

Final Report
Agricultural Statistics Pilot Project in Ukraine

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1. INRODUCTION

Agricultural statistics in the United States (US) and Western Europe have evolved into a system based on sampling methods and statistical inference. In the US, accurate information is provided on the agricultural sector based on less than one half of one percent of the population. Such information has been found to be statistically and legally valid when placed under intense scrutiny by both professionals and legal scholars. However, while Ukrainian institutions often use sampling procedures to obtain data on various sectors of its economy, the country does not depend on these procedures to the same extent as the US and certain other countries.

Prior to 1992, as part of the former Soviet Union, a census approach was used to collect information on Ukraine's agricultural sector. Under this approach, all 12,000 state and collective farms were required to report certain aspects of their agricultural operations. More recently, after gaining its independence from the Soviet Union, Ukraine has begun moving towards a more liberalized economy. As part of this movement, the Government of the Republic of Ukraine (GRU) has begun privatizing the large-scale farms presently operating in the country. To date, this movement has been sporadic in nature, and this fact has been recognized by the GRU. The Presidential decree "On Immediate Measures to Speed Reforms in the Agricultural Sector of the Economy" (No. 1529/99, December 3, 1999) indicated that these changes were going slowly and that the effectiveness of the changes to date was questionable. However, it is expected that this movement towards privatization will accelerate in the near future.

As Ukraine shifts from a centrally controlled to an open market economy, improved agricultural information is a necessary decision-making tool for all interested parties - the agricultural community, central government, oblast and local administrations and the participating public and private sectors. Moreover, access to timely, accurate information becomes critical within Ukraine and between Ukraine and other nations as the country moves towards its place in a global market economy. However, with the movement of the agricultural sector towards privatization, the GRU can no longer rely on its historical data collection methods for "tracking" changes within it. Over the past 10 years, the composition of this sector has changed from one, which relied almost exclusively on the productivity of 12,000 state and collective farms to a structural system, which includes approximately 14,000 Collective Agricultural Enterprises (CAEs) and over 30,000 private farms. In addition, it has been recognized that household plot farms contribute significantly to the overall productivity of the sector. Continuing to utilize a census approach to collecting information on the sector has become increasingly difficult. Updating a list frame of CAEs and private farms for inclusion on the census for collecting data has become more and more time consuming. At the same time, Ukrainian government officials have long recognized that utilizing this approach to collect information on household plots has been less than satisfactory. Consequently, Ukrainian officials have begun investigating more advanced methods based on sampling in an effort to improve their efficiency in producing statistical data that better "tracks" the changes in Ukrainian agriculture, which are occurring. In addition, Ukraine's agricultural sector is currently being assisted by the United States Agency for International Development (USAID), the World Bank, and other international organizations in its effort to restructure farms. Both Ukrainian government officials and donor managers are aware that such programs require improved data to better manage these programs. In response to these needs, the Ukrainian Land Resource Management Center (ULRMC), an organization established with the financial support of USAID, contracted with the Agricultural Assessments International Corporation (AAIC) to implement an agricultural statistics project designed to test the feasibility of using sampling to collect information on Ukraine's agricultural sector for the purpose of monitoring changes in this sector over time. Specific goals of the

project included:

1. Introducing the use of more advanced statistical techniques which meet conditions faced when collecting information on the agricultural sector in Ukraine;
2. Identifying the necessary prerequisites for the development of an efficient data collection system for agricultural statistics at the oblast and national levels;
3. Establishing a system of agricultural statistics at the oblast level that has credibility and validity (Lviv Oblast Case Study); and
4. Providing in a timely manner the required information needed to monitor changes in the agricultural sector by farm type – household plots, private farms, and public sector farms.

This final report summarizes the results of this pilot project as well as provides recommendations on methods, which might be used to improve the results of similar efforts in the future.^a

1.1 Objectives

The primary objective of this project was to test the feasibility of utilizing sampling to collect required information to both measure and monitor changes occurring in the agricultural sector of Ukraine. Secondary objectives included:

1. To identify data needs for monitoring the agricultural sector of the country and, based on these needs, providing baseline data for the purpose of developing agricultural policies designed to encourage growth in this sector;
2. To test alternative methods for collecting and processing the resulting data in an effort to improve the survey design in later years (assuming the methodology is accepted);
3. To train GRU staff in all facets of data collection, management, processing, and summarization; and
4. At the request of USAID, to collect information which would allow the evaluation of the restructuring effort in support of privatization of large-scale farms in Lviv Oblast only.

The survey activities were conducted in cooperation with staff from the State Statistics Committee of Ukraine (SSCU). Materials utilized to develop the initial sample for the survey were provided by the Center for Privatization and Economic Reform in Agriculture (Institute of Agrarian Economics, Iowa State University) and the Ministry of Agrarian Policy of Ukraine (MAPU) formerly the Ministry of Agro-Industrial Complex of Ukraine (MAICU).

1.2 Sequence of Analysis

In presenting the results of the 1999 Pilot Agricultural Survey exercise, the following sequence of analysis was used. First, a detailed description of the project activities accomplished during the survey period (including training) is provided, along with the timing of each activity. The methodology used to complete each part of the survey exercise is outlined, and training provided as part of the exercise is summarized.

Next and areas of potential improvement for future surveys are identified. The feasibility of

^a This is the second of a planned three reports to be completed based on the results of the 1999 Pilot Agricultural Survey. The first, Results of the 1999 Pilot Agricultural Survey in Ukraine, summarizes the results of the Survey in tabular form and was completed in January, 2000. A third report, which will evaluate the economic impact of the restructuring program for the agricultural sector in Lviv Oblast based on data collected under the survey, is planned for completion in the near future.

utilizing the present sample frame for multiple uses is examined, and a detailed list of lessons learned with respect to sample and questionnaire design is provided.

Finally, an assessment of the 1999 Pilot Agricultural Survey is provided including a cursory examination of discrepancies, which occurred between the survey estimates, and official GRU estimates are outlined on support/improvements needed to ensure the success of the conduct of future surveys of a similar type.

2. METHODOLOGY

When conducting a statistically valid survey of any type, certain inter-related activities must be completed if the survey is to be conducted efficiently. The major activities needed with any survey are presented below by activity area.

1. Sample Design:
 - a. Select the type of population frame to be utilized.
 - b. Develop the sampling frame.
 - c. Select the sample.

2. Survey Development:
 - a. Assess data needs/timing of data collection.
 - b. Develop and test the questionnaire(s).
 - c. Develop and test the data entry and computer editing systems (including the development of computer edit specifications for “cleaning” the data).
 - d. Develop and test the table specifications (including coding sheets) for data summary.

3. Data Gathering:
 - a. Develop training manuals for enumerators.
 - b. Prepare manual edit instructions for use “in-the-field” and at the central office.
 - c. Provide enumerator training.
 - d. Collect the data (including “in-the-field” manual edits and follow-up activities to reduce non-sampling errors and better ensure data accuracy).

4. Data Processing:
 - a. Develop data receipt management system.
 - b. Conduct central office manual edits.
 - c. Enter data on the computers.
 - d. Complete computer edits on the data.
 - e. Calculate expansion factors, enter on computers and conduct edits to ensure accuracy.

5. Data Summarization:
 - a. Calculate Coefficients of Variation (CVs) for selected variables.
 - b. Complete tabular summarization of the data.
 - c. Develop a distribution list for the data.
 - d. Print and distribute summary of data.

6. Data Analysis (optional – may be done by other organizations):
 - a. Select topics of interest to policy makers/other information users (may be done by a management group).
 - b. Conduct required analysis.
 - c. Publish and distribute attractive, user-friendly summaries of the analyses.

