



Focused Environmental and  
Social Assessment -  
Incremental Impacts of the Infill  
Drilling Program for the Komé  
and Bolobo Oil Fields, Chad

Prepared for:

**Esso Exploration &  
Production Chad Inc**

Prepared by:

**ENVIRON  
London, UK**

Date:

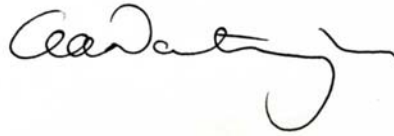
**March 2010**

Project Number:

**61-C14017**

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Contract/Proposal No: 61-C14017  
Issue: 05  
Author: Neil Daetwyler / Claire Preece  
Project Director/Approved: Neil Daetwyler  
(signature):



Date: 15<sup>th</sup> March 2010

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#### **VERSION CONTROL RECORD**

<b>Issue</b>	<b>Description of Status</b>	<b>Date</b>	<b>Reviewer Initials</b>	<b>Authors Initials</b>
01	Report to Client	18/12/08	ND	ND/CP
02	Amended report to Client	13/02/09	ND	ND/CP
03	Final Report to Client	28/07/09	ND	ND/CP
04	Revised Final Report to Client	25/08/09	ND	ND/CP
05	Revised Final Report to Client	15/03/10	ND	ND/CP

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# 1 Introduction

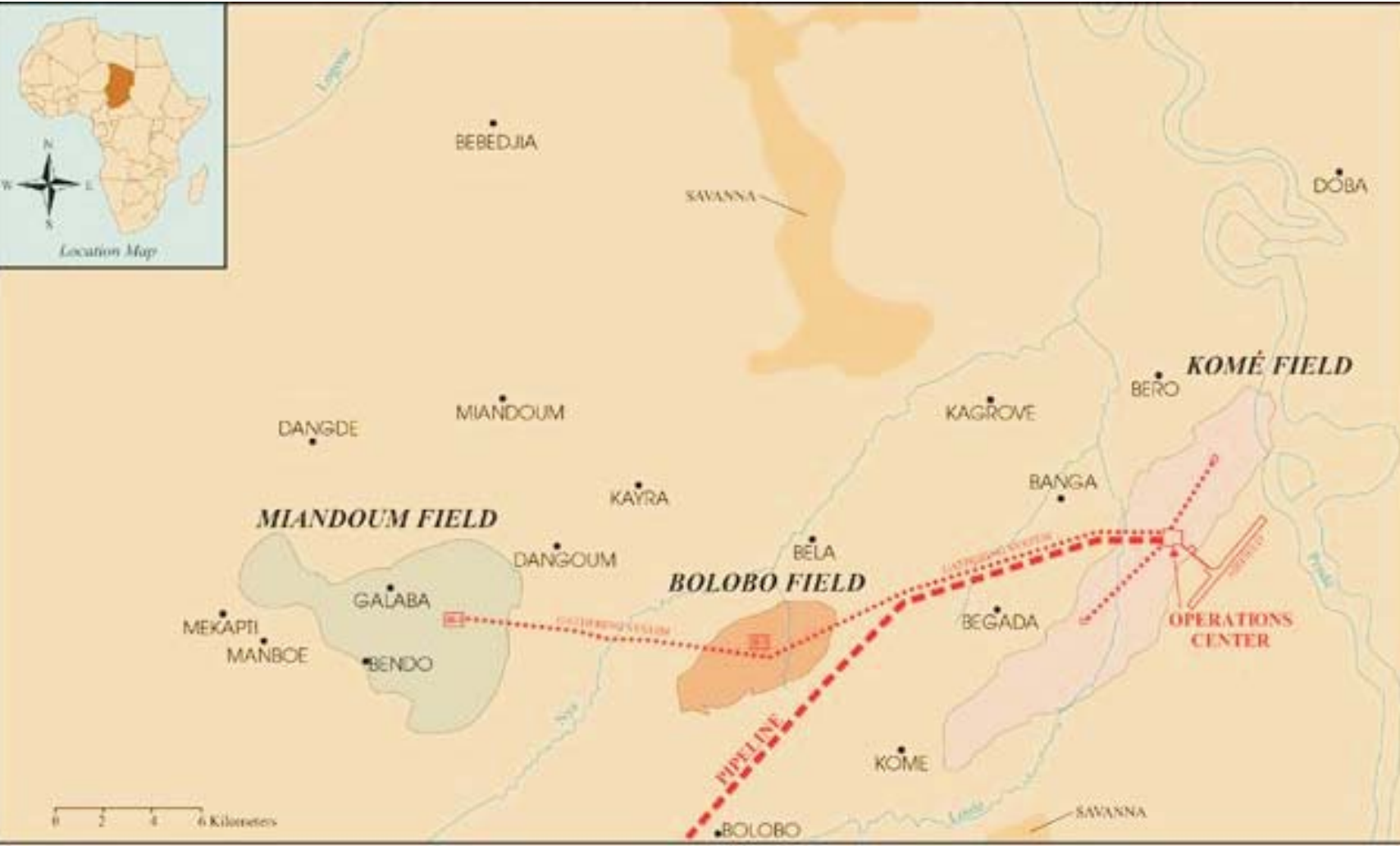
Esso Exploration & Production Chad Inc (EEPCI) is currently producing oil from oil fields in the Oil Field Development Area (OFDA) located in the Doba basin of southern Chad (the Project – see Figures 1, 2 & 3). As a result of difficult reservoir conditions, production levels are decreasing and a new Infill Drilling Program that adds wells to the existing Komé and Bolobo fields is being developed to meet production targets. EEPCI has commissioned this focused Environmental and Social Assessment to evaluate the incremental impacts resulting from the new Infill Drilling Program.

The assessment, which covers social and biophysical aspects, was the subject of Terms of Reference (ToR) that are appended to this report (Annex A). The assessment has the following objectives:

- Examine whether existing mitigation measures are sufficient to deal with any increased impacts that may occur as the result of continued drilling;

and

- Recommend additional mitigation measures if needed, based on the assessment of the incremental impacts due to the additional wells that will be drilled in the Komé-Bolobo program.



