which the KRSO will oversee collection of statistics.

Our first observation is that Article 1, Clause 9, when defining **statistical data**, repeats only five of these (economic, social, population, environmental, and cultural), adds two others (health and services), with the rest presumably grouped under a blanket category of activities.

Recommendation: We recommend that the statistical data be defined consistently with the activities to make clear the logic of the organization of the different directorates (headquarters) and departments (governorate offices) responsible for each statistical area.

Head Office Directorates

The different **directorates** under the Directorate General of Technical Affairs at KRSO headquarters are similar but do not correspond exactly to the activities defined in Article 1, Clause 7 (see columns 1 and 3 of Table F.1). In some cases this is merely semantic. For example, there is a Directorate of Construction Statistics, but “building and construction” is listed as an activity. In other cases, the correspondence is uncertain, although it is likely that the directorates of “Prices and Records,” “Living Standards,” and “National Accounts” correspond to the activities categorized as “economic,” “financial,” and “monetary.” And in two cases, those of the activities “communication” and “cultural,” it appears there is no directorate responsible.

Recommendation: We recommend that the head office directorates correspond more closely with the activities of Article 1, Clause 7, and with the statistical data defined in Article 1, Clause 9.

Taken in conjunction with the previous recommendation, activities, statistical data, and directorates all need to be consistent with each other.

The KRSO Head Office and COSIT

There are many reasons for the Kurdistan Regional Government to diverge from the central Iraqi government in its statistics law and statistics organization. It has its own social and economic needs and its own aspirations. However, there are also reasons to structure the organization similar to the COSIT structure. Specifically, similar structures can facilitate data sharing and joint data analysis, help build trust among specialists, reduce bureaucratic hurdles and miscommunication, and eliminate at least some potential objections that might arise from COSIT regarding working with the KRSO. Six of the head office directorates are exactly the same as COSIT directorates. However, a number of others are different or simply missing.

Recommendation: If possible, we recommend that the head office directorates be structured as closely as possible to the structure of COSIT directorates to facilitate cooperation. Because of the special conditions of the KRI, KRSO directorates may have slightly different statistical areas than COSIT directorates, or the KRSO may have directorates that COSIT does not have. However, it would be beneficial to have all directorates that COSIT now has.

The Governorate Offices

The Departments in each of the three governorate offices are exactly the same. This is a benefit since it can facilitate data sharing among the three offices.

However, the Departments are somewhat different from the Directorates in the head office. This could confuse lines of communication and data sharing.

Recommendation: We recommend that the statistical Departments in the governorate offices mirror the statistical Directorates in the head office.

[The following two paragraphs did not appear in the original memo. The recommendation did appear in the original briefing, however.]

The head office contains directorates for Research and Studies, Analysis and Programming, and Training and Development. We note, however, that the governorate offices have no coordinate departments.

Recommendation: We recommend that each governorate have a combined Department of Research, Analysis, and Training. The ability to carry out research and analysis and to have a nearby point-of-contact for arranging training can help motivate the governorate office staff and build skills.

The Administrative Structure

Administrative and Financial Affairs

The administrative structure of the head office is more complex than the administrative structures of the governorate offices. This makes a great deal of sense, since it is useful to concentrate some administrative tasks to gain efficiencies and cut costs.

Recommendation: We recommend no changes to the administrative structure of the head office.

However, we do note that the administrative structures of the governorate offices are slightly different. In particular, in Erbil and Duhok, there are five units reporting to a central administration and finance function, which then reports to the Director. However, in Sulaimaniyah, there are only four units, and these all report directly to the Director.