Activities in support of the 1999 Pilot Agricultural Survey followed essentially this format with some overlap due to time constraints.

2.1 Summary of Pilot Project Activities

The Agricultural Statistics Pilot Project was initiated in mid-March 1999 and is scheduled for completion in February 2000. As initially designed, the project was mandated to field test a pilot agricultural survey in Lviv Oblast only for the purposes outlined earlier in this report. Later, at the request of USAID, this mandate was expanded to incorporate collecting data in this oblast in a manner, which would allow the evaluation of the restructuring program being supported by that organization. At the same time, AAIC staff decided that, in order to properly evaluate a pilot survey of this type, it would have to be expanded to cover the entire country. This would allow estimates to be provided at the national level for the country, and the resulting exercise could serve as a better test for all facets of the type of survey being designed – sampling, survey development, data collection, and data processing and summarization – than one covering a single oblast.

Table 1 summarizes the activities performed in support of the 1999 Pilot Agricultural Survey by AAIC, ULRMC, and other organizations. A brief description of each of the activities completed is provided below.

2.2 Conduct Data Users Requirements Study (DURS)

In mid-March 1999, a team from AAIC visited Ukraine. Working in coordination with ULRMC staff, a DURS was conducted for the purpose of organizing and focusing the survey design to be conducted under the Project. Specific objectives of the DURS included to:

1. Identify data user needs through a series of interviews held with Ukrainian Government, donor, private and other individuals/personnel
2. Develop the sample design for the planned pilot survey;
3. Raise the awareness of relevant Government and other persons on the survey activities planned; and
4. Develop the itinerary for the planned survey as well as identify support needs from other institutions/organizations to allow its conduct in an efficient and timely manner.

Table 1: Activities Performed in Support of the 1999 Pilot Agricultural Project.

Activity	Responsible Agencies	Timing
1. Conduct Data Users Requirement Study (DURS)	AAIC/ULRMC	3/99 – 4/99
2. Complete Sample Design/Select Sample:		
a. Select sample design to be utilized	AAIC	4/99
b. Develop sampling frame	AAIC	4/99 – 5/99
c. Select primary sample	AAIC	5/99
d. Select secondary sample	SSCU	7/99 – 8/99
3. Survey Development – Survey 1:		
a. Develop and test questionnaires	AAIC/ULRMC	4/99 – 5/99
b. Develop and test data entry/computer editing systems	AAIC	6/99 – 7/99
c. Develop and test preliminary table specifications	AAIC/ULRMC	7/99 – 8/99
4. Data Gathering – Survey 1:		
a. Develop enumerator training manuals	AAIC/ULRMC	6/99
b. Prepare manual edit instructions	AAIC	6/99 – 7/99
c. Provide enumerator training	AAIC/ULRMC	7/99
d. Collect data	SSCU	7/99 – 8/99
5. Data Processing – Survey 1:		
a. Develop data receipt management system	AAIC	7/99
b. Enter data/conduct manual/computer edits	AAIC/ULRMC/GOSK.	7/99 – 8/99
c. Calculate/enter/edit expansion factors	AAIC/SSCU	8/99
6. Data Summarization – Survey 1:		
a. Complete preliminary summarization of data	AAIC/ULRMC	9/99
7. Survey Development – Survey 2:		
a. Develop and test questionnaires	AAIC/ULRMC	9/99 – 10/99
b. Develop and test final table specifications	AAIC/ULRMC	10/99 – 11/99
8. Data Gathering – Survey 2:		
a. Develop enumerator training manuals	AAIC/ULRMC	9/99 – 10/99
b. Prepare manual edit instructions	AAIC/ULRMC	10/99
c. Provide enumerator training	AAIC/ULRMC/GOSKOM	10/99 – 11/99
d. Collect data	SSCU	11/99 – 12/99
9. Data Processing – Survey 2:		
a. Enter data/conduct manual/computer edits	AAIC/ULRMC/SSCU	12/99
10. Data Summarization – Both Surveys:		
a. Calculate coefficients of variation (CVs) for selected variables.	AAIC	1/00
b. Complete tabular summarization of data.	AAIC/ULRMC	1/00
11. Data Analysis:		
a. Complete final report summarizing results of survey.	AAIC/ULRMC	2/00
b. Complete analysis of effects of restructuring program in Lviv Oblast.	AAIC/ULRMC	To be completed

A partial list of the organizations visited in Ukraine is presented below.

1. The Ministry of Agro-Industrial Complex of Ukraine (MAICU);
2. Ukrainian Institute of Research in Environment and Resources, Council of National Security of Defense of Ukraine;
3. State Statistics Committee of Ukraine (SSCU);
4. Environmental and Resource Research Institute of Ukraine (ERRIU);
5. Ukrainian Agrarian Academy of Sciences (UAAS);
6. National Academy of Sciences in Ukraine (NASU);
7. Lviv Oblast Statistics Board;
8. The Lviv branch of the Institute of Ground Arranging, UAAS;
9. Four collective agricultural enterprises (CAEs), 3 in Lviv and 1 in Kiev;
10. U.S. Agency of International Development/Ukraine;
11. Agricultural Land Share Project, RONCO Consulting Corporation;
12. Ukrainian Agricultural Policy Project, Center for Agricultural and Rural Development (CARD);
13. Agricultural Attache, U.S. Embassy, Ukraine; and
14. World Bank, Ukraine.

In addition, discussions were held with USAID and World Bank representatives at their central offices in Washington, DC to identify their data needs as part of the DURS effort.^b

The DURS served as a valuable tool for defining the data requirements to be met during the Project period. Sixteen broad categories were identified as being important data requirements with some containing multiple elements. For example, *livestock requirements* contained eight elements:

- Numbers of livestock by type;
- Culling rates;
- Death rates;
- Barters;
- Value of sales and barters;
- Prices received;
- Value of livestock products; and
- Barters of livestock products.

MAICU and SSCU identified *household plot information* as being of primary importance, and USAID and World Bank cited the need for additional information on *privatization and privatization issues* as being critically required information. Other issues cited by the DURS participants included:

- Crop production/yields;
- Rural employment/incomes;
- Crop hectares for privatized farms and household plots;
- Sales/barters for crops, livestock and livestock products;
- The operational level – functioning vs. nonfunctioning – for farm equipment and machinery;
- Soils/conservation issues;

^b For a partial list of the persons interviewed as part of the DURS, see Appendix I, Display I.1.

- Social issues such as schools, health clinics and other infrastructure maintenance;
- Farm credit for inputs; and
- The marketing outlets being utilized for farm products.

Based on the DURS experience, it was decided to:

1. Utilize area frame sampling with sub-sampling (multiple stage sampling) which would allow a comparison of relevant information for the three types of farm operations to be examined – household plots, private farms, and public sector farms;^c and
2. Conduct two surveys under the Pilot Project to better allow the collection of the required information – the first in July/August and the second in November/December – working in conjunction with personnel from the State Statistics Committee of Ukraine/ SSCU.

In addition, the support requirements needed to plan, conduct and summarize the results of these surveys as well as the responsibilities to be borne by each of the organizations engaged in the effort – AAIC, ULMRC, and the Environmental Research Institute of Michigan (ERIM) – were identified.^d

2.3 Sample Design

Area frame construction was used to develop the population frame for the 1999 Pilot Agricultural Survey based on areas controlled by RADGOSP (state controlled) and KOLGOSP (collective) farms in 1986. After the farm list (with the areas associated with each) had been constructed, primary sampling units (PSUs) were selected from a single geographic (land use intensity) stratum with probability proportional to size, which were valid at the oblast level.^e Once the sample areas had been selected, enumerator teams visited each area to collect the required information. As part of this data collection effort, the different types of farm operations located in each PSU were first identified, and sub-samples of the farm operators/managers associated with each type of operation were selected for interview.^f As developed, the frame used with the survey consisted of three substrata based primarily on farm size. A description of each is provided below.