Key	
	Komé Field
	Miandoum Field
	Bolobo Field
	Villages / Towns
	Gathering Stations
	Rivers

Title **Figure 1**

Project **Chad Export Project**

Site **Komé and Bolobo Oil Fields, Chad**

Client **Esso Exploration & Production Chad Inc Chad**

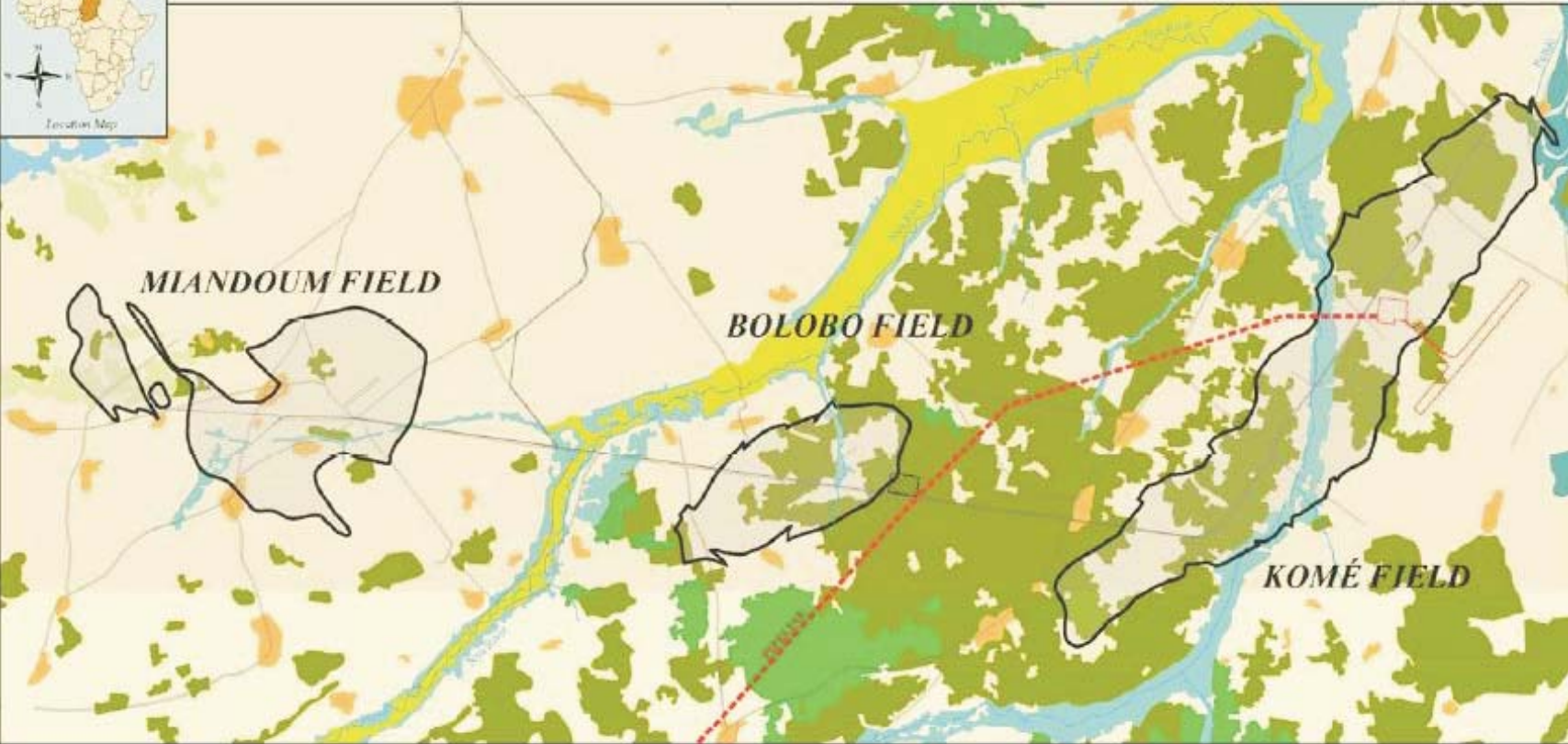
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Scale **As shown**



**LEGEND**

Agricultural	Wooded Savanna	Rivers / Gallery Forest
Marshland	Village / Towns	Rivers / Livestock Grazing Zone
Savanna	Well	Marshland / Livestock Grazing Zone
		Existing Roads



ESSO Exploration and Production Chad Inc.



LAND USE IN THE OIL FIELD DEVELOPMENT AREA

FIGURE 6.2-3

Scale **As shown**

Title **Figure 2**

Project **Chad Export Project**

Site **Komé and Bolobo Oil Fields, Chad**

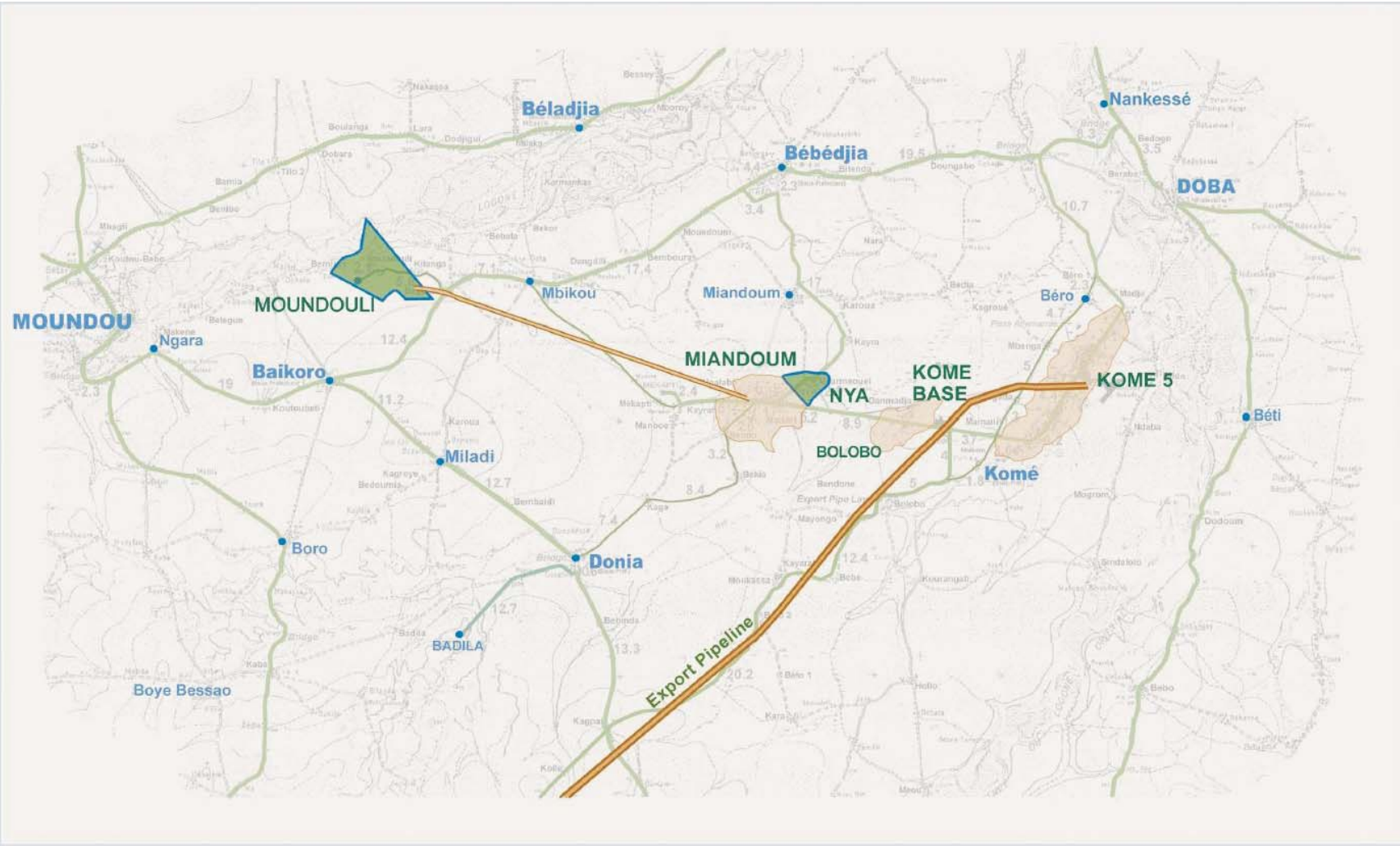
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Title	
<b>Figure 3</b>	
Project	
<b>Chad Export Project</b>	
Site	
<b>Komé and Bolobo Oil Fields, Chad</b>	
Client	
<b>Esso Exploration &amp; Production Chad Inc Chad</b>	
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## 2 Background

The ToR requires this assessment to examine whether the mitigation measures proposed in the Project Environmental Management Plan (EMP) and the Land Use Mitigation Action Plan (LUMAP) are sufficient to address any increased impacts that may occur as a result of continued infill drilling. This section provides the background to the EMP, the LUMAP, and the need for this assessment.

