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AGRICULTURE RECONSTRUCTION AND DEVELOPMENT PROGRAM FOR IRAQ

Identification and Collection of Socio-Economic Data for the Agro-Ecological Zone (AEZ) Mapping Program

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INTRODUCTION

From August 28 - September 25, 2005, an ARDI specialist in socio-economic data collection worked with Ministry of Agriculture (MOA) officials and consultants and staff of USAID/Iraq's Agricultural Reconstruction and Development Project for Iraq (ARDI) to begin to identify the socio-economic data required for ARDI's Agro-Ecological Zone (AEZ) Mapping program. This was the first of two planned assignments to Iraq.

The Scope of Work for this first assignment states that the consultant will (*inter alia*):

- Examine previously gathered data on land use and socio-economic characteristics in the pilot areas.
- Assist national counterparts in identifying and establishing relevant socio-economic indicators for crop production in the pilot areas.
- Discuss with concerned government officials to identify national priorities and plans for land use.

This report will describe how these activities were carried out.

1. BACKGROUND: AEZ, LAND EVALUATION FOR IMPROVED AGRICULTURAL DECISION-MAKING, AND SOCIO-ECONOMIC DATA COLLECTION TO DEFINE LAND UTILIZATION TYPES (LUTs)

1.1 AEZ

AEZ inventories land resources to assess all feasible land-use options, under various levels of inputs and different management conditions, and then evaluates and quantifies the anticipated crop production potential. AEZ is a tool for policy formulation and development planning. It can help sector and regional planning, acting as a bridge between conventional macro-planning and project-specific planning.

1.2 Land Evaluation

In addition to its usefulness as a policy formulation tool, AEZ can also play a large role in land use planning, to help guide decisions. A key component of land use planning is land evaluation, which describes how land is presently managed, what improvements are possible, and other potential uses of land. To assist in making rational decisions, land evaluation techniques collect information about physical, social, and economic conditions, and assess the land's relative suitability for different uses in light of different objectives. Land evaluation aims to catalogue different types of land that exist in the study area, identifies possible uses to which they might be put, and assesses the suitability of each use for each land unit.

Land evaluation, however, does not determine land use changes. Land evaluation simply provides data to enable more informed decisions. Land evaluation usually provides information on two or more potential forms of use for each area of land, including good and

bad consequences. The land evaluation process describes different land uses, and assesses and compares the different uses. This can lead to recommendations about the preferred kind of use, and these recommendations can be used to assist rational decision-making. In land evaluation, the characteristics or qualities of land have to be matched against the requirements for each land use considered. Land evaluation, then, is a method to predict the consequences of change.

1.3 Land Utilization Types (LUTs) and Socio-Economic Data

Land evaluation helps to define land utilization types (LUTs). LUTs define not only the produce (e.g. crops) of a particular piece of land, but also how the land use is managed. LUTs are defined in terms of: (i) product, (ii) inputs, (iii) operations required to produce those products, and (iv) the socio-economic setting in which production is carried out. Land evaluation also tries to predict how different LUTs are likely to perform on different tracts of land, and also compares how the same land is suitable for different land uses.

The socio-economic setting is particularly important in land evaluation and LUT definition, as a new or improved land use can succeed only if it can be adapted to fit local social and economic conditions. In AEZ, socio-economic considerations are explicitly taken into account, thus providing an integrated planning approach to agricultural development. During this assignment, efforts were made to define the variables required to adequately describe the socio-economic setting, keeping in mind the unique objectives and requirements of the AEZ program. By combining land evaluation methods with socio-economic analysis, AEZ can evaluate the spatial and dynamic aspects of agriculture.

2. ACTIVITIES OF THE AEZ SOCIO-ECONOMIC TEAM

During this first of two assignments to define the socio-economic data requirements for the AEZ program, the AEZ socio-economic team decided to concentrate on:

- What socio-economic data to collect, and
- How to collect it.

To this end, the AEZ team conducted a number of activities, including:

- Extensively reviewed AEZ literature, articles, and reports, particularly focusing on the socio-economic aspects of AEZ;
- Conducted almost daily meetings and discussions among ourselves, analyzing and debating the advantages and disadvantages of different socio-economic variables;
- Via email corresponded with: (i) the Director of AEZ Program at the MOA/Baghdad, (ii) Riverside Technology, inc. (RTi), and (iii) AEZ technical experts at the International Institute for Applied Systems Analysis (IIASA) regarding the team's progress and to receive suggestions on the "what" and "how" of data collection.
- Met with the Director of the AEZ Program and other MOA officials in Baghdad on September 18-19, 2005 to discuss the team's progress.
- Met with other MOA officials in Erbil to discuss the socio-economic component of the AEZ program and to listen to their suggestions re already-existing agricultural data, and gathering new data.