^c For a summary of the definitions used when selecting this subsample of farm operations, see the next section of this paper.

^d For a complete summary of the support requirements to be provided by AAIC as well as those identified as needed from the Environmental Research Institute of Michigan (ERIM) – the primary contractor for the pilot project effort – see Appendix I, Display I.2.

^e One option which was considered when developing the PSU area frame was to stratify the frame by land use – forest vs. agricultural – in Lviv Oblast *only* in order to test this concept. Unfortunately, satellite imagery was not immediately available for use in developing this area frame stratification. As a result, it was decided to utilize a single land use stratum for selecting the PSUs. However, selecting PSUs at the oblast level is equivalent to using 25 substrata of the overall geographic stratum during the sampling process. It was felt that this degree of land use sub-stratification for the PSU sample selection would be adequate for the exercise.

^f The method used to make the selections of the subsample of farms to be interviewed was as follows. Upon arrival at a sample area, the relevant enumerator team developed a list of public sector and private farms located in each using a listing form. Once these lists were compiled, single public sector farm was randomly selected and up to six private farms were systematically selected for interview. Upon arrival at the selected public sector farm, a second list was developed containing all households directly associated with this farm. A sample of eight households was then systematically selected from this list to obtain information on household plots.

1. Substratum 1 – Household Plots – Usually consisted of very small farm operations managed by households primarily for their own use. The size of this operation normally ranged from 0.1 to 1.5 hectares.
2. Substratum 2 – Private Farms – Consisted of farm operations owned/controlled by farm households, which were managed primarily for commercial purposes. The size of this type of operation normally ranged from 5 to 100 hectares.
3. Substratum 3 – Public Sector Farms – Consisted of large-scale farm operations, which were controlled by a manager and associated farm workers and were operated for commercial purposes. In the context of the survey, no attempt was made to identify this type of farm by management organization – collective agricultural enterprises (CAEs), joint ventures, etc. Thus, as used in the survey, “public sector” farms was a generic term designed to present information for large scale farms and, with a few exceptions, included both restructured (where privatization of the land controlled had begun) and non-restructured (where this privatization was not, in reality, underway) farms. In addition, farms included in this group usually had a heavy social commitment to provide services to villages/households located as part of their organization. The size of these types of operations might range from less than 500 to more than 10,000 hectares controlled.

A total of 122 sample segments (PSUs) were selected using this technique – 50 in Lviv Oblast and 72 over the remainder of the country – three in each of the remaining 24 oblasts (Table 2). These represent a total population of better than 11,000 segments located in the 25 oblasts of the country. Within these segments, under the primary sampling frame, data were collected from 116 public sector farms, 271 private farms, and better than 900 household plots. These represented a segment population of 183 public sector farms, 391 private farms, and nearly 70,000 household plots.

Table 2: Description of Sampling Frame/Sample Sizes Used to Collect Data Under the 1999 Pilot Agricultural Survey.

Item	Lviv Oblast	Other Oblasts	Total
PRIMARY SAMPLE FRAME:			
Segments in Population	379	10,683	11,062
Segment Sample Size	50	72	142
1. <u>Public Sector Farms:</u>			
Segment population	87	96	183
Sample Size	44	72	116
Data collected	44	72	116
2. <u>Private Farms:</u>			
Segment population	179	212	391
Sample Size	137	154	291
Data collected	135	136	271
3. <u>Household Plots:</u>			
Segment population	22,370	47,248	69,618
Sample Size	349	558	907
Data collected	349	555	904

Item	Lviv Oblast	Other Oblasts	Total
PRIMARY SAMPLE FRAME:			
RESTRUCTURED FARM SAMPLE FRAME:			
1. <u>Public Sector Farms:</u>			
Restructured farm population	66	--	66
Restructured farm sample size	20	--	20
Data collected	20	--	20
2. <u>Household Plots:</u>			
Farm population	12,926	--	12,926
Sample size	159	--	159
Data collected	158	--	158

Multiple Frame Sampling (MFS) was used to select the sample of restructured farms in Lviv Oblast to be used in evaluating the impact of this USAID program on the oblast’s agricultural sector. First, an area frame was developed using a list of state and collective farms receiving support under the Agricultural Land Share Project in the oblast. A total of 66 public sector farms were included on this list (Table 2).^g A sample of 20 farms was then selected from this list, again with probability proportional to size.^h Once these farms had been selected, they were visited by enumerator teams, the household plots associated with each were identified, and a sub-sample of these households was systematically selected for interview in the same manner as outlined earlier for the primary sample segment household plots. Data were collected from 158 households, which represented nearly 13,000 household plots associated with the sample public sector farms.ⁱ

Finally, as already outlined, with the exception of Lviv Oblast the sample sized used with the 1999 Pilot Agricultural Survey was very small – only three PSUs per oblast. Thus, although the overall sample size was large enough to give reasonably reliable estimates at the Lviv Oblast and national levels, it was not large enough to provide these estimates for other oblasts. Instead, when summarizing the data, estimates for the other oblasts had to be aggregated to a single set of data – “other oblasts”.

^g It should be noted that the initial list of restructured farms provided included 71 farms. Five of these were dropped because the areas they controlled were extremely small. (In some cases the farm controlled no area.) It was felt that these farms were not representative of the total public sector farms undergoing restructuring in the oblast.

^h It should be noted that where overlap occurred between the primary sample segments selected and the public sector farms included on the restructured farm list, the latter were given precedence. This occurred in six cases in Lviv Oblast, and, as a result, the final sample of public sector farms interviewed under the primary sample was 44 rather than 50.

ⁱ It is recognized that other methods could have been used to select sample households to obtain information on household plots. For example, a village frame could have been used for this purpose. However, it was decided to use the sampling technique outlined for several reasons. First, at the time of subsample selection, no maps or aerial photos were available to ensure the sample village selected was located in the sample segment or to define portions, which might lie, located outside the segment. Second, there was insufficient time available to train enumerators on the techniques required to utilize a village frame efficiently – splitting villages prior to listing and mapping and listing the households prior to sample selection. Finally, using this technique allowed direct comparisons of households associated with the relevant public sector farms when evaluating the impact of farm restructuring in Lviv Oblast on the agricultural sector. This subject is discussed in greater detail later in this paper.

2.4 Developing and Conducting the Surveys

2.4.1 Survey Development

Development of materials required to complete the first of the two surveys planned – that to be conducted in July/August – began in April 1999. At that time, based on the DURS experience, decisions were made on the information to collect during the two survey periods; preliminary questionnaires were designed to collect this information as well as complete the sub-sampling of public sector, private, and household plot farms for interview; and preliminary position (variable) codes were assigned to the variables on which data were to be collected.^j Preliminary table specifications were also developed during this period for the purpose of summarizing the information collected during the first survey.