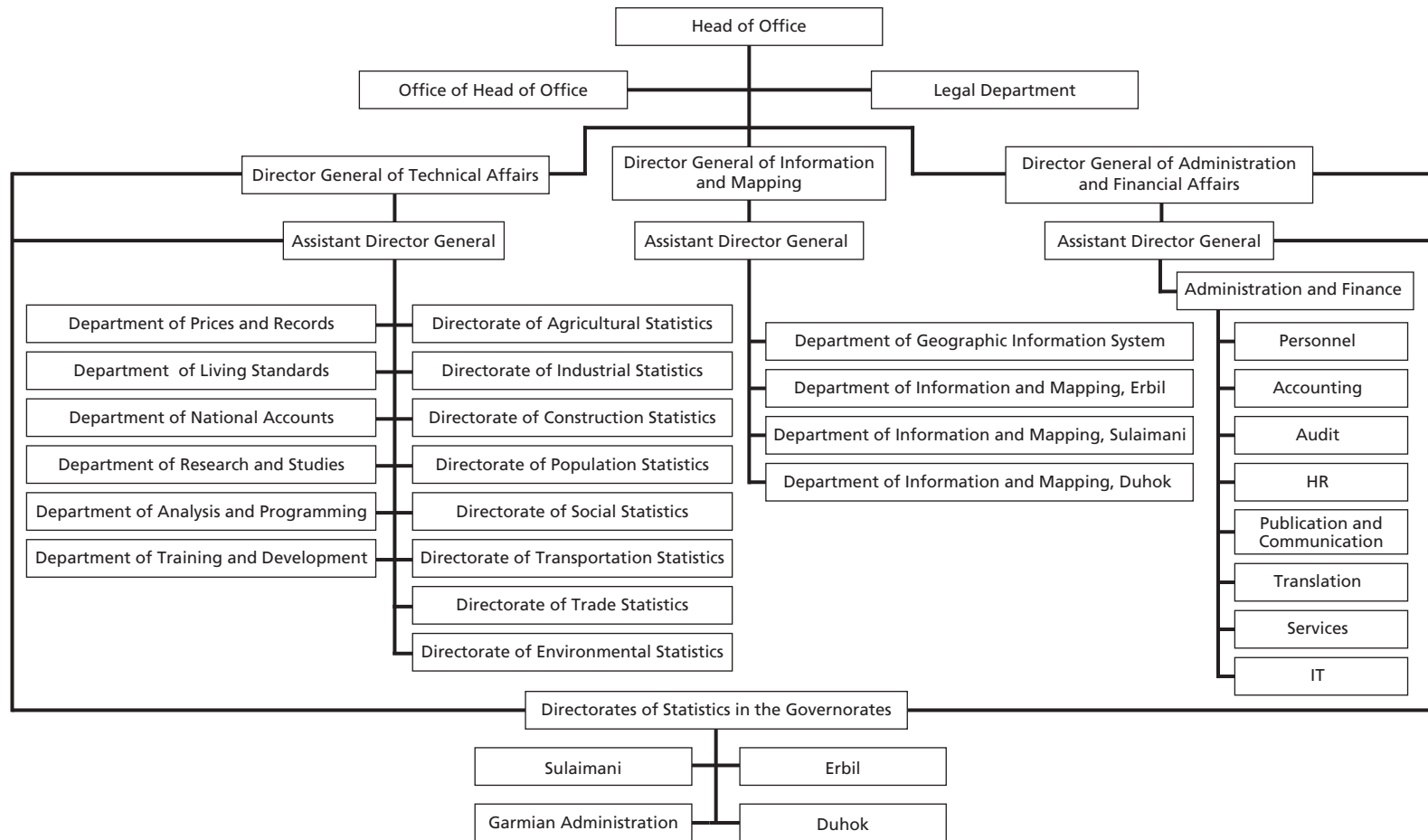
Recommendation: We recommend that the administrative structures of all three governorate offices be identical. In addition to simplifying communication across the governorate offices and with the head office, this would also signal uniformity in structure to the governorates. Uniformity in organizational structure would be reflected in the uniformity of statistics collection.

Information Systems

It appears from the head office chart that the head office will have a Department of Geographic Information Systems but that the governorates will have Departments of Information and Mapping.