- Met with ARDI's Agricultural Survey Team to coordinate the AEZ socio-economic survey with their agricultural survey.

3. RESULTS AND ISSUES

3.1 The "What" of Socio-Economic Data Collection for AEZ

Key issues and results regarding the "what" of AEZ socio-economic variables are listed below:

Seven General Data Categories Identified - The AEZ team identified seven key types of variables that should be collected: (i) Products/Produce, (ii) Inputs, (iii) Land Size and Land Tenure, (iv) Labor Intensity, (v) Farm Power/Capital Intensity, (vi) Agricultural Infrastructure, and (vii) Cropping Intensity/Crop Rotation. Certainly these seven categories could be altered or collapsed (e.g. Farm Power could be collapsed into Inputs). The categories provide a general roadmap of the specific types of data that need to be collected in an AEZ study.

Annex A of this report presents in tabular form the seven general categories, and the potential variables associated with each category. Annex A is not a questionnaire and it could be simplified for field use. Annex A is presented here merely to give a broad overview of the type of data collection required. Based on the data collected, simple calculations will be done to develop variables suitable for the AEZ database. It is important to note that it may not be possible to gather all the data shown in Annex A. Some data may not be available or logistically too difficult to collect. Therefore, some compromises in data collection may have to be made.

Annex B shows additional variables that could be collected, if sufficient time and resources are available. The variables shown in Annex B should be seen as second priority.

Need for Frequency Distributions Across Pilot Sites - The socio-economic variables shown in Annex A focus on very precise and detailed data, e.g. 250 donums of irrigated wheat planted in Village X. Later, these data need to be collapsed into three or five categories and shown as frequency distributions, e.g. 40 percent of farms in Village X have between 0-50 donums of irrigated wheat, 30 percent have between 51-100 donums, and 30 percent have between 101-150 donums. The tables in Annex A do not show these categories or frequency distributions now, as it is not possible to define in advance the most appropriate categories. After field visits are made, these categories can be defined.

Variables Need to Vary - It is critically important that the socio-economic variables vary within the two AEZ pilot sites. Otherwise, maps will be impossible to make. For example, if labor intensity (agricultural workers/dounam) is fairly uniform within the two pilot sites, it will not act as a good variable for AEZ mapping. If it is discovered that selected variables do not vary, they may have to be replaced.

Satellite Images from 2002, Socio-Economic Data from 2005 - The latest satellite images of the two pilot sites are from 2002, while ideally we want socio-economic data from 2005.

Unless new satellite images are purchased, AEZ will have to make "leap of faith" that the socio-economic conditions have not changed significantly from 2002 to 2005. In truth, it is likely that conditions have not altered significantly, but in principle, it would be best if the dates of the socio-economic data correspond to the dates of the satellite images.

AEZ Socio-Economic Data Sometimes Different From Other Agricultural Data - As mentioned above, the objective of the AEZ socio-economic data collection is to make maps. As such, the objectives, content, methods, and final use of the AEZ socio-economic data can be different for other collected agricultural data.

For example, the AEZ socio-economic data are not meant to be shown in tabular form, or to provide detailed agricultural statistics to decision-makers. The data are meant to be entered into a data-base, and then used to make maps. Likewise, random sampling would not necessarily be the best method for selecting sample villages or farms, as AEZ mapping is looking for particular attributes and land characteristics (and variables that vary), and therefore purposive sampling is a better technique.

Need for Homogeneous, Spatially Dispersed Data Within the Pilot Sites - One of the most challenging aspects of AEZ socio-economic data collection will be to gather quality data at the field/farm level, from spatially dispersed points within the two AEZ pilot sites. Each of the spatially dispersed points within the pilot sites should be homogeneous on some characteristic (e.g. same type of irrigation system, same type of soil, relatively same size of farm, etc.), but there also should be variability and heterogeneity between each selected point. For example, at village X in the Ninewah pilot site, we hope to find roughly similar levels of agricultural capital intensity (agricultural machines per dounam). At the same time, we hope to find very different levels of capital intensity in Village Y within the same Ninewah pilot site. To accomplish this goal, the AEZ socio-economic data collections will be based on purposive, stratified sampling based on ecologically or agriculturally homogenous zones or villages in order to make the results usable for land evaluation.