Early in the development period, it was decided to limit the information collected to that, which could be provided by the farm managers/operators interviewed. For example, no effort was made to consider ecological issues (soils, conservation, etc.) during the survey. Also, collecting information on such social issues as the support needed for schools, health clinics, etc. was not considered for inclusion in the survey. Finally, the consideration of credit problems faced by the sector for later evaluation was not included.^k Instead, emphasis was placed on collecting information in areas such as:

- Rural population and demographic characteristics for these households;
- Structural characteristics of the agricultural sector;
- Crop areas planted/production levels/yields;
- Farm inputs used – equipment, labor, crop inputs (fertilizer, seeds, chemicals, etc.), land leasing costs for public sector farms, etc.;
- Livestock holdings and changes in inventories;
- Sales and barter for crops, livestock, and livestock products;
- Rural employment and incomes; and
- Marketing outlets utilized by farm operators/managers for marketing selected outputs.

In addition, as part of the survey exercise, it was decided to test the feasibility of utilizing the recall surveys as a means for providing early estimates/preliminary forecasts of production levels for selected grains with special emphasis place on wheat.^l

2.4.2. Questionnaire Design/Testing

Two sets of questionnaires were designed to gather data during the 1999 Pilot Agricultural

^jThe codes developed were designed for use with a customized computer program provided by AAIC to process and summarize (if desired) the data collected. This program is extremely user friendly, and, by the end of the Project period, its menus had been translated into Ukrainian for future use by interested persons if desired.

^k This does not mean that these areas could not be included as part of a future survey system in Ukraine. However, the sampling techniques utilized would have to be modified, and considerable monetary support would be required to allow designing, conducting the specialized surveys required, and processing/summarizing/analyzing the data collected.

^l Other techniques which could be used for forecasting crop production levels include using objective yield techniques and/or satellite imagery for this purpose. However, both of these techniques require that the personnel engaged in them receive extensive training, and both are quite expensive to initiate. Due to time and other constraints, it was decided to not employ either of these techniques at the present time. However, assuming sufficient funding is available, the feasibility of using these techniques in the future could be evaluated.

Survey. The first set, designed for use in the July/August survey period included:

1. Form 1 – designed to obtain information on the numbers of public sector and private farms located in each sample PSU prior to completing the sub-sampling of these farm types;
2. Form 1A – designed to obtain information on public sector farms as well as select a sample of household plot operators for later interview;
3. Form 1B – designed to obtain information on private farms; and
4. Form 1C – designed to obtain information on public sector farms.

This set of questionnaires was field tested in May in Kiev and Lviv Oblasts, and, after testing, the questionnaires were redesigned to place emphasis on obtaining information in the following areas:

1. Demographic characteristics of households associated with public sector farms and/or operating household plots/private farms;
2. Overall land use (i.e., areas held in agricultural lands, forests, etc. by public sector and other types of farms);
3. Agricultural land use (i.e., areas planted in field crops – both winter and summer – and tree crops for harvest in 1999, areas held in grasslands/pastures, etc.);
4. Winter wheat production;
5. Dairy production/sales;
6. Input/labor usages during the planting season; and
7. The operating levels for equipment held by public sector farms.

In addition, the first survey was used to test the feasibility of collecting certain other information/methods, which might be used to collect this information in future surveys. Information areas tested included:

1. Lease payments made by public sector farms for their land use;
2. Outside income sources for households;
3. Marketing outlets utilized for dairy product sales, etc.^m

Questionnaires used in the November/December survey period were designed in September 1999 and tested in the following month. The three questionnaires designed for this purpose were:

1. Form 2A – designed to collect information from public sector farms;
2. Form 2B – used with private farms; and
3. Form 2C – used with household plots.

During the second survey period, emphasis was placed on obtaining information in the following areas:

1. Detailed information on livestock numbers, herd compositions, additions to herds, sales/barters of animals and prices received, etc. Livestock considered included cattle, pigs, goats/sheep and, to a certain extent, other livestock.
2. Dairy production/sales/prices received.

^m See Appendix II, displays II.1a through II.1d for the final versions of the questionnaires used in the July/August survey.

3. Winter plantings of crops with emphasis placed on wheat and barley.
4. Inputs utilized with some information obtained on the costs of inputs; and
5. Field and tree crop production, sales/barters and prices received.

Information was also obtained on marketing outlets utilized for the sales/barters of cattle as well as on the goods/services purchased through the barter of crops by public sector farms.ⁿ

Questionnaire design incorporates the identification of position codes that are compatible with the data entry, computer editing, summarization programs being used to process and summarize the data collected. Thus, the position codes utilized with the 1999 Pilot Agricultural Survey were developed as part of the overall questionnaire design process to meet this requirement. The final codes developed are shown in Appendix II, Display II.3.

2.4.3. Enumerator Training/Data Collection

Once the survey instruments (questionnaires) had been designed and tested, preparation for data gathering began. This consisted of three steps:

1. Developing the step-by-step enumerator training manuals and manual edit instructions for use with the relevant survey;
2. Providing training to enumerators, field supervisors, and central office personnel in the conduct of the surveys and manual edits after the data had been collected; and
3. Collecting the data and completing the manual edits both in the field and at the central offices where data processing occurs.

The enumerator training manuals along with two sets of manual edit instructions used with each survey effort – first in July/August and then in November/December – were developed in June/July and September/October, respectively.^o

Prior to each data collection effort, emphasis was placed on providing adequate enumerator training and quality control in an effort to reduce non-sampling errors. Before the conduct of the first data collection effort, two one-week training schools were held in July 1999 during which SSCU central office and Lviv Oblast personnel as well as designated enumerators were trained in the data gathering requirements in the oblasts for which they were responsible. Approximately 80 persons were trained during these two periods on the methods to be utilized to select the public sector, private and household plot farms using systematic sampling as well as on the completion of the relevant questionnaires. In addition, selected oblast and central office staff were given training on the manual edit requirements for completed questionnaires both in-the-field and after they were returned to the oblast and/or central offices of SSCU. During this first survey, ULRMC and AAIC staff were responsible for providing the training.

Thirteen teams consisting of approximately 70 persons – one supervisor for each team and the remainder enumerators, conducted this first survey. The team supervisors were responsible for conducting the first quality control checks on the completed questionnaires while still in the field. Where errors were noted, the enumerators were required to re-interview the sample farm operators/managers and make the necessary corrections. Data collection began in early July and

ⁿ For the finalized versions of the questionnaires used with the second survey see Appendix II, Displays II.2a through II.2c.

^o Copies of the enumerator training manuals and manual edit instructions used with each survey are provided in Appendix III – see: Displays III.1 – III.3 for survey 1 and III.4 – III.6 for survey 2.

was completed by mid-August.

In late October/early November, this process was essentially repeated in support of the second survey. Again, two training sessions were provided to enumerators, team supervisors and SSCU personnel prior to beginning data collection – the first in Kiev and the second in Lviv. However, in this case, the training period was shortened to three days since the sub-sample of farm operators/farms to be visited had already been selected during the first survey effort. In addition, in the case of Lviv Oblast, SSCU staff assumed the responsibility for providing this training with ULRMC and AAIC staff acting as observers. The conduct of most of the manual edits was also decentralized, and the team supervisors were made responsible for their conduct.

2.5 Data Processing/Summarization

Data processing under the 1999 Pilot Agricultural Survey was conducted in conjunction with each data collection effort. For example, under the July survey effort, immediately upon receipt of the first survey data at the Lviv and central offices of SSCU, additional manual edit checks were completed by SSCU staff, and the data were entered directly from the forms into microcomputers using a customized data entry package provided by AAIC. The data were then run through a comprehensive computer edit system used for detecting data entry, coding, and enumerator errors. Necessary data corrections were then made on the forms and to the data set in the computers. ULRMC and AAIC staffs were responsible for much of the data management and processing efforts during this initial effort.^P

Once the data collected under the first survey had been “cleaned”, the expansion factors were calculated and entered on the computers for use with subsequent data summarization. Again, AAIC staff was responsible for completing these calculations, and, once they were completed, training was provided to SSCU staff through seminars on the logic involved in making these calculations. Training in the calculation of expansion factors was provided in both Lviv and Kiev as part of this effort, which was completed in late August 1999.