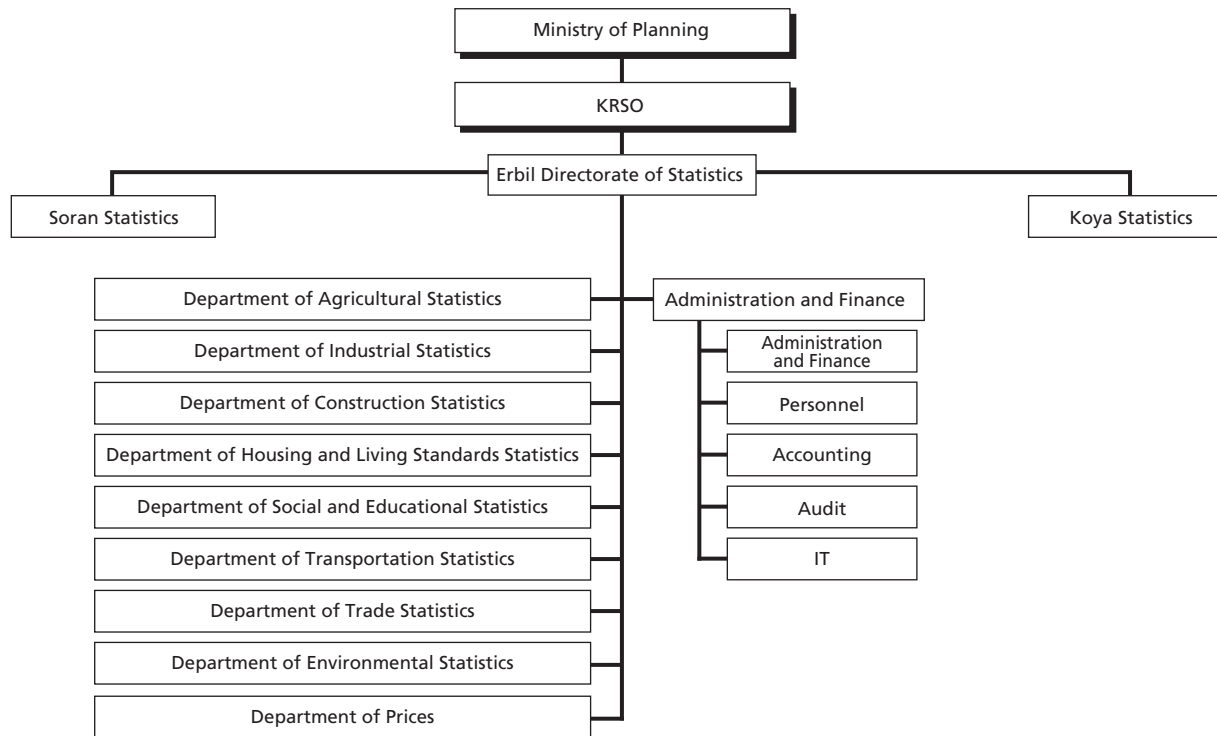
Recommendation: In line with the above recommendations on consistency and uniformity, we recommend that the terms used for all these offices be the same.

Figure F.1
Proposed Organization Structure for the Kurdistan Regional Statistics Office



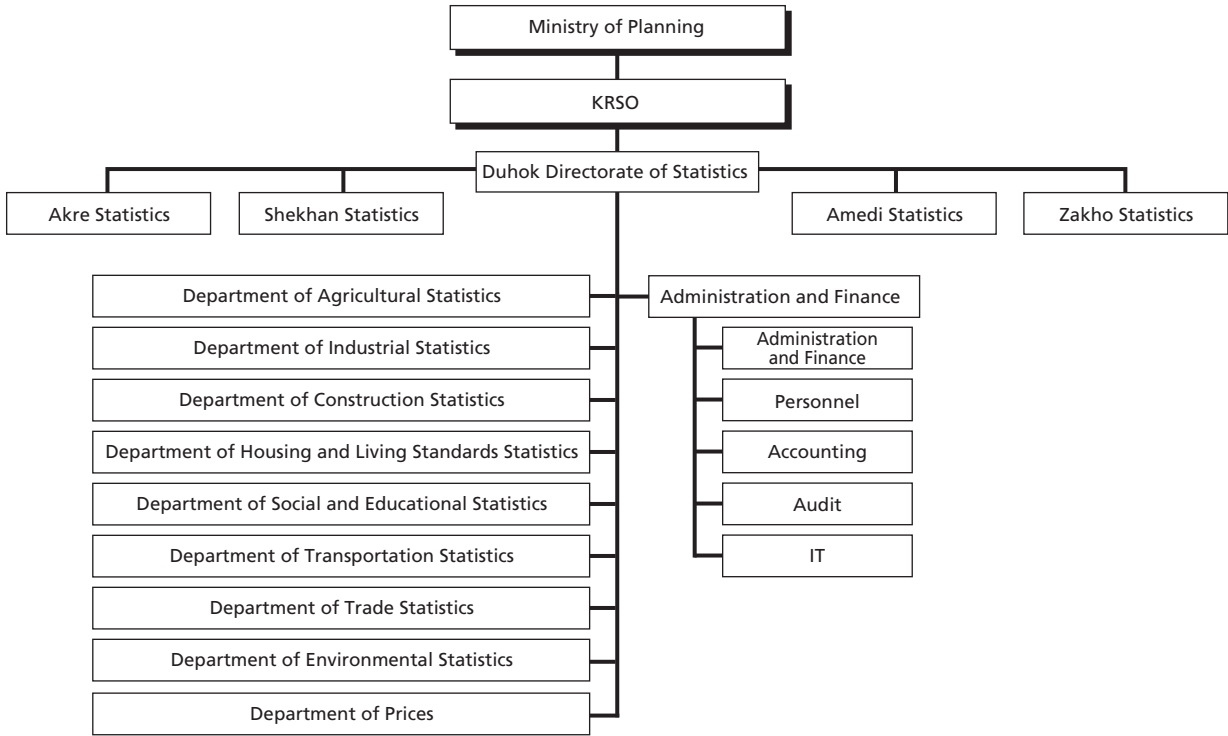
RAND MG1184-F1

Figure F.2
Proposed Organization Structure for the Erbil Directorate of Statistics