The Project's overall impacts, its land needs in the OFDA, the impacts of those land needs on land use by the local population, and the mitigations of these impacts have all evolved since the inception of planning for the Project. Key steps in this evolution have been documented in the following publicly disclosed materials:

### Project Environmental Assessment (EA) and Environmental Management Plan (EMP)

A substantial package of environmental and social information was publicly disclosed in 1999 as part of the environmental approvals processes for the Chad Export Project. These processes included satisfying the formal requirements of prospective Project lenders, including institutions of the World Bank Group (the International Bank for Reconstruction and Development and the International Finance Corporation (IFC)). An EMP was a keystone of the disclosure package, building upon the findings of the prior (1997) EA. An EA Executive Summary and Update (EAESU) also formed part of the 1999 disclosure package. The EMP incorporated the Chad Resettlement and Compensation Plan (CRCP), and these three documents (EA, EMP and CRCP) provided a variety of information on projected Project impacts and land uses. This disclosure package may be accessed at the World Bank website<sup>1</sup> and at the Esso Chad website.<sup>2</sup>

### The Chad Resettlement & Compensation Plan Evaluation Study

An EMP commitment to conduct an evaluation of the CRCP was implemented through a study conducted in 2006, some three years after oil exports commenced. The study was authored by Barclay and Koppert (B&K) and is sometimes referenced as the B&K report. This study recognised that some aspects of the Project's development in the OFDA were evolving in ways not envisaged in the EA/EMP (for instance, at the time of study 390 wells had been completed out of an estimated total of 450, as compared to a CRCP estimate of 287 wells), and B&K recommended various further studies and remedial actions.

### Land Use Mitigation Action Plan

The Project responded to the B&K report by producing the Land Use Mitigation Action Plan (LUMAP). The LUMAP report documented a variety of land management actions that were already being implemented in response to the changing Project circumstances (some of which were directly relevant to the B&K report), and also addressed various recommendations of Barclay and Koppert. The LUMAP report was completed in April 2007 and was prepared by the Project's Environmental Management Group in collaboration with the Environment and Social Development Department of the IFC.

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<sup>1</sup> <http://go.worldbank.org/504AW22GX0>

<sup>2</sup> [http://www.esso Chad.com/Chad-English/PA/Newsroom/TD\\_Documentation.asp](http://www.esso Chad.com/Chad-English/PA/Newsroom/TD_Documentation.asp)

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The LUMAP was developed and is being implemented to address land use management issues resulting from the well count of ~450 that was referenced in the B&K report.

Due to continuing difficult reservoir conditions, production levels have decreased. In order to address this issue, the Infill Drilling Program began in the second half of 2008 on Komé field and Bolobo field only. It is this infill drilling and the potential incremental impacts resulting from it that are subject of this assessment.

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### 3 Baseline Conditions

The baseline conditions for the Project were described in detail in the 1997 Project EA, the disclosure package of 1999, and the source documents referenced therein. The existing environment was summarised in the Environmental Assessment Executive Summary and Update (EAESU) in terms of four bioclimatic zones, one of which (the Wooded Savanna Zone) encompasses the Project in Chad. The existing environment in the OFDA (both human and biophysical) is therefore discussed in the summary of the Wooded Savanna Zone contained in the EAESU; this summary is presented in Annex B. (The EAESU is available at the Esso Chad website<sup>3</sup>.)

A substantial volume of additional data that is relevant to this assessment has been acquired since Project inception, primarily as a result of the implementation of the Project EMP and the development of various satellite oilfields in the OFDA:

- The EMP requires active management of Project impacts, and these management actions are summarised in Project Update Reports (the most recent of which is Project Update Report No. 26 – Mid-year Report 2009). All Project Update Reports are available on the Project website at [www.essochad.com](http://www.essochad.com).
- The Project is subject to external compliance monitoring by the External Compliance Monitoring Group (ECMG). Under contract to the Project Lender Group, the World Bank and EEPCL, the environmental consultant D'Appolonia S.p.A. has been acting as the Project's ECMG during construction and into the operations phase. ECMG currently reports on a biannual basis and its reports are available on the IFC website at [www.ifc.org/ecmg](http://www.ifc.org/ecmg).
- The Project has developed a database to handle the large amounts of data acquired during the implementation of the EMP. This database (the EMP Information System, or EMP-IS) is described in section 6.1 of this assessment.
- The Project has developed satellite oilfields, which have been the subject of publicly disclosed environmental documentation. Documentation packages were prepared for:
  - The Maikeri (Poutouguem) Project
  - The Nya/Moundouli Project

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<sup>3</sup> [http://www.essochad.com/Chad-English/PA/Newsroom/TD\\_Documentation.asp](http://www.essochad.com/Chad-English/PA/Newsroom/TD_Documentation.asp)

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## 4 Project Description

As originally envisioned (and as documented in the EA and EMP), the Project was to include a variety of permanent and temporary land uses in the OFDA. The most significant land uses are associated with the permanent facilities at Komé (including the Central Treating Facility, Export Pipeline Pump Station 1, the power plant, the Komé Facilities Camp and the airstrip), and the production wells with their supporting infrastructure (including pads, access roads, flow lines and power supplies). The permanent facilities are fixed and complete, while the number of wells and the amount of associated infrastructure varies over time as more is learnt regarding the properties of the producing reservoirs.

Experience with the development of the oilfields has led EEPIC to increase the number of wells drilled and therefore to increase the land use requirements of the Project. At the time of the B&K report a total of 391 wells had been constructed and it was anticipated that up to 450 wells would be required in total.