Data processing for the November survey followed much the same pattern as outlined for the July/August Survey. However, prior to the initiation of this effort it was decided to complete the processing for the entire country in Lviv Oblast. In addition, two sets of computer edits were required to “clean” the second data set. First, range and consistency checks were conducted on the second data set collected. Once this data set was “clean”, a second set of computer edits was

^P Data management under the two survey efforts actually began when the subsamples of farm operators/farms were selected during the enumerator visits to the sample segments (PSUs). The IDs assigned to each operator/farm served as a basis for all subsequent data management activities during the survey effort. These IDs consisted of: (1) the oblast ID number; (2) the raion ID number; (3) the sample segment (or PSU) ID number; (4) the strata ID number; and (5) the household/farm ID number. Prior to beginning the first data collection effort, individual envelopes were prepared for each sample PSU to be visited. On the outside of each envelope was placed the name and ID number of the oblast in which the relevant segment was located; the name and ID number of the relevant raion was noted; and the ID number of the sample PSU was entered. Once this exercise had been completed, a sufficient number of questionnaires required to complete the interviews and the materials necessary to conduct them were placed in the envelopes. Upon arrival at each segment, supervisors/enumerators selected a subsample of households/farms for interview in each stratum to be analyzed – public sector farms, private farms, and household plots. Strata and household/farm IDs were then assigned to each sample household/farm to be interviewed, and, along with the IDs shown on the envelope, were entered on the relevant questionnaire prior to each interview. Once the questionnaires were received at the central office, a master list of these IDs was constructed which was used to “track” all subsequent data collection/processing/summarization activities. This is an uncomplicated procedure for conducting data management, and it is recommended that it be retained in subsequent surveys.

run which was used to check for consistency between the July/August data set and the November set.^q During this effort, Lviv Oblast SSCU staff was made responsible for the majority of the data processing. In addition, as part of this effort, on-the-job training was provided on all facets of data management. The second data processing effort was initiated in early December 1999 and completed by the end of the month.

Data summarization began after each data processing effort was completed. Preliminary summarization of the information collected during the July/August was completed in September. At that time a set of tables (which was specified prior to and during the data collection period) was generated which summarized the results of the survey in the following areas:

1. Demographic characteristics of rural households;
2. Farm structure with special emphasis on crops;
3. Dairy production/sales/prices received during the survey period;
4. Winter wheat production forecasts; and
5. Farming practices utilized during the planting season.

Upon completion, this summary was presented to the Environmental Research Institute of Michigan (ERIM) for presentation to Government of Ukraine officials to illustrate the types of information, which could be provided using the survey methodology employed.

Upon completion of the second data processing effort, a complete summary of selected results of the Survey effort was completed in January 2000. This first consists of a brief introduction which includes a description of the methodology employed to collect the information provided discusses the sampling procedures used, points out the weaknesses and strengths of the information provided, definitions employed while collecting the data, etc.), provides information on the sample sizes employed, shows the coefficients of variation (CVs) for selected variables, etc.

Selected tables were then provided which summarizes the results of the surveys in the areas of:

1. Demographic characteristics;
2. Farm structure;
3. Farming practices;
4. Crops – Summary;
5. Crops – Individual;
6. Livestock – Summary; and
7. Livestock – Individual.^f

AAIC and ULRMC staffs were responsible for completing this summary, and, to date, no training has been provided in the calculation of CVs to SSCU staff (although this training is planned for the near future). A copy of this summary is attached.^s

^q The three sets of computer edits specifications used to process the two data sets are presented in Appendix IV, Displays IV.1-IV.3.

^r For a list of the tables specified for the 1999 Pilot Agricultural Survey, see Appendix IV, Display IV.4.

^s See: Litschauer, John G., William H. Wigton, and others, Results of the 1999 Pilot Agricultural Survey in Ukraine, ULRMC and AAIC in cooperation with SSCU, January 2000.

2.6 Summary of Training Provided During the Survey

During the survey a significant amount of training was provided in all facets of survey planning and design, data collection, data processing and data summarization – both through on-the-job experience and through a series of seminars. However, not all areas of training have been completed. Table 3 provides a summary of training provided/needed additional areas of training as well as describes the agency responsible for training, the recipient audience, training techniques employed and the timing of the training. A brief description of the training given as well as needed additional training is provided below.

1. Sample Design/Selection – Multiple stage sampling was utilized for selecting the households/farms for interview during the survey, and AAIC staff was responsible for this sample design. In addition, *multiple frame sampling* was utilized in Lviv Oblast to allow a comparison between restructured and non-restructured farms in that oblast only. No training was provided to either ULRMC or SSCU staff in the concepts of selecting primary sample units (PSUs) with probability proportional to size using an area frame due to time constraints. In addition, the training provided on the multiple frame sampling used in Lviv was limited to defining when a public sector farm should be included in either of the two frames – the frame for restructured vs. that for restructured farms in order to remove domain overlap. However, in preparation for the July/August survey, enumerators and other ULRMC and SSCU staff were trained in the use of random and systematic sampling to select the farms for interview in the three substrata listed – public sector, private, and household plot farms. A total of 84 persons received this training, and based on an evaluation of the results of the first survey sub-sampling exercise, all are now familiar with the techniques required to use this type of sampling. Any future survey activities of this type should include a training component aimed at familiarizing selected personnel in all facets of frame design and sample selection – area, village and list frame development and sampling, land use stratification using maps and satellite imagery, selecting sample sizes and allocating samples between strata to attain a desired level of precision, etc.
2. Survey Development/Data Gathering – Questionnaire design and the development of the manuals used for training enumerators were primarily the responsibility of AAIC staff with assistance provided by ULRMC personnel. Thus, training in the development of these survey instruments was quite limited, consisting primarily of on the job training provided to ULRMC staff during the development process just prior to each survey period. However, training in the actual conduct of the survey was extensive with approximately 80 persons being trained just prior to each data collection effort. This latter exercise was also decentralized over the project period. During the first survey period, AAIC staff were primarily responsible for providing this training. However, during the second survey, ULRMC and SSCU staff assumed much of this responsibility. Any further survey efforts, if undertaken, will require at least some questionnaire (and associated training manual) redesign. In addition, as new information responsibilities are assumed (say, for example, an examination of social issues and/or the availability of farm credit for inputs), new questionnaires will have to be designed and the appropriate training provided. If this occurs, care should be taken to provide training in this survey instrument development exercises to appropriately selected personnel.

Table 3: Summary of Training Provided Under the 1999 Pilot Agricultural Survey.