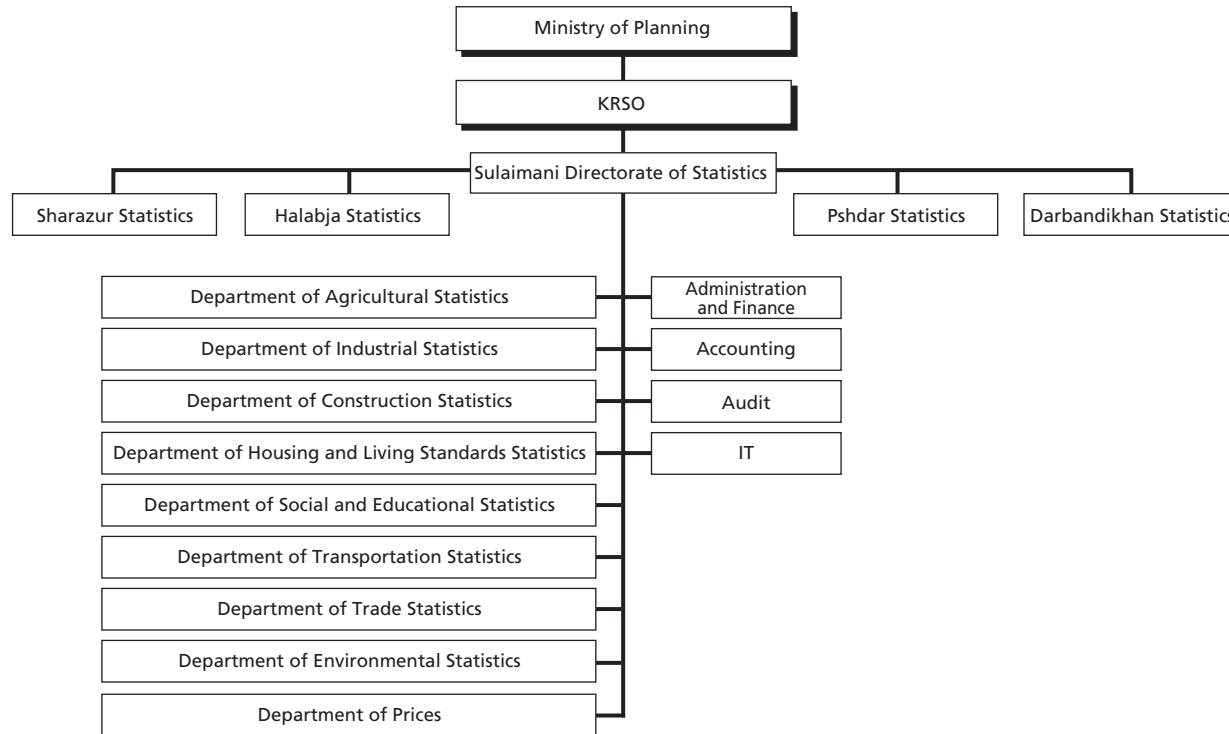
RAND MG1184-F.2

Figure F.3
Proposed Organization Structure for the Duhok Directorate of Statistics



RAND MG1184-F3

Figure F.4
Proposed Organization Structure for the Sulaimani Directorate of Statistics