Need for Data at Village or *Mukatta* Level - To gather and analyze spatially dispersed data within the two pilot sites, village level data will have to be collected. It is not clear whether data aggregated by village exist in the two pilot sites. We know agricultural data exist at the sub-district, and the total pilot site level, but to make the AEZ maps for the two pilot sites, we need data from scattered locations within the pilot sites.

Location, Location, Location - Though not shown in Annexes A or B, it is vitally important that the precise location of each data point in the pilot sites are noted. This location is necessary for mapping purposes. Global Positioning Systems (GPS) can be used for this.

3.2 The "How" of Socio-Economic Data Collection in AEZ

Below are some of the key issues regarding the "how" of AEZ socio-economic data collection:

Reconnaissance of Two Pilot Sites - As the "what" of the AEZ socio-economic data collection has been tentatively identified, AEZ personnel might consider brief visits to: (i) the agricultural offices of the two governorates (Ninewah and Wassit) to see what data are

available for the pilot sites, and (ii) the agricultural offices of the concerned sub-districts to check on data availability, if the security situation allows.

Security and Expanded Areas of Two Pilot Study Sites - In September of 2005 the Director of the AEZ program suggested that the two AEZ pilot sites be expanded. On the one hand this is good news as with an expanded area there is a greater chance that variables will vary, and more opportunities to define spatially dispersed data points. On the other hand, the expanded areas may not be safe to visit, and therefore data collection may be problematic at best. It would be best if ARDI supervisors and the Director discuss the security issues with AEZ staff before any travel to the two pilot areas is discussed.

AEZ Data Collection Surveys and ARDI Contracts - In the past, ARDI has worked out agreements with local MOA officials to gather needed agricultural data. Under these agreements, salaries come from MOA, while certain other expenses are paid for by ARDI. If the needed AEZ data is not available at the agricultural offices at the governorate or the sub-district, and if therefore some surveys are needed in the two pilot sites with simple questionnaires, ARDI personnel and the Director of the AEZ program should discuss with ARDI personnel the security situation in the two pilot sites, and how to ensure that the people conducting the surveys are not at risk by their contractual relationship to ARDI while working in the pilot sites.

4. NEXT STEPS

The following are the next steps that should be taken regarding socio-economic data collection for the AEZ program:

- If security conditions are deemed safe, the ARDI AEZ team should visit the agricultural offices of the Governorates in Ninewah and Wassit, and the sub-district agricultural offices of the two pilot sites, to conduct a reconnaissance. If the security situation is not safe, such visits should not be made, and if at all possible, telephone calls be made to the agricultural offices to ascertain data availability.
- If the security situation is not safe, strategies should be developed to try to collect a minimum amount of socio-economic data from the pilot sites by using already existing data (e.g. data from the Ministry of Agriculture's research.
- If the security situation is safe, then during the reconnaissance the ARDI AEZ team will determine if the needed data (type, quality, variability, etc.) are available or not available at the agricultural offices. If available, the team will gather the needed data in a separate format.
- If the needed data are not available at the agricultural offices, the ARDI AEZ team will informally discuss with local officials how such village-level data could be gathered in the pilot sites, perhaps using local people. Then the team would return to Erbil and discuss the security situation and the logistical/administrative arrangements with ARDI for conducting a survey with simple questionnaires. He would then develop site specific simple questionnaires.
- If the security situation is safe, short surveys need to be carried out to collect the needed village-level data. The raw data would need to be collected and returned to Erbil for processing. At this point, after the raw data are collected and returned to Erbil

and are ready for input to the database, then it would be appropriate for the international socio-economic consultant to return to Erbil.

- In all the next steps listed above, a staff member from the ARDI AEZ team should be the implementer. He knows what data to collect, and how it should be collected. It would be important the this staff member keep in close coordination with:
 - The AEZ Director at the Ministry of Agriculture in Baghdad.
 - The AEZ Program Manager.
 - ARDI Management in Erbil.
 - The database management specialist who will actually enter the raw data into the database.

Note: One donum = 2,500 square meters, and one hectare = four donum.