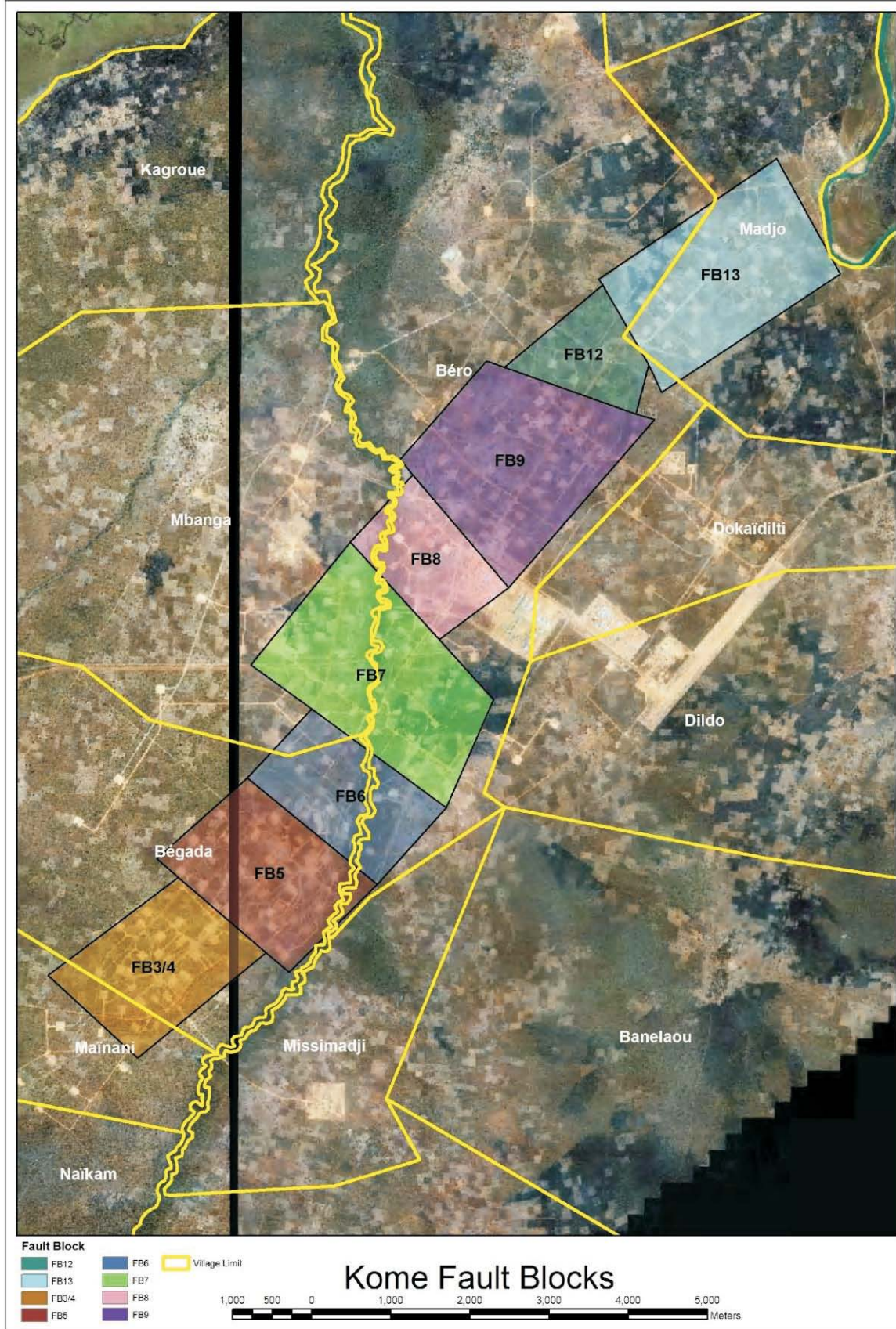
The impacts anticipated from this level of drilling (up to a total of approximately 450 wells completed throughout the OFDA) were examined by B&K, who identified a number of issues related to the Project's established land management practices. The Project subsequently prepared (and is implementing) the LUMAP to address these issues and to ensure land management practices appropriate to the expanded land use requirements of the Project.

It is the Project at this stage of development (i.e. mid-2008, when a total of approximately 450 wells had been drilled throughout the OFDA) that defines the baseline for the current assessment of the infill drilling, which is being implemented through a rolling program of drilling in core areas of the Bolobo and Komé fields. This drilling began in the second half of 2008.



These core areas are termed fault blocks, and the disposition of the fault blocks for the Komé and Bolobo fields is shown on figures 4 and 5. The fault block concept and its significance to the social issues associated with the Infill Drilling Program are discussed in Annex C.

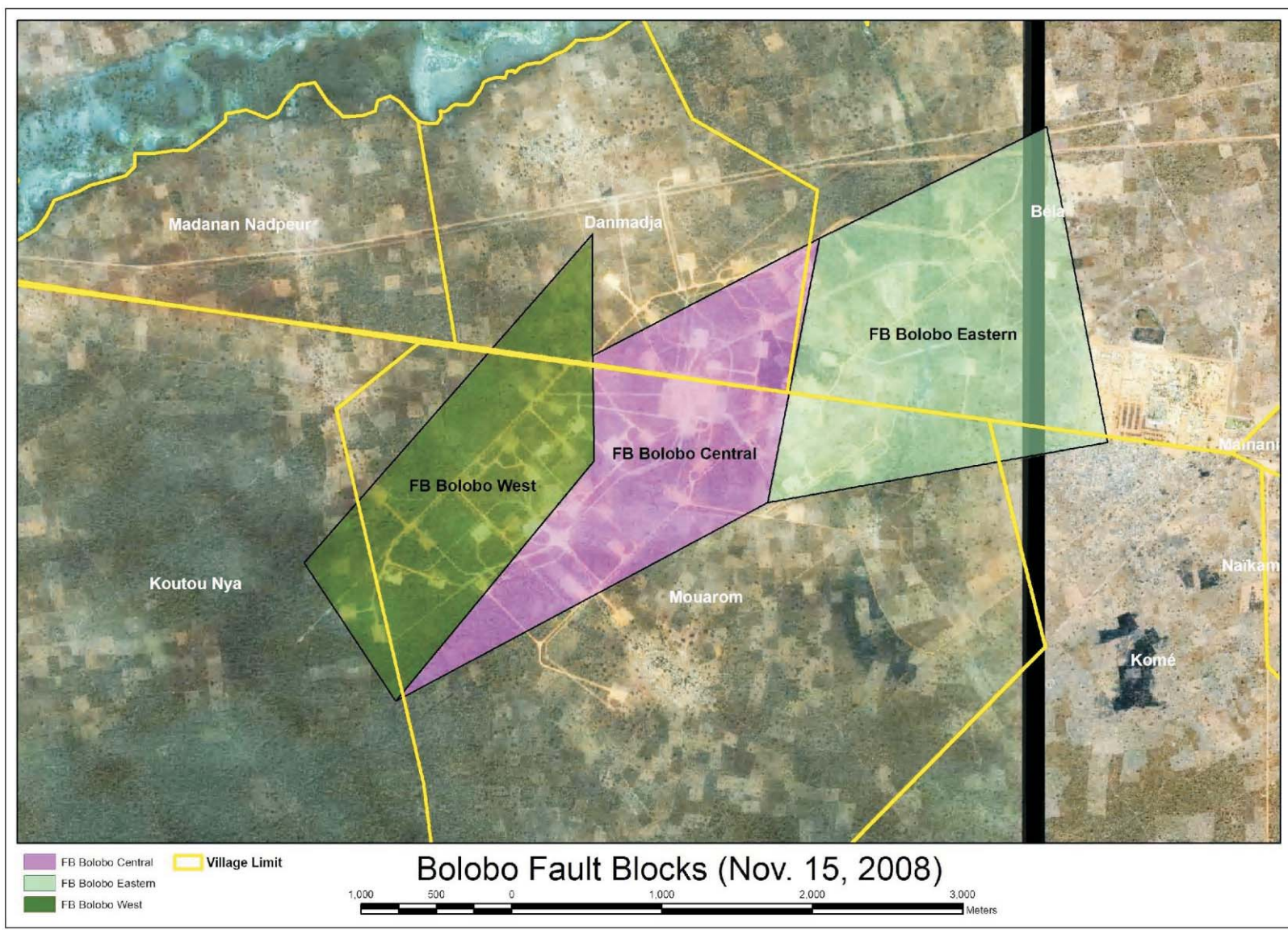
Thirteen wells had been completed in the Bolobo field and twelve in fault block 6 of the Kome field by December 2008, and a further 31 wells in Kome fault block 3/4 by mid-2009. The extent and configuration of further drilling is being determined based on the results achieved with these early wells, at an indicative rate of 100 wells per year through the end of 2010.