RAND MG1184-F4

Bibliography

- Alcser, Kirsten, Christopher Antoun, Ashley Bowers, Judi Clemens, and Christina Lien, "Ethical Considerations in Surveys," in Lars Lyberg, Zeina Mneimhen, and Peter Mohler, eds., *Cross-Cultural Survey Guidelines*, 2010. As of December 7, 2011:
<http://ccsg.isr.umich.edu/archive/pdf/eth060108.pdf>
- Berk, Richard A., and David A. Freedman, "Statistical Assumptions as Empirical Commitments," in Thomas G. Blomberg and Stanley Cohen, eds., *Law, Punishment, and Social Control: Essays in Honor of Sheldon Messinger*, 2nd ed., New York: Aldine de Gruyter, 1995, pp. 245–258.
- Central Organization for Statistics and Information Technology (Iraq), Kurdistan Region Statistics Organization, and World Bank, *Iraq Household Socio-Economic Survey: IHSES—2007*, Baghdad, Iraq, 2008. As of November 29, 2011:
<http://go.worldbank.org/GMS95L4VH0>
- Central Organization for Statistics and Information Technology (Iraq), Iraqi Ministry of Planning and Development Cooperation, Kurdistan Region Statistics Office, Nutrition Research Institute, Iraqi Ministry of Health, and United Nations World Food Programme Iraq Country Office, *Comprehensive Food Security and Vulnerability Analysis (CFSVA), Iraq*, November 2008. As of December 15, 2011:
<http://www.wfp.org/content/iraq-comprehensive-food-security-and-vulnerability-analysis-2008>
- Central Organization for Statistics and Information Technology (Iraq), Kurdistan Regional Statistics Office, Ministry of Health, and United Nations Children's Fund, *Iraq: Multiple Indicator Cluster Survey 2006: Monitoring the Situation of Children and Women*, October 2007. As of December 15, 2011:
http://www.childinfo.org/files/MICS3_Iraq_FinalReport_2006_eng.pdf
- Cochran, William G., *Sampling Techniques*, 3rd ed., New York: John Wiley & Sons, 1977.
- Diamond, Shari S., "Reference Guide on Survey Research," in *Reference Manual on Scientific Evidence*, 2nd ed., Washington, D.C.: Federal Judicial Center, 2000, pp. 229–276.
- Doing Business*, homepage, 2011. As of December 15, 2011:
<http://www.doingbusiness.org/>
- Dziobek, Claudia, and Florina Tanase, *IMF Backs UAE in Statistics Overhaul*, International Monetary Fund Statistics Department, 2007. As of December 7, 2011:
<http://www.imf.org/external/pubs/ft/survey/so/2007/num1126a.htm>
- European Union, "Directive 95/46/EC of the European Parliament and the Council on the Protection of Individuals with Regard to the Processing of Personal Data and on the Free Movement of Such Data," *Official Journal of the European Communities*, Vol. 281, 1995, pp. 31–50, As of December 7, 2011:
<http://eurlex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:31995L0046:EN:HTML>
- Fellegi, Ivan P. (Chief Statistician of Canada), "Characteristics of an Effective Statistical System," Morris Hansen Lecture, Washington Statistical Society, October 25, 1995. As of December 30, 2011:
<http://unstats.un.org/unsd/dnss/docViewer.aspx?docID=190#start>
- Freedman, David A., "Sampling," in Michael S. Lewis-Beck, Allen E. Bryman, and Tim F. Liao, eds., *Encyclopedia of Social Science Research Methods*, Vol. 3, Sage Publications, 2004, pp. 986–990.
- Freedman, David A., and Kenneth W. Wachter, "On the Likelihood of Improving the Accuracy of the Census Through Statistical Adjustment," in Darlene R. Goldstein, ed., *Science and Statistics: A Festschrift for Terry Speed*, Institute of Mathematical Statistics Monograph 40, 2003, pp. 197–230.