Training Area	Responsible Agency	Recipient Audience	Number Trained	Type Training	Timing
Sample Design/Selection:					
a. Area frame sampling	AAIC	None	--	--	--
b. List frame sampling	AAIC	ULRMC/SSCU	84	seminars	7/99
Survey Development/ Data Gathering:					
a. Questionnaire design	AAIC	ULRMC	4	ojt *	5/99 & 10/99
b. Dev. enum. manual	AAIC	ULRMC	4	ojt	6/99 & 10/99
c. Enumerator training	AAIC/ULRMC/ SSCU	SSCU staff/ others	80	seminars	7/99 & 11/99
Data Processing:					
a. Data management	AAIC	SSCU staff	4	ojt	12/99
b. Field level manual edits	AAIC	ULRMC/SSCU	80	seminar/ojt	7/99 & 11/99
c. Central level manual edits	AAIC/ULRMC	SSCU staff	24	seminar/ojt	8/99 & 12/99
d. Data entry	AAIC	ULRMC/SSCU	10	ojt	7, 8 & 12/99
e. Computer edits	AAIC	ULRMC/SSCU	10	ojt	7, 8 & 12/99
f. Expansion factor calculation	AAIC	ULRMC/SSCU	24	seminar	7/99
Data Summarization:					
a. Specify tables	AAIC/ULRMC	SSCU staff	8	seminar	8/99 & 12/99
b. Computer generate tables	AAIC/ULRMC	SSCU staff	4	seminar	12/99
c. CV calculations	AAIC	None	--	--	--

* ojt = on the job training.

- Data Processing – Training provided under the data processing component of the survey is well advanced although some areas may need reinforcement if future surveys using similar techniques are conducted. Most of these trainings were provided by AAIC staff while working on-the-job with SSCU and ULRMC staff. For example, during the December data processing period, the AAIC person responsible for assisting in data processing worked closely selected Lviv Oblast personnel in developing a data management system to “track” the data as it moved through the process. Similarly, AAIC staff worked closely with selected SSCU personnel during both the first and second surveys’ data processing exercise to ensure they understood the customized computer program when used to enter, computer edit, and summarize the data being processed. During the life of the Project, from four to 80 persons were trained in the various activities required to process the data. In most cases, the transfer of technical skills in each of these areas is complete (although the training will have to be repeated if future surveys area conducted which allow data summary for all oblasts in the country). The exception to this is in the case of expansion factor calculations. Significant training was provided in this area on the logic involved in making these calculations. However, AAIC staff was actually responsible for making the actual calculations used with the Survey. As a result, although additional training is planned in this area in the near future, additional

training will probably is required if a decision is made to continue the survey methodology in the future. This additional training, if provided, should include a complete coverage of sampling methodology as it relates to expansion factors.

4. Data Summarization – To date, training has been provided in two activities required to summarize the data collected – in the logic involved in developing table specifications required to summarize the data collected, and in the use of the customized computer program to generate the required tables using these specifications.^t Additional training will probably required in each of these areas if the survey method is continued in the future. In addition, to date, no training has been provided in the calculation of the coefficients of variations (CVs) for use with the Survey. However, it is planned to provide this training in the near future. However, more intensive training will be required under any future survey efforts which covers all facets of sampling and the calculation of CVs with different sampling designs – list frame, cluster, stratified, etc.

^t It should be noted that it is not necessary to use the customized computer program to generate these tables. It is also possible to export the cleaned data to other packages for summarization. In fact, Lviv Oblast personnel used the Statistical Package for Social Scientists (SPSS) to complete the summarization of the data for their oblast.

3. RESOURCE REQUIREMENTS

Financial resource requirements to complete two surveys in Lviv total about \$25,000 US and two surveys in the rest of Ukraine were closer to \$35,000 US dollars. (The 24 Oblast central office surveys were more expensive). Equipment was not purchased, and no surplus funds were available after the surveys to conduct a 10 percent re-interview for quality control. Any future program should have adequate funds to provide support in these two areas. In addition, additional technical support will be required to handle the additional workload as the program is expanded to 25 oblasts. The costs outlined above also did not cover AAIC or ULRMC expenses. When these funds are taken into account, the entire projected costs are over 350,000 US dollars. Finally, there was extensive time donated by AAIC and ULRMC staff in order to complete the 1999 project, which is not included in the above amount.

A preliminary estimate has been completed on the funds required for a new project that allows for the implementation of the program in all 25 oblasts over a three-year period. The budget for the government is also included in this estimate, and this latter budget will have to be defended by Government officials. A proposal is being prepared for donor funding. This proposal will take additional time to complete and will require close liaison with government officials during its development.

4. PRESENTATION OF RESULTS

Summary results are presented in an earlier report, completed in January 2000, which includes over 200 tables selected from the more than 300 tables originally specified. These 200 summary tables provide information on:

- 1) Demographic characteristics,
- 2) Farm structure,
- 3) Farm practices,
- 4) A summary of crops,
- 5) Individual crops,
- 6) A summary of livestock, and
- 7) Individual livestock.

These tables show the principal findings from two surveys conducted in July and November 1999.

5. AREAS OF POTENTIAL IMPROVEMENT

Overall, the methodology employed during the Survey was successful. Information was collected on more than five hundred variables, and a summary of the results of the survey would indicate that the sample size was adequate for providing accurate estimates of baseline data at the level for which the survey was designed – at the Lviv Oblast and total country levels. However, as noted earlier, one of the goals of the Survey was to identify potential areas of improvement that might be initiated under future surveys, if these are conducted. A partial list of potential areas for improvement as well as possible needed additional evaluations identified through the survey experience is provided below by major survey activity.

5.1 Sample Design

As outlined earlier, an area frame was used for conducting the 1999 Pilot Agricultural Survey based on areas controlled by RADGOSP (state controlled) and KOLKGOSP (collective) farms in 1986. Subsampling was then used to select the farm operators/farms to be visited for data collection by type of operation to be evaluated during the survey – public sector farms, private farms, and household plots. The present frame would appear to have met the needs defined as required under the Survey. However, there is need to conduct additional evaluations designed to improve this frame in the future. Based on the experience gained through the survey effort, a partial listing of potential areas where the frame might be improved is provided below.

1. The Area Frame – Adequacy of Coverage – In 1986, the frame used to select the sample PSUs for survey included all agricultural lands in Ukraine. However, since then, information obtained by the authors of this paper would indicate that at least some public lands have been converted to agricultural (from other) use(s). There is need to evaluate whether this transfer of land use has been significant and, if so, expand the area frame to include any areas where this has occurred.^u
2. The Area Frame – Stratification – As outlined earlier in this paper, one option which was considered when initially developing the PSU area frame was to stratify the frame by land use in at least one oblast in order to test this concept. Unfortunately, the necessary materials were not available to conduct this test. If the present area frame is utilized for any future activities, the testing of this concept should be considered as part of the frame design. A test of this type could also be used to evaluate the feasibility of using the forest frame developed to measure degradation based on satellite imagery or through some other method (see next item).
3. The Area Frame – Multiple Use – At present, the area frame developed for use with the Survey serves as a basis for collecting information on public sector, private and household plot farms based on sub-sampling. However, one of the strengths of using this type of frame is its capability for multiple uses. For example, closed area frame techniques could be used to collect information on general land use, the areas planted in selected crops, etc. rather than relying on the present method, which uses a sub-sample of farms for this purpose. Similarly, satellite imagery coupled with on-the-ground verification or objective yield techniques could be used for forecasting the production

^u A rather cursory evaluation of the degree to which this has occurred would indicate that the transfer is not significant.

levels for selected crops through the growing season. The feasibility for using the frame for multiple use purposes should be evaluated if it continues as a basis for future surveys of the type just completed.