The data available in the second half of 2009 regarding the disposition of the known well pads within the various fault blocks (and in relation to local village land holdings) is presented in Annex C.



Original document courtesy of EEPCI – EMP

Title		Figure 4		Site		Komé and Bolobo Oil Fields, Chad	
Client		Esso Exploration & Production Chad Inc Chad					
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Title	<b>Figure 5</b>	
Project	<b>Chad Export Project</b>	
Site	<b>Komé and Bolobo Oil Fields, Chad</b>	
Client	<b>Esso Exploration &amp; Production Chad Inc Chad</b>	
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## 4.1 Drilling and Associated Activities

The drilling and associated activities that are and will continue to be performed as the major part of the Infill Drilling Program will be restricted to the Komé and Bolobo fields and is being planned and implemented so that construction activities (including land compensation) utilise the concept of fault blocks to minimize impacts by maximising the use of common rights-of-way for access roads and flowlines. In short, the process comprises:

- The identification of a drilling location by the Project reservoir engineers.
- The optimisation of the location in respect to other facilities (for instance, existing flowlines and roads are used where possible, and if new construction is required are grouped together where possible to minimise impacts).
- Determination of land compensation requirements, and conduct of an Environmental Baseline Assessment (including an archaeological assessment), prior to construction.
- Construction of a laterite drill pad to the minimum size required for safe and efficient drilling.
- Well drilling and completion, after which the mud pits are cleaned out and backfilled, and ancillary services such as flowlines, water injection pipelines and powerlines are hooked up to the well which is then put into service.
- The pad size is then reduced to the minimum required for safe and efficient well workovers, with the reclaimed land rehabilitated to agricultural use and returned to the land pool of the village within whose boundaries the pad lies.

## 4.2 Land Acquisition and Management

The use of land for the Infill Drilling Program is governed by the overall principles set out in the EMP (including the CRCP), and as detailed in the LUMAP and the Land Management Manual.

Each of these documents has been developed to address Project, World Bank and IFC requirements, focussing on: setting Project standards to follow; putting into place Project operational processes and procedures to ensure these standards are met adequately; and monitoring on a regular basis. Project activities that ensure standards, processes, procedures and actions are followed also build and strengthen relationships with Project stakeholders and ensure that the “licence to operate” approach is entrenched in everyday activities. (Enhancement of these positive outcomes could result from the implementation of various suggested actions which are presented in section 7 of this report.)

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## 5 Impacts

Impacts due to the infill drilling are examined in the context of the extensive prior impact assessment processes for the Project.

As noted in Section 4, the drilling and associated activities for the continuation of infill drilling in the Komé and Bolobo fields are similar to previous Project drilling programs. Consequently, the type of impacts that will result will also be little different from those considered as part of the prior impact assessment processes. However, the scale and intensity of the impacts may change.

### 5.1 Relevance of Chad Export Project impacts to the Infill Drilling Program

The EAESU provides an overview of key impacts and mitigation measures for the Chad Export Project in both Chad and Cameroon. Those impacts applicable to the Project in Chad are listed below (where direct quotes from the EAESU are presented in italics), and their relevance to the Infill Drilling Program is evaluated, based on the following criteria:

**Not relevant** – the impact is indirect (and therefore the responsibility of the Government of Chad and/or the World Bank, rather than EEPCI), or the Infill Drilling Program will not induce incremental effects.

**Relevant** – the Infill Drilling Program will induce incremental effects of a similar type and at similar levels to those already induced by the Project.

**Directly relevant** – the Infill Drilling Program has the potential to induce incremental effects of a type and scale not previously induced by the Project.

#### Oil Spill Prevention and Response

**Impact/Issue:** *There is a concern that an oil leak or spill could occur.*

**Relevance:** The Infill Drilling Program has the similar potential to result in oil spills as did previous drilling for the Project. While the Infill Program will not increase the overall level of oil production beyond that originally envisaged for the Project it will have the potential to increase the overall production of liquids, comprising oil and produced water. As these liquids are commingled before separation the Infill Program has the potential to result in the production of greater quantities of oily liquids than were previously expected. This impact/issue is therefore assessed to be **directly relevant**.

#### Benefit and Cost Analysis

**Impact/Issue:** *World Bank Operational Directive 4.01 suggests that projects quantify the relative benefits and costs, including the environmental costs, of the project.*

**Relevance:** A benefit and cost analysis (including environmental costs) was conducted for the overall Project. A similar analysis of the Infill Drilling Program is not considered to be necessary as the principal environmental costs are captured in the mitigations associated with the impacts to the human environment. This impact/issue is therefore considered to be **not relevant**.

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### Revenue Management Plan

**Impact/Issue:** *There is a need to ensure that Chad has the capacity to manage its oil revenues for the long term and for the benefit of the citizens of Chad.*

**Relevance:** This issue/impact is indirect, and therefore considered to be **not relevant**.

### Regional Development Plan

**Impact/Issue:** *The concentration of Project activity in the oilfield area may create indirect impacts in the Doba Basin area.*

**Relevance:** This issue/impact is indirect, and therefore considered to be **not relevant**.

### Community and Worker Health

**Impact/Issue:** *As with any large industrial project in a remote area, the potential exists for health impacts such as accidents or the sharing of diseases between local populations and the workers.*

**Relevance:** Community and worker health impacts from the Infill Drilling Program will be comparable in scale, scope and size to those that are currently being experienced, and for which a range of mitigation measures have been adopted. This impact/issue is therefore assessed as being **relevant**.

### Compensation Principles

**Impact/Issue:** *Construction will require temporary clearing of land and, in some cases, long term land use by Project facilities. This land use will potentially have a disrupting effect on agriculture and subsistence food gathering.*

**Relevance:** **Directly relevant**, as not only will the Infill Drilling Program require further temporary and long term land use by Project facilities, but it is also increasing the intensity of Project land use.