- Freedman, David, Robert Pisani, and Roger Purves, *Statistics*, 3rd ed., New York: W. W. Norton, Inc., 1998.
- Gertler, Paul J., Sebastian Martinez, Patrick Premand, Laura B. Rawlings, and Christel M. J. Vermeersch, *Impact Evaluation in Practice*, Washington, D.C.: World Bank, 2011.
- Glewwe, Paul, “Chapter III: An Overview of Questionnaire Design for Household Surveys in Developing Countries,” in United Nations Statistics Division, ed., *Household Sample Surveys in Developing and Transition Countries*, New York, ST/ESA/STAT/SER.F/96/WWW, 2005a. As of December 16, 2011: http://unstats.un.org/unsd/hhsurveys/pdf/Household_surveys.pdf
- , “Chapter IV: Overview of the Implementation of Household Surveys in Developing Countries,” in United Nations Statistics Division, ed., *Household Sample Surveys in Developing and Transition Countries*, New York, ST/ESA/STAT/SER.F/96/WWW, 2005b. As of December 16, 2011: http://unstats.un.org/unsd/hhsurveys/pdf/Household_surveys.pdf
- Groves, Robert M., Floyd J. Fowler, Jr., Mick P. Couper, James M. Lepkowski, Eleanor Singer, and Roger Tourangeau, *Survey Methodology*, 2nd ed., Hoboken, N.J.: Wiley and Sons, 2009.
- Hansen, Morris H., William N. Hurwitz, and William G. Madow, *Sample Survey Methods and Theory*, New York: John Wiley & Sons, 1953.
- Imber, Jonathan B., ed., “Symposium: Population Politics,” *Society*, Vol. 39, No. 1, 2001, pp. 3–53.
- Instituto Nacional de Estadística, *Evolution of the National Statistical System of Spain*, presented at the 38th session of the United Nations Statistics Commission, New York, 2007. As of December 7, 2011: http://unstats.un.org/unsd/statcom/statcom_seminar/EvolucionSEN_EN_spain.pdf
- International Monetary Fund, *World Economic Outlook Database*, October 2010. As of December 15, 2011: <http://www.imf.org/external/pubs/ft/weo/2010/02/weodata/index.aspx>
- Iraqi Ministry of Health, Central Organization for Statistics and Information Technology (Iraq), Iraqi Ministry of Planning and Development Cooperation, Ministry of Health (Kurdistan Region in Iraq), Kurdistan Regional Statistics Office, and Ministry of Planning (Kurdistan Region in Iraq), in collaboration with World Health Organization, *Iraq Mental Health Survey 2006/7 Report*, 2009. As of December 15, 2011: http://www.emro.who.int/iraq/pdf/imhs_report_en.pdf
- Iraqi Ministry of Youth and Sports and Central Organization for Statistics and Information Technology, Kurdistan Regional Government Ministry of Sports and Youth, and Kurdistan Regional Statistical Office, in cooperation with United Nations Population Fund Iraq Country Office and the Pan Arab Project for Family Health, *Iraq National Youth and Adolescents Survey 2009: Summary Report*, Republic of Iraq, 2009. As of December 15, 2011: http://cosit.gov.iq/english/pdf/2010/youth_nys.pdf
- Kasprzyk, Daniel, “Chapter IX: Measurement Error in Household Surveys: Sources and Measurement,” in United Nations Statistics Division, ed., *Household Sample Surveys in Developing and Transition Countries*, New York, ST/ESA/STAT/SER.F/96/WWW, 2005. As of December 16, 2011: http://unstats.un.org/unsd/hhsurveys/pdf/Household_surveys.pdf
- Kish, Leslie, *Statistical Design for Research*, New York: John Wiley & Sons, 1987.
- Kopsch, Gunter, *The Role and Function of Regional and Local Statistical Offices*, Statistisches Bundesamt, presented at Workshop Yangon, Burma, December 11–13, 2002. As of December 7, 2011: http://unstats.un.org/unsd/methods/statorg/Workshops/Yangon/Session1_Local_Kopsch_Slides.pdf
- Kurdistan Regional Government, *Kurdistan Region—Iraq Council of Ministers Ministry of Planning Statistical Office Yearbook 2008*, 2008.
- Kurdistan Regional Government, Council of Ministers, *Good Governance & Transparency Strategy*, Summary Information, July 2009.
- Kurdistan Regional Government, Department of Information Technology, homepage, 2011. As of December 15, 2011: <http://krgit.org/>
- Kurdistan Regional Government, Ministry of Agriculture and Water Resources, *The Strategic Plan for Agriculture Sector for the Kurdistan Regional Government, 2009–2013*, no date.

———, *Ministry of Agriculture Profiles 2007*, 2007.

Kurdistan Regional Government, Ministry of Planning, “Objectives and Functions,” Erbil, Kurdistan Region of Iraq, 2011. As of December 12, 2011:

<http://www.mop-krq.org/index.jsp?sid=1&id=119&pid=84>

Kurdistan Regional Statistics Office, homepage, no date-a. As of December 15, 2011:

<http://www.krso.net/>

———, “KRSO Structure,” no date-b. As of December 15, 2011:

<http://www.krso.net/default1.aspx?page=sitecontents&c=Structure&l=1>

Lehtinen, Rick, Deborah Russell, and G. T. Gangemi, *Computer Security Basics, Second Edition*, O’Reilly Media, June 2006.

OECD Programme for International Student Assessment, homepage, no date. As of December 15, 2011:

<http://www.pisa.oecd.org>

Parliamentary Assembly of Bosnia and Herzegovina, *Law on Statistics of Bosnia and Herzegovina*, Official Gazette of Bosnia and Herzegovina, No. 26, Sarajevo, 2004.