4. The Area Frame – Sample Size – As presently designed, the sample in Lviv Oblast is representative, and excellent geographic coverage was obtained. However, the sample in the other 24 oblasts has inadequate geo-spatial distribution. (i.e., The systematic selection process did not spread the sample adequately.) If the survey is continued, a new sample will have to be selected for the 24 oblasts (other than Lviv). Information obtained from the 1999 Survey (i.e., the relevant variances) can be used to select the new sample sizes by oblast, which meet the desired level of precision for the estimates to be provided.
5. The Private Farm Sub-sample – At present, the technique used to list the private farms located in the sample PSUs appears adequate. However, care must be taken to ensure that the listing is complete, especially with the expected movement towards privatization in the future. Quality control visits to a sub-sample of PSUs can be used for this purpose in the future.
6. Household Plot Sub-sample – As explained earlier in this paper, a list frame of households associated with the sample public sector farm selected in each PSU visited was used to select the sub-sample of household plot operators interviewed during the survey. This technique should be checked to ensure that it provides a representative sample for all household plot operators located in rural areas. If it does not, an alternative approach might be considered such as a village frame. If it is decided to use a village frame for this purpose, alternative techniques should be evaluated as a means of collecting the required information. For example, one might wish to select one or more villages located in a sample PSU, “split” the village(s) into parts, and then randomly select one or more parts for listing, sub-sampling and subsequent interview. Another technique might be to use a list frame supplied by the village officials for this purpose. If the latter technique is used, care must be taken that the list frame used is current.

5.2 Questionnaire Design

When conducting the 1999 Pilot Agricultural Survey, considerable reliance was placed on the prior experience of AAIC staff engaged in its conduct when designing the questionnaires used due to time constraints. The questionnaires used were designed not only to obtain information in the areas selected for examination but also to test different methods for collecting the desired data. Based on this test, suggestions are provided below on the results of these tests/methods, which might be used to improve the design of the questionnaires used in future surveys.

1. Questionnaire Design – Planning – Prior to initiation of the survey design exercise under the 1999 Pilot Agricultural Survey, a DURS was conducted to identify information needs prior to initiating the surveys. This produced valuable information concerning primary data users and critical data needs. Much of the data produced by project staff were relevant to the stated needs in the DURS. All subsequent surveys conducted should be preceded by a DURS to serve this same purpose.
2. Questionnaire Design – Testing – Although some testing was completed on the questionnaires used with the 1999 Survey prior to their use, this testing was inadequate.

The experience gained through the conduct of the 1999 Survey can be used to improve the design of these questionnaires when used to collect similar data in future surveys. However, any questions needed to collect additional information should be tested *thoroughly*. In addition, any new data collection efforts designed to obtain information in different areas, such as on social issues like schools, health clinics, and other infrastructure maintenance, will require a completely new set of questionnaires which *must be tested thoroughly*. Normally, three tests are required to ensure that a questionnaire is designed properly.

3. Suggested Questionnaire Improvements Based on the 1999 Survey – A partial list of suggested questionnaire improvements is provided below in no particular order. It is also suggested that any changes in the questionnaires’ design should also be thoroughly tested prior to their use.
 - a. Winter crop areas planted last year – In conducting the July/August survey, data were collected on areas planted last year in wheat and barley for harvest this year. One might wish to expand this coverage to include rye areas planted, at least in selected oblasts.
 - b. Alfalfa/other forage crop areas planted – Under the 1999 Survey, it was decided to “break out” the areas planted in alfalfa from that planted in “other forage crops”. Results of the survey would indicate that this is a very minor crop in Ukraine.^v Thus, future surveys should include areas planted in alfalfa under “other forage crop” areas planted. At the same time, results of the 1999 Survey would indicate that the areas planted in/production of sugar (and other) beets for forage is a quite important crop, especially for household plot operators. Based on this experience, future surveys should probably collect information on this crop separately.
 - c. Tree Crop Areas – Under the 1999 Survey, all areas held or planted in crops were measured in units of 100 square meters (i.e. one hectare = 10,000 m²/100 m² = 100 units). However, in the case of household plots (and, in some instances, private farms) the areas planted in trees are often both very small as well as planted in a mix of trees. Thus, it is suggested that information provided on trees for these two farm types be limited to the number of trees planted rather than area planted. If areas are desired by type of tree, an average area planted per tree could be used to convert tree numbers to areas.
 - d. The Cost of Leasing Land – Public Sector Farms – Under the July/August survey, an attempt was made to obtain information on the costs of leasing land by public sector farms, which was unsuccessful (see Appendix II, Display II.1b, p. 20). When paid, leasing costs were usually paid in kind as a percentage of selected crops or numbers of livestock. It is suggested that this information be moved to the November survey and that the information sought be adjusted to include: (i) whether the farm leased or rented any land; (ii) the total area leased or rented; (iii) whether or not the farm paid anything for leasing/renting this land; and (iv)

^v In 1999, only two percent of the farms had alfalfa areas planted, and only one percent of the field crop area planted was in alfalfa.

assuming a rent was paid, the type of rent paid – cash, the percent of crops paid, number and types of animals provided, etc.

- e. Winter Wheat Barter – Public Sector Farms – In July/August, an attempt was made to obtain information on winter wheat barter to date (see Appendix II, Display II.1b, p. 23). This set of questions should be dropped from the questionnaire since more detailed information is obtained as part of the November survey.
- f. Plowing Methods/Equipment Used – Public Sector Farms – In July/August, information was obtained on the plowing methods/equipment used by public sector farms during the planting season (see Appendix II, Display II.1b, pp. 25-26). These two questions should be dropped from the Form 1A only since information is also being collected on equipment owned/operated by public sector farms.
- g. Manure Purchases – All Farms—In the November survey, an attempt was made to collect information on manure purchases (see Appendix II, Displays II.2a, b and c, Farm Practices Section, questions 1b and 1c). These questions should be dropped from the three questionnaires since virtually no manure is being purchased.
- h. Crop Production/Sales/Barter – As designed, the method used to obtain information on both field and tree crops production/sales/barter treated each crop individually. One might wish to use a matrix approach to obtaining this information, at least with respect to public sector farms, which would shorten the length of the questionnaire(s) significantly. If this technique is utilized, the format used should be tested in depth prior to use, and lengthy enumerator training should be provided in its use to ensure accuracy during data collection.

5.3 Other Areas for Potential Improvement

On the previous pages, areas for potential improvements in sampling and questionnaire designs have been noted. However, experience gained through the Survey exercise would indicate there are certain other areas where improvements could be made with future surveys of a similar type. A brief list of these is provided below.

1. Enumerator Training – When to Interview Selected Sample Farm Operators – As explained earlier, multiple stage sampling was used to select sub-samples of farm operators for interview during data collection. In the case of the public sector and household plot farms, open area frame was used for this purpose, while with private farms weighted area frame was used. Determining when to interview a farm operator/manager with these two techniques differs. With open area farm sampling the sample farm operator should be interviewed only when his/her dwelling unit (or the farm center in the case of a public sector farm) is located within the sample PSU being visited. With a weighted area frame, the farm operator should be interviewed as long as *any farm area being operated* lies within the sample PSU, whether or not the operator's dwelling unit lies within the sample PSU. Emphasis should be placed on providing training on this distinction if future surveys are conducted.

2. Adjusting Expansion Factors for Non-Response – One of the strengths of using sampling to collect information is that it allows automatic adjustments when providing estimates for a population for interviews that were not completed. Any future survey activity should emphasize what to do when this occurs as the result of refusals, the operator moving from the area, the inability to find the operator, etc.
3. Quality Control Activities – Normally, when conducting a survey, a quality control module is included as part of the exercise. This usually consists of a follow-up survey where a subsample of the different types of farm operators is re-interviewed in a subsample of PSUs (in the cases like the 1999 Survey). This can serve two purposes. First, it can induce enumerators to do a better overall job since they have no prior knowledge on which PSUs/farm operators will be interviewed. Second, the results of the follow-up survey can be analyzed and compared with the regular survey as a means of measuring the nonsampling errors on national (and other) estimates. Funding for any future surveys should be adequate to allow quality control activities of this type.