### Compensation and Resettlement in Chad

**Impact/Issue:** *Project oilfield and pipeline facilities will require construction in some agricultural areas, causing the land users to lose the use of their land. In some cases (no more than 150 households) residents of the oilfield area will be resettled.*

**Relevance:** **Directly relevant**, as the increased land requirements for the Project mean more than 150 households have been made eligible for resettlement compensation. The Infill Drilling Program will result in more households becoming eligible for resettlement compensation.

### Waste Management

**Impact/Issue:** *The Project will generate a variety of waste that must be disposed of properly.*

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**Relevance:** Infill drilling will result in the continued generation of waste streams of a type and scale consistent with those resulting from prior Project drilling activities. This issue/impact is therefore considered to be **relevant**.

#### Decommissioning

**Impact/Issue:** *At Project end it will be necessary to decontaminate and dispose of Project facilities and pipelines.*

**Relevance:** Infill drilling results in an increase in the amount and volume of Project facilities and pipelines that will eventually need to be decommissioned. However, the scope and scale of the decommissioning task is not expected to differ significantly from that originally envisaged. Therefore, this issue/impact is considered **relevant** to the current assessment.

#### Management Plan for Cultural Properties

**Impact/Issue:** *It will be necessary to protect cultural properties during construction and operation of the Project.*

**Relevance:** Infill drilling will result in the continued potential for impacts to cultural properties, of a type and scale consistent with those resulting from prior Project drilling activities. This issue/impact is therefore considered to be **relevant**.

#### Greenhouse Gasses

**Impact/Issue:** *As the Project develops petroleum, its produced oil will lead to emissions of two greenhouse gasses, carbon dioxide and methane.*

**Relevance:** A greenhouse gas emissions study was conducted as part of the Project's environmental assessment process. It concluded that:

- Within the Project area, it is estimated that emissions from Project facilities and operations will be less than half the amount that would be expected from a 500 MW natural gas-fired generating plant.
- The study also included an estimate of emissions as a result of transporting, processing and consuming the extracted oil once it reaches world markets. Approximately 0.0055 million metric tons of methane and 10.95 million tons of carbon dioxide will be generated annually. This represented a tiny fraction (0.15%) of the total global annual carbon emissions at the time of study.

The Infill Drilling Program is not expected to result in incremental increases in the rate of generation of either of these two greenhouse gases, and therefore this impact/issue is **not relevant** to the current assessment.

#### Environmental Monitoring Plan

**Impact/Issue:** *There is a need to monitor the Project's environmental mitigation performance during the construction phase.*

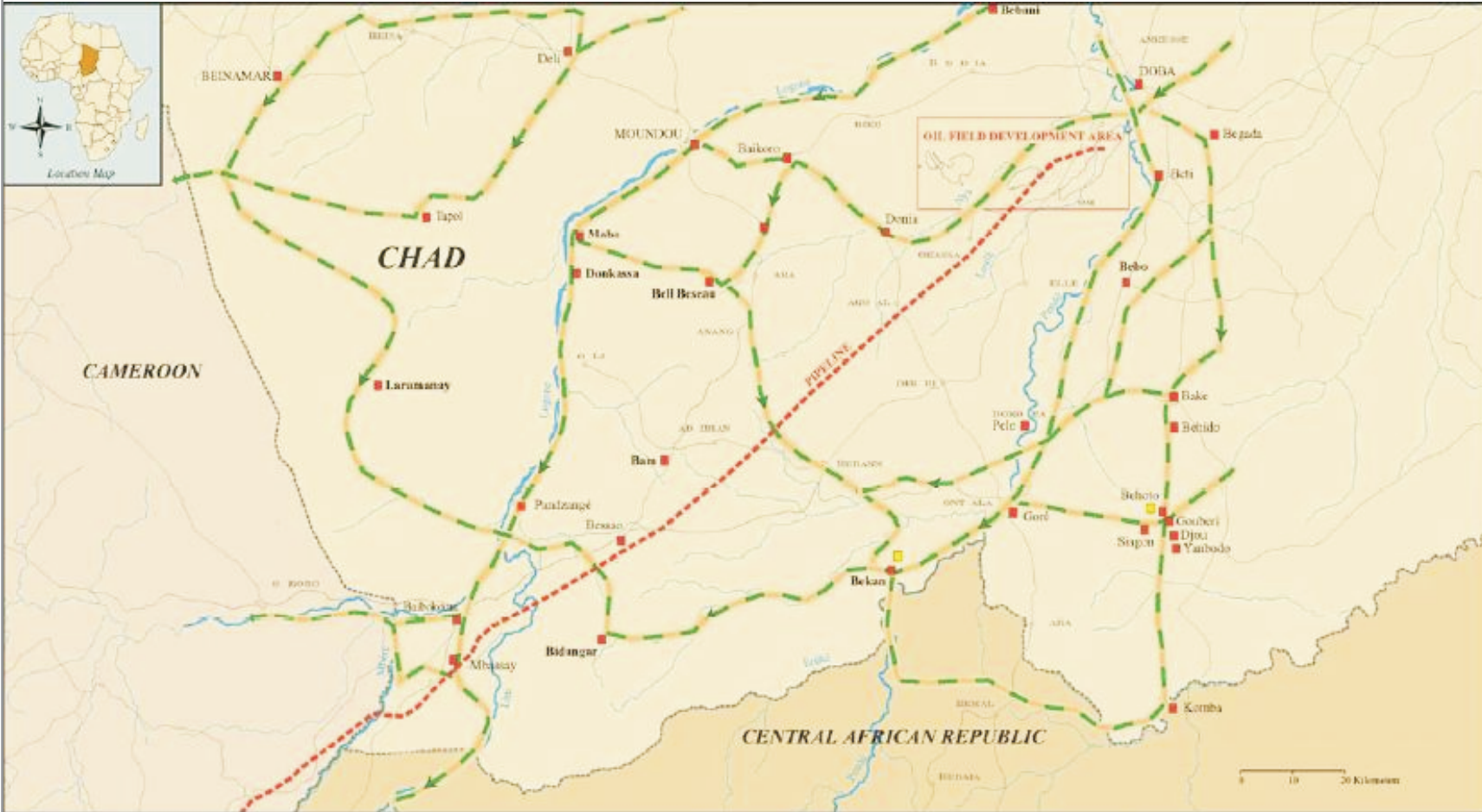
**Relevance:** Infill drilling will result in the continued potential for environmental impacts and will therefore require continued environmental monitoring. As the type and scale of the required monitoring is consistent with that which is currently being implemented this issue/impact is considered to be **relevant**.