ANNEX A
SOCIO-ECONOMIC VARIABLES FOR ARDI AEZ PROGRAM¹
September 25, 2005

1. PRODUCE/PRODUCT - CROPS (in each selected mukatta or village)

SEASON	AREA (donum)	PRODUCTION (kg)	YIELD (kg/donum)	PERCENT AREA (%)
WINTER				
• Irrigated				
○ Crop 1				
○ Crop 2				
○ etc.				
Sub-Total				
• Rainfed/Supplementary Irrigation				
○ Crop 1				
○ Crop 2				
○ etc.				
Sub-Total				
• Rainfed				
○ Crop 1				
○ Crop 2				
○ etc.				
Sub-Total				
TOTAL WINTER				
SUMMER				

¹ These tables are still in draft form and will likely be revised somewhat in the future.

SEASON	AREA (donum)	PRODUCTION (kg)	YIELD (kg/donum)	PERCENT AREA (%)
• Irrigated				
○ Crop 1				
○ Crop 2				
○ etc.				
Sub-Total				
• Rainfed/Supplementary Irrigation				
○ Crop 1				
○ Crop 2				
○ etc.				
Sub-Total				
TOTAL SUMMER				

2. (a) INPUTS - CHEMICAL FERTILIZER FOR PRIMARY CROPS² (e.g. wheat, etc.; in each selected mukatta or village)

CHEMICAL FERTILIZER DISTRIBUTED	RECOMMENDED AREA COVERED BY FERTILIZER DISTRIBUTED³ (donum)	ACTUAL CULTIVATED AREA (donum)	DIFFERENCE BETWEEN (i) RECOMMENDED AREA COVERED BY FERTILIZER DISTRIBUTED AND (ii) ACTUAL CULTIVATED AREA⁴ (donum)
Crop 1			
• Urea (kg or l)			
• Combined (kg or l)			
• Total			
Crop 2			
• Urea (kg or l)			
• Combined (kg or l)			
• Total			
etc.			

² Data from this table can also be used to calculate intensity of use (kg or l/dounam)

³ The area (dounam) in this column will be based on the scientifically "recommended" area that should be covered by the amount of fertilizer distributed.

⁴ Data from this column can be converted into a ratio or percent.

2. (b). INPUTS - PLANT PROTECTION FOR PRIMARY CROPS⁵ (e.g. wheat, etc.; in each selected mukatta or village)

KIND AND AMOUNT OF PLANT PROTECTION DISTRIBUTED (kg or l)	RECOMMENDED AREA COVERED BY PLANT PROTECTION DISTRIBUTED ⁶ (donum)	ACTUAL AREA CULTIVATED (donum)	DIFFERENCE BETWEEN: (i) RECOMMENDED AREA COVERED BY PLANT PROTECTION DISTRIBUTED, AND (ii) ACTUAL CULTIVATED AREA ⁷ (donum)
Crop 1			
• Insecticide			
• Disease			
• Herbicides for Weeds			
• Rats			
• Total			
Crop 2			
• Insecticide			
• Disease			
• Herbicides for Weeds			
• Rats			
• Total			
etc.			

⁵ Data from this table can also be used to calculate intensity of use (kg or l/dounam)

⁶ The area (dounam) in this column will be based on the scientific "recommended" area that should be covered by the amount of plant protection distributed.

⁷ Data from this column can be converted into a ratio or percent.

2. (c). INPUTS - SEEDS FOR PRIMARY CROPS⁸ (e.g. wheat, etc.; in each selected mukatta or village)

KIND AND AMOUNT OF SEED DISTRIBUTED (kg or l)	RECOMMENDED AREA COVERED BY SEEDS DISTRIBUTED ⁹ (donum)	ACTUAL AREA CULTIVATED (donum)	DIFFERENCE BETWEEN: (i) RECOMMENDED AREA COVERED BY SEEDS, AND (ii) ACTUAL CULTIVATED AREA ¹⁰ (donum)
• Crop 1			
• Crop 2			
• etc.			
Total			

⁸ Data from this table can also be used to calculate intensity of use (kg or l/donum)

⁹ The area (donum) in this column will be based on the scientific "recommended" area that should be covered by the amount of seeds distributed.

¹⁰ Data from this column can be converted into a ratio or percent.

3. LAND SIZE/LAND TENURE¹¹ (in each selected mukatta or village)

TYPE OF LAND AND LAND TENURE	TOTAL SIZE (donum)	NUMBER OF FARMS	PERCENT OF TOTAL LAND (%)
Irrigated			
• Owned			
• Rented			
Sub-Total			
Rainfed-Supplementary Irrigation			
• Owned			
• Rented			
Sub-Total			
Rainfed			
• Owned			
• Rented			
Sub- Total			
TOTAL			

¹¹ Average size of farms can also be calculated from data from this table.