6 SUMMARY AND RECOMMENDATIONS

6.1 Introduction

At present, the Government of Ukraine faces a dilemma in managing the movement of Ukraine's agricultural (and related) sectors from a command to a market based economy. Environmental factors are of concern in many areas of the country; the movement towards the privatization of agricultural lands has often been sporadic; and much of the agricultural sector operates on a barter system. At the same time, many young (and other) people have moved from rural to urban areas in search of better economic opportunities, and, at least partly due to the lack of credit, the input supply as well as the output processing support mechanisms for the agricultural sector have deteriorated badly. Similarly, many of the large scale farms (public sector farms under the Survey) are being operated less than efficiently due to a number of factors including deteriorated equipment, management skills geared to a command rather than a market oriented economy, etc. As a result, there is real need to define the present status of the agricultural sector of the country. Utilizing the techniques similar to that employed with the 1999 Pilot Agricultural Survey is an efficient method of collecting information on and analyzing the status of this sector on a year-by-year basis. Using the DURS approach to identifying data needs can be used to identify areas of concern for the Government of Ukraine, and based on the results of these, special surveys can be designed to broaden the scope of coverage over time and meet these needs in a cost efficient manner.

6.2 Qualitative Assessment of the Pilot Project

Although at least some improvements in the survey are required, the pilot survey conducted in Ukraine was of excellent quality overall. Both the project management staff and enumerators were exemplary and highly motivated. They, in turn, motivated their staff in both Kiev and Lviv to perform in a superior manner when collecting, processing, and summarizing the information collected. The enumerators were able to locate all sample PSUs as well as account for the farmland in their segments based on the sampling design employed. Although the questionnaires for the two pilot surveys were complex and contained many variables, the enumerators, with support provided by their supervisors, were able to manage the problems faced in a competent manner. The survey was completed quickly with limited resources and at minimal costs, and its results have been used to generate estimates on over 500 variables. In future projects, more advanced technologies (i.e., the use of satellite imagery and more complex multiple sample frames) can be implemented to improve these results. In addition, the efficient use of the excellent maps that are now available for selected sample PSUs can be used to benefit future surveys.

While the survey team is satisfied with the quality and timing of the field data collection, processing and summarization efforts under the survey, it is important to note that this is a first time effort, and the results of future surveys will no doubt improve as they are conducted. The management of future surveys will improve as the relevant management personnel become more experienced, and data collection/processing/summarization will improve as additional experience is gained/training is provided in these areas of effort. Integrating relevant GU personnel into the DURS process in preparation for future surveys will upgrade their skills in identifying data needs, which will better serve data users in the future. "Fine tuning" present/developing new sampling/questionnaire designs to better meet the information needs identified will better ensure the transfer of technical skills in these areas.

6.3 Conclusions and Recommendations

Conclusions based on the survey experience along with their associated recommendations are provided below. It is important to note that these are presented in no particular order of importance.

Conclusion 1: The overall survey design was successfully implemented and completed. The team was able to collect and process multi-sector/multipurpose data and generate over 300 tables describing the present status of the agricultural sector as well as on public and private sector farms and household plots in Ukraine.

Recommendation 1: The Government of Ukraine should agree to continue this basic methodology as well as extend its coverage to all areas of the country with suggested improvements.

Conclusion 2: There is agreement between the pilot survey data and SSCU data in grains, including hectares and production. – 15.2 million head vs. approximately 13 million head, respectively. Most of this difference occurs at the household plot level.

Recommendation 2: SSCU professionals, ULRMC and AAIC staff need to resolve this difference in livestock numbers by conducting detailed follow-up interviews on a subsample of the PSU sample. Once the reason for this difference has been identified, corrective action can be taken (if needed) based on changes in sample design, questionnaire design, etc.

Conclusion 3: There are discrepancies between the numbers of private provided through the survey when compared to these estimates by the GU. The survey indicates an estimate of 29,000 private farms presently operating compared to 35,000 to 38,000 estimated by the government.

Recommendation 3: Again, GOSCOMSTAT, ULRMC and AAIC staff professionals need to resolve this discrepancy through the conduct of follow-up visits to a selected subsample of PSUs. In this case, the primary purpose of these revisits should be to check for nonsampling errors.

Conclusion 4: There is some discrepancy between the estimates of the number of household plots obtained through the survey versus that for the government – 7.4 vs. 8.4 million household plots, respectively.

Recommendation 4: An assessment of the present sampling method used to obtain the information on household plots needs to be completed. Based on this assessment, conclusions can be reached on whether a new sampling design is required to obtain this information, and, if so, what type of sampling design should be employed – area frame combined with a village subframe, multiple frames employing both village and an area frame, etc.

Conclusion 5: The SSCU offices – both at the oblast and central levels – need more powerful computer equipment (and possibly additional software) with greater capacity software if future surveys are to be processed efficiently.

Recommendation 5: Any new project should upgrade computers (both hardware and software) in government offices, both at the oblast and central levels.

Conclusion 6: The data user requirement study conducted at the beginning of this pilot project produced valuable information concerning the primary data users and their critical needs. Much of the data produced by project staff activities were relevant to the state needs in the DURS.

Recommendation 6: AAIC, URM, SSCU, and MAIC staff need to conduct a DURS on a continuing basis in order to address the evolving concerns of managers of the agricultural and food sectors. Each survey publication should be provided to data users along with the

opportunity to provide an evaluation of the information provided.

Conclusion 7: The involvement of MAIC in the pilot survey project was minimal. Pilot project staff interacted with the Agricultural Policy Unit (primarily), but that is a donor-funded unit. With the exception of the DURS, other professional staff members of MAIC were not participants in the various stages of the pilot project process.

Recommendation 7: ULRMC should circulate this final report at the MAIC and arrange meetings to solicit comments, with the objective of increasing their involvement in using the agricultural statistics available through sampling in the future to manage the agricultural sector.

Conclusion 8: The SSCU office is well staffed in Lviv Oblast. Their performance during the pilot survey period was outstanding, and if personnel in other SSCU oblast offices are comparable to those in Lviv, the probability of success for future surveys will be excellent. However, there are still some areas of training required to upgrade the technical skills of Lviv Oblast personnel prior to and during subsequent surveys.

Recommendation 8: The SSCU central office should set standards and provide support to oblasts as they are introduced to the survey program and survey management. SSCU staff who worked with the pilot survey can also provide training in the areas of management of the surveys as well as on data collection/processing/summarization to personnel in other oblasts if additional survey efforts continue. Additional training should also be provided in all aspects of sampling theory prior to and during subsequent surveys. MAIC also needs to be involved in determining which data are collected and how data should be analyzed. The Agricultural Policy Unit could provide training for these purposes.

Conclusion 9: The sample used in Lviv was representative and provided excellent geographic coverage. However, the sample in the other 24 oblasts had inadequate geo-spatial distribution. In this latter case, the systematic selection process did not spread the sample adequately. In addition, other methods may be required to increase the accuracy/efficiency of providing the estimates through future surveys – land use stratification, multiple use of the sampling frame(s) used, etc.

Recommendation 9: A new sample should be selected for use with the 24 oblasts (other than Lviv), which allow the provision of estimates at the oblast level. The raions need to be arrayed geographically so that the systematic selection process ensures an adequate geographic dispersion of the sample PSUs across the oblasts. The feasibility of employing land use stratification, at least in the western Ukraine, during sampling should also be evaluated.