Pettersson, Hans, “Chapter V: Design of Master Sampling Frames and Master Samples for Household Surveys in Developing Countries,” in United Nations Statistics Division, ed., *Household Sample Surveys in Developing and Transition Countries*, New York, ST/ESA/STAT/SER.F/96/WWW, 2005. As of December 16, 2011:

http://unstats.un.org/unsd/hhsurveys/pdf/Household_surveys.pdf

PISA—See OECD Programme for International Student Assessment.

RAND Corporation, “RAND Family Life Surveys (FLS),” 2010. As of December 15, 2011:

<http://www.rand.org/labor/FLS.html>

Republic of Iraq, Council of Ministers, Planning Commission, Central Statistical Organization; and United Nations Children’s Fund (UNICEF), *Multiple Indicator Cluster Survey for the Year 2000*, Baghdad, December 2001. As of December 15, 2011:

http://www.childinfo.org/mics2_iraq.html

Republika Srpska Institute of Statistics, *Organisational Chart of Republika Srpska Institute of Statistics*, no date. As of December 7, 2011:

http://www.rzs.rs.ba/Dokumenti/OrganizacioneSheme/OrganizacionaShemaRZS_ENG.pdf

Sieber, Joan E., *Summary of Human Subjects Protection Issues Related to Large Sample Surveys*, U.S. Department of Justice Bureau of Justice Statistics, NCJ 187692, 2001. As of December 12, 2011:

<http://bjs.ojp.usdoj.gov/content/pub/pdf/shspirls.pdf>

Singer, Eleanor, “Ethical Issues in Surveys,” in Edith D. de Leeuw, Joop J. Hox, and Don A. Dillman, eds., *International Handbook of Survey Methodology*, New York/London: Lawrence Erlbaum Associates/Taylor & Francis Group, 2008, pp. 78–96.

Sudman, Seymour, *Applied Sampling*, Burlington, Mass.: Academic Press, 1976.

Statistics Canada, “About Us,” 2010. As of December 7, 2011:

<http://www.statcan.gc.ca/about-apercu/about-apropos-eng.htm>

Taylor, Fraser, *Global Geographic Information Management: Some Institutional and Data Sharing Issues in Integrating Geospatial and Statistical Data*, presentation to the Second Preparatory Meeting of the Proposed United Nations Committee on Global Geographic Information Management, New York, May 10–11, 2010. As of December 7, 2011:

<http://ggim.un.org/2nd%20Prep%20Meeting/UN-May-10-Global%20Geographic%20Information%20Management-FINAL-1.pdf>

UK Statistics Office, *UK Statistical System*, UK Statistics Authority, London, no date. As of December 7, 2011:

<http://www.statisticsauthority.gov.uk/about-the-authority/uk-statistical-system/index.html>

United Nations, Millennium Development Goals web page, 2010. As of December 15, 2011:

<http://www.un.org/millenniumgoals/>

United Nations Country Team Iraq, *United Nations Development Assistance Framework for Iraq 2011–2014*, 2010. As of December 15, 2011:

<http://iq.one.un.org/cca-undaf.asp>

United Nations Development Group, United Nations Development Assistance Framework, no date. As of December 15, 2011:

<http://www.undg.org/?P=232>

United Nations Development Programme—Iraq Recovery and Crisis Prevention Program, *Improving Basic Social Services in the Kurdistan Region of Iraq*, Collaborative and Cost-Sharing Initiative, April 14–16 2008, in partnership with UNICEF, World Health Organization, and United Nations Development Programme.

United Nations Economic Commission for Africa—Economic and Social Policy Division, Statistics Team, *The Use of Geographic Information Systems in National Statistical Offices for Data Collection and Poverty Mapping*, United Nations Economic Commission for Africa, 2005. As of December 7, 2011:

<http://www.uneca.org/statistics/docs/gis/GISinNSOs.pdf>

United Nations Statistics Division, *Fundamental Principles of Official Statistics*, New York, 1994.