4. LABOR INTENSITY (in each selected mukatta or village)

TOTAL AGRICULTURAL WORKING ¹² POPULATION	TOTAL CULTIVATED AREA (donum)	LABOR INTENSITY (Ag. Worker/donum)
• Family		
• Hired		
TOTAL		

5 FARM POWER/CAPITAL INTENSITY (MACHINERY)¹³ (in each mukatta or village)

TOTAL NUMBER MACHINES IN USE	RECOMMEND ED AREA COVERED BY MACHINES ¹⁴ (donum)	ACTUAL AREA CULTIVATED/ IRRIGATED (donum)	HOURS OF USE PER MACHINE	MACHINERY USE INTENSITY (hours/donum)	DIFFERENCE BETWEEN: (i) RECOMMENDED AREA COVERED BY MACHINES, AND (ii) ACTUAL AREA CULTIVATED (donum) ¹⁵
• Tractor					
• Combine/Harvester					
• Sprinkler					
• Pumps					

¹² Working population is defined as those people between the ages of 6 and 65.

¹³ Data from this table can also be used to calculate farm power/capital intensity (no. machines/dounam)

¹⁴ The area (dounam) in this column will be based on the scientific "recommended" area that should be covered by the machines in use.

¹⁵ Data from this column can be converted into a ratio or percent.

6. (a) AGRICULTURAL INFRASTRUCTURE (in each selected mukatta or village)

ROAD	LENGTH OF ROAD IN MUKATTA OR VILLAGE (km or m)	WIDTH OF ROAD IN MUKATTA OR VILLAGE (m)	TOTAL ROAD AREA (km²)	ROAD INTENSITY IN MUKATTA OR VILLAGE (total road area (km²)/total area of mukatta or village (km²))
• Main				
• Secondary				
• Agricultural				
TOTAL				

6 (b) DISTANCE FROM MUKATTA TO "SAILLOW" (in each selected mukatta or village)

MUKATTA/VILLAGE	DISTANCE (km) TO NEAREST SAILLOW
• Mukatta/Village 1	
• Mukatta/Village 2	
• Mukatta/Village 3	

7. CROPPING INTENSITY/CROPPING ROTATION (in each selected mukatta or village)

TOTAL ARABLE AREA (donum)	PLANTED AREA (WINTER) (donum)	PLANTED AREA (SUMMER) (donum)	TYPE OF CROP ROTATION ¹⁶			CROPPING INTENSITY (%)
• Mukatta/Village 1						
• Mukatta/Village 2						
• Mukatta/Village 3						
TOTAL						

¹⁶ The types/categories of crop rotation will be determined later.

ANNEX B
OTHER POTENTIAL SOCIO-ECONOMIC VARIABLES FOR ARDI AEZ PROGRAM

PRODUCE/PRODUCT - ORCHARDS (in each selected mukatta or village)

MUKATTA OR VILLAGES	NUMBER OF TREES ¹				AREA (donum)				PRODUCTION (kg)				YIELD (kg/donum)				PERCENT TOTAL AREA (%)			
	E	D	M	T	E	D	M	T	E	D	M	T	E	D	M	T	E	D	M	T
Mukatta/Village 1																				
Mukatta/Village 2																				
Mukatta/Village 3																				

PRODUCE/PRODUCT - FORESTRY (in each selected mukatta or village)

¹ E=Evergreen; D=Deciduous; M=Mixed; T=Total

MUKATTA OR VILLAGE	AREA (donum)			PERCENT OF TOTAL AREA (%)		
	Plantation	Natural	Total	Plantation	Natural	Total
Mukatta/Village 1						
Mukatta/Village 2						

PRODUCE/PRODUCT - LIVESTOCK (in each selected mukatta or village)

LIVESTOCK	NUMBER OF ANIMALS	NUMBER OF ANIMAL UNITS (AUs) ²	AREA OF CONFINED FODDER ³ CROPS (donum)	LIVESTOCK INTENSITY (AUs/donum)
• Cattle				
• Buffalo				
• Sheep/Goats				
TOTAL				

² Number of animals will be expressed in standardized "animal units" (AUs) - Buffalo: 1.2; Cattle: 0.8; Sheep/Goats: 0.12. Chickens are not included here as their production has become more industrial than agricultural.

³ Confined fodder crops are defined as clover, barley, etc.