### Bioclimatic Zone Impacts


The EAESU also defines Project impacts to the biophysical environment and the human environment by bioclimatic zone. The OFDA (and indeed the Project in Chad) lies wholly within the Wooded Savanna Zone, for which the relevant identified impacts are:

	<b>Original Impact/Issue</b>	<b>Current Relevance</b>
Human Environment	<i>Concentration of an estimated peak of 2,000 construction phase workers in the oil field area could cause a boom-bust effect as workers are released from construction.</i>	The next phase of infill drilling will not result in any significant variations to the Project workforce, and therefore will not produce any significant incremental impacts. <b>Not relevant.</b>
	<i>Extensive purchases in the local area during construction will decline at the end of the construction phase, potentially causing a boom-bust effect.</i>	The next phase of infill drilling will not result in any significant variations to the Project workforce, and therefore will not produce any significant incremental impacts in respect of boom-bust effects. <b>Not relevant.</b>
	<i>The concentration of hiring for construction at the oilfield area has the potential to draw migrants seeking jobs, individuals wishing to set up new businesses, as well as families who want to be with hired workers.</i>	The next phase of infill drilling will not result in any significant variations to the Project workforce, and therefore will not produce any significant incremental impacts in respect of in-migration. <b>Not relevant.</b>
	<i>The Republic of Chad will need to deal with some of the effects of migration into the Project area, even though the government does not yet have the institutional capacity to manage these effects.</i>	The next phase of infill drilling will not result in any significant variations to the Project workforce, and therefore will not produce any significant incremental impacts in respect of in-migration. <b>Not relevant.</b>
	<i>Some resettlement will be required in the oilfield area (no more than an estimated 150 households).</i>	<b>Directly relevant.</b>
	<i>Construction activities will cause short term (approximately 3 months) disruption of agriculture as construction proceeds.</i>	<b>Directly relevant.</b>


	<b>Original Impact/Issue</b>	<b>Current Relevance</b>
	<i>Construction activities have the potential to interfere with seasonal migrations of transhumant cattle herds going to market. Many of the migrant herder routes in the Project area are located in the Wooded Savanna Zone. (See Figures 6 &amp; 7)</i>	In the EMP (original document), this comment pertained to the export pipeline corridor only. Nevertheless, potential adverse impacts of the Infill Program on the transhumant populations were reviewed as part of the current assessment. <b>Relevant.</b>
<b>Biophysical Environment</b>	<i>The pipeline makes five crossings of major rivers in the Wooded Savanna Zone, including the Nya, Loule, Lim, and Mba rivers. It crosses the Mbéré River twice. These waterways could be contaminated if an oil spill event were to occur in their vicinity.</i>	<b>Directly relevant.</b>
	<i>Oil in the Doba Basin will contain a significant percentage of water that must be extracted from the crude oil before shipment in the pipeline. It will be necessary to safely dispose of this water.</i>	<b>Directly relevant.</b>
	<i>Biological field research has identified a need to protect some IUCN-listed species that are known or have the potential to occur in some areas of the Wooded Savanna Zone of the Project area. Some of these species include elephant, hippopotamus, bushbuck, kob, waterbuck, reedbuck, red-flanked duiker and oribi.</i>	<b>Directly relevant.</b>
	<i>The oilfield will have air quality impacts from power plant engines and a topping plant, from the venting/flaring of hydrocarbons and from the oilfield area waste incinerator</i>	Infill drilling will result in continued air quality impacts, of a type and scale consistent with those resulting from prior Project drilling activities. This issue/impact is therefore considered to be <b>relevant</b> .
	<i>The trenching process of burying the pipeline will disturb topsoil, potentially reducing the growing capability of the pipeline easement when it is turned back to public use following construction.</i>	This impact/issue is focussed on the Project export pipeline. On the understanding that the Project will continue to apply EMP-compliant topsoil handling and rehabilitation measures as part of the construction of flowlines and pipelines this impact/issue is considered to be <b>not relevant</b> to the current assessment.



LEGEND	
	Pipeline
	Pastoral Routes
	International Boundaries
	Villages Situated on Pastoral Routes
	Pastoral Wells


**ESSO Exploration and Production Chad Inc.**

**TRANSHUMANT PASTORALIST ROUTES**  
 DESCENT FROM NORTH TO SOUTH  
 (NOVEMBER THROUGH JANUARY)


**FIGURE 6.2-4**

Scale **As shown**

Title **Figure 6**

Project **Chad Export Project**

Site **Komé and Bolobo Oil Fields, Chad**

Client **Esso Exploration & Production Chad Inc Chad**

Date <b>December 2008</b>	Drawn by <b>DM</b>
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- Pastoral Wife



**ESSO** ESSO Exploration and Production Chad Inc.

**TRANSHUMANT PASTORALIST ROUTES**  
ASCENT FROM SOUTH TO NORTH (MAY THROUGH JULY)



FIGURE 6.2-5

Scale **As shown**

Title **Figure 7**

Project **Chad Export Project**

Site **Komé and Bolobo Oil Fields, Chad**

Client **Esso Exploration & Production Chad Inc Chad**

Date <b>December 2008</b>	Drawn by <b>DM</b>
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Project No. <b>61-C14017</b>	Approved
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Impacts relevant to the current assessment are therefore as follows:

- Oil spill prevention and response
- Community and Worker Health
- Compensation Principles
- Compensation and Resettlement in Chad
- Waste Management
- Decommissioning
- Management plan for cultural properties
- Environmental monitoring plan
- Construction impacts to agriculture
- Construction impacts to transhumance
- Disposal of produced water
- Protection of IUCN-listed species in the OFDA
- Air quality

## **5.2 Significance of Impacts**

A common set of significance criteria has been adopted for previous Project assessments, including the original Chad EA and the later assessments of the Maikeri (Poutouguem) and Nya/Moundouli Projects, as follows:

- Beneficial – Beneficial impacts result in some improvement, or positive or desirable effects on the environment or future conditions of a resource or economy.
- Less than significant – These impacts would cause no substantial economic or environmental change to the resource; it is recognized that a low level of impact may remain. No mitigation is required for this type of impact. This category also includes impacts for which mitigation measures have been incorporated into the design and construction of the Project (Project design measures) reducing them to less-than-significant levels.
- Significant but mitigable – A significant but mitigable impact has the potential to cause a substantial, adverse change in the economy or environment it affects; however, mitigation measures can be implemented to reduce (but not necessarily eliminate) the impact and to render it less than significant.
- Significant and unavoidable – These are impacts that have the potential to cause a substantial adverse change in the economy or environment they affect, and for which no mitigation measures lessen the severity of the impact to a less-than-significant level.

Based on these criteria, the impacts listed above as being relevant to the Infill Drilling Program are assessed as significant but mitigable.

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## 6 Mitigations

All Project impacts identified in the Project environmental documentation are the subject of existing mitigation actions, including those discussed in section 5 of this assessment. These mitigations are summarised below for those impacts assessed as being 'relevant' to the Infill Drilling Program. This section also assesses the adequacy of the mitigation to address the incremental impacts of the Infill Drilling Program. (As in section 5 of this report, direct quotes from the EAESU are presented in italics.)

### Oil Spill Prevention and Response

**Impact/Issue:** *Risk that an oil leak or spill could occur.*

**Existing mitigation:** *Design the Project with an emphasis on preventing oil spills. Develop an Oil Spill Response Plan. Conduct contingency planning and perform drills that will maintain constant readiness in case a spill does occur.*

**Evaluation of adequacy of existing mitigation:** Based on the reports of the ECMG the oil spill prevention and response provisions for the OFDA have been adequate to date (notwithstanding some recommendations made in the ECMG report of the December 2009 site visit in respect of investigations and documentation associated with spill events). These provisions have been designed for the production and transportation of volumes of oil that are substantially greater than those currently being handled in the OFDA. The objective of the Infill Drilling Program is to produce oil at rates closer to those originally envisaged, and for which the existing oil spill prevention and response measures were designed. While the existing measures are assessed as being **adequate** for the Infill Drilling Program, EEPIC has committed to conduct a review of the oil spill prevention and response planning for the Project and, if required, to update these strategies in response to the infill drilling activities.