———, *Handbook of Statistical Organization, Third Edition: The Operation and Organization of a Statistical Agency*, Studies in Methods: Series F, No. 88, Department of Economic and Social Affairs, New York, 2003. As of December 7, 2011:

http://unstats.un.org/unsd/publication/SeriesF/SeriesF_88E.pdf

———, ed., *Household Sample Surveys in Developing and Transition Countries*, New York, ST/ESA/STAT/SER.F/96/WWW, 2005. As of December 16, 2011:

http://unstats.un.org/unsd/hhsurveys/pdf/Household_surveys.pdf

———, “Country Practices on National Official Statistics: Fundamental Principles of Official Statistics,” Department of Economic and Social Affairs, New York, 2007a. As of December 15, 2011:

<http://unstats.un.org/unsd/dnss/gp/fundprinciples.aspx>

———, *Integrated List of Data Items for Use in Basic Economic Statistics*, Department of Economic and Social Affairs, New York, 2007b. As of December 15, 2011:

http://unstats.un.org/unsd/industry/docs/stat_2008_7.pdf

———, *Principles and Recommendations for Population and Housing Censuses*, Statistical Papers: Series M, No. 67/Rev.2, Department of Economic and Social Affairs, New York, 2008. As of December 7, 2011:

http://unstats.un.org/unsd/demographic/sources/census/docs/P&R_%20Rev2.pdf

———, *International Recommendations for Industrial Statistics 2008*, Department of Economic and Social Affairs, New York, 2009. As of December 7, 2011:

http://unstats.un.org/unsd/publication/seriesM/seriesm_90e.pdf

———, *International Recommendations for Water Statistics*, Department of Economic and Social Affairs, New York, 2010. As of December 15, 2011:

<http://unstats.un.org/unsd/envaccounting/irws/irwswebversion.pdf>

———, *United Nations Initiative on Global Geographic Information Management (GGIM)*, Department of Economic and Social Affairs, New York, 2011. As of December 7, 2011:

<http://ggim.un.org/>

United Nations World Food Programme, Iraq Country Office, Central Organization for Statistics and Information Technology (Iraq), and Iraqi Ministry of Planning and Development Cooperation, *Food Security and Vulnerability Analysis in Iraq 2005*, 2006. As of December 15, 2011:

<http://home.wfp.org/stellent/groups/public/documents/ena/wfp193132.pdf>

U.S. Department of Health and Human Services, *US Office for Human Research Protections Compilation of Laws, Regulations, and Guidelines*, 2010. As of December 7, 2011:

<http://www.hhs.gov/ohrp/international/index.html#NatIPol>

Van Tongeren, Jan W., and Jan Bartlema, “(Kurdistan Bayesian) KBSNA 2008 Estimates,” Kurdistan GDP Project, developed in cooperation between AUMMA and KRSO, briefing, February 6, 2010.

World Bank, *Guidelines for Preparing a Statcap Statistical Master Plan*, no date. As of December 7, 2011:

<http://go.worldbank.org/RG3DER8ZT0>

World Bank, "Enterprise Surveys: Methodology," 2011a. As of December 16, 2011:
<http://www.enterprisesurveys.org/methodology/>

———, "Living Standards Measurement Study," 2011b. As of December 15, 2011:
<http://go.worldbank.org/IFS9WG7EO0>

———, "Living Standards Measurement Study: Integrated Surveys on Agriculture," 2011c. As of
December 16, 2011:
<http://go.worldbank.org/2446YU5330>



OBJECTIVE ANALYSIS.
EFFECTIVE SOLUTIONS.



Kurdistan Regional Government Ministry of Planning

This product is part of the RAND Corporation monograph series. RAND monographs present major research findings that address the challenges facing the public and private sectors. All RAND monographs undergo rigorous peer review to ensure high standards for research quality and objectivity.

Comprehensive and reliable statistics are crucial for policy formulation in any region or country. The Kurdistan Region—Iraq (KRI) is hampered by the lack of such statistics as it aims to improve infrastructure, encourage private-sector development, attract foreign investment, and create a sustainable economy. The authors of this study, which was funded by the Kurdistan Regional Government (KRG), interviewed officials in several KRI ministries, assessed available data within the KRI, conducted cross-country benchmarking, and studied best practices in data-collection methodologies. In this volume, the authors describe the KRG’s statistical institutions; identify ten high-priority areas for the KRI and the types of data that should be collected to support policymaking in these areas; and outline a system to collect and disseminate these data on an ongoing basis. The authors conclude with a series of recommendations on the topics that should be addressed by statistics legislation, the structure and oversight of data institutions, the implementation and use of surveys and censuses, and the use of administrative data. Together, these recommendations provide a roadmap that will help the KRG assemble the core elements of a quality data system, which, in turn, will increase the availability of data to help KRG leaders achieve their most important policy goals.

\$31.50

ISBN-10 0-8330-8590-5
ISBN-13 978-0-8330-8590-0