### Community and Worker Health

**Impact/Issue:** *As with any large industrial project in a remote area, the potential exists for health impacts such as accidents or the sharing of diseases between local populations and the workers.*

**Existing mitigation:** *The Project has developed mitigation plans to help protect community and worker health and safety including: community health outreach; confronting AIDS and other STDs; other disease prevention; and accident prevention.*

**Evaluation of adequacy of existing mitigation:** Community and worker health impacts are regularly monitored by ECMG, which then provides recommendations for improvement. On the understanding that ECMG's remit will include infill drilling as part of all Project drilling activities and assuming the Project will continue to respond to ECMG's recommendations for improvements regarding community and worker health, this impact/issue is **evaluated and further information presented in section 6.1.1 of this report.**

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### Compensation Principles

**Impact/Issue:** *Construction will require temporary clearing of land and, in some cases, long term land use by Project facilities. This land use will potentially have a disrupting effect on agriculture and subsistence food gathering.*

**Existing mitigation:** *A set of general compensation principles has been adopted to guide the development of the Compensation and Resettlement Plan for Chad*

**Evaluation of adequacy of existing mitigation:** The adequacy of the existing mitigation in respect of compensation principles to deal with infill drilling is **evaluated and further information presented in section 6.1: Resettlement and Compensation Plan**, of this report.

### Compensation and Resettlement in Chad<sup>4</sup>

**Impact/Issue:** *Project oilfield and pipeline facilities will require construction in some agricultural areas, causing the land users to lose the use of their land. In some cases (no more than 150 households) residents of the oilfield area will be resettled.*

**Existing mitigation:** *The Compensation and Resettlement Plan for Chad provides monetary and in-kind compensation for loss of crops and other resources. The Plan also provides for compensation and assistance in situations where a householder may need to relocate.*

*As a practical matter, the vast majority of the land will be affected only for an approximate three-month construction period and usage for most purposes will be returned after completion of construction.*

**Evaluation of adequacy of existing mitigation:** The adequacy of the existing mitigation in respect of compensation principles to deal with infill drilling is **evaluated, in detail, in section 6.1: Resettlement and Compensation Plan**, of this report.

### Waste Management

**Impact/Issue:** *The Project will generate a variety of waste that must be disposed of properly.*

**Existing mitigation:** *Waste Management Plans have been developed to manage and monitor the disposal process.*

**Evaluation of adequacy of existing mitigation:** Waste management impacts and mitigations are regularly monitored by ECMG and recommendations are made for improvement. On the understanding that ECMG's remit includes all Project drilling activities, including infill drilling, and assuming the Project will continue to respond to ECMG's recommendations for improvements in respect of waste management, this impact/issue is assessed as **adequately addressed**.

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<sup>4</sup> As noted above, all italicised script is a direct quotation from the 1999 EAESU.

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### Decommissioning

**Impact/Issue:** *At Project end it will be necessary to decontaminate and dispose of Project facilities and pipelines.*

**Existing mitigation:** *A Decommissioning Plan will be developed to manage and monitor the decontamination and disposal processes.*

**Evaluation of adequacy of existing mitigation:** The scope and scale of the decommissioning task for the Project, as a whole, is not expected to differ significantly from that originally envisaged. Therefore, provided that the Project allows for the incremental increase in Project facilities resulting from infill drilling when considering the decommissioning process, this issue/impact is assessed as **adequately addressed**.

### Management Plan for Cultural Properties

**Impact/Issue:** *It will be necessary to protect cultural properties during construction and operation of the Project.*

**Existing mitigation:** *Management Plans for Cultural Properties have been developed and the EMP Department has contracted an archaeological consulting firm, which conducts an appropriate survey of sites before construction to identify all cultural property.*

**Evaluation of adequacy of existing mitigation:** Mitigation of impacts on cultural property is regularly monitored by ECMG and recommendations are made for improvement. On the understanding that ECMG's remit includes all Project drilling activities, including infill drilling, and assuming the Project will continue to respond to ECMG's recommendations for improvements regarding the management of cultural property, this impact/issue is assessed to be **adequately addressed**.

### Environmental Monitoring Plan

**Impact/Issue:** *There is a need to monitor the Project's environmental mitigation performance during the construction phase.*

**Existing mitigation:** *An Environmental Monitoring Plan has been developed to manage the biophysical, socioeconomic and health aspects of the Project's construction phase activities.*

**Evaluation of adequacy of existing mitigation:** A wide-ranging program of environmental monitoring has been underway since the beginning of Project construction and will continue throughout Project operations. One element of this program is the monitoring undertaken by ECMG. On the understanding that the existing program of monitoring includes: all Project drilling activities (including infill drilling), and that the program will continue to be implemented throughout Project operations, this impact/issue is assessed as being **adequately addressed**.

### Bioclimatic Zone Impacts: Biophysical and Human

The EAESU also defines Project impacts to the biophysical environment and the human environment by bioclimatic zone. The OFDA, and indeed the Project in Chad, lies wholly within the

Wooded Savanna Zone, for which the identified impacts and mitigations are presented in the following table:

	<b>Impact/Issue</b>	<b>Mitigation</b>	<b>Evaluation of adequacy of existing mitigation</b>
<b>Human Environment</b>	<i>Some resettlement will be required in the oilfield area (no more than an estimated 150 households).</i>	<i>The Compensation and Resettlement Plan for Chad provides for replacement dwellings and other compensation, including assistance during relocation in compliance with World Bank OD 4.30.</i>	The adequacy of the existing mitigation in respect of compensation principles is <b>evaluated, in detail, in section 6.1: Resettlement and Compensation Plan.</b>
	<i>Construction activities will cause short term (approximately 3 months) disruption of agriculture as construction proceeds.</i>	<i>The Compensation and Resettlement Plan for Chad provides for monetary and/ or in-kind compensation in compliance with World Bank Group guidelines.</i>	The adequacy of the existing mitigation in respect of compensation principles is <b>evaluated, in detail in, section 6.1: Resettlement and Compensation Plan.</b>
<b>Biophysical Environment</b>	<i>Oil in the Doba Basin will contain a significant percentage of water that must be extracted from the crude oil before shipment in the pipeline. It will be necessary to safely dispose of this water.</i>	<i>Reinjection wells will be constructed and used to return the water to the strata from which it was originally drawn.</i>	The existing measures are assessed as <b>adequate</b> for the Infill Drilling Program.

	Impact/Issue	Mitigation	Evaluation of adequacy of existing mitigation
	<p><i>Biological field research has identified a need to protect some IUCN-listed species that are known or have the potential to occur in some areas of the Wooded Savanna Zone of the Project area. Some of these species include elephant, hippopotamus, bushbuck, kob, waterbuck, reedbuck, red-flanked duiker and oribi.</i></p>	<p><i>Environmental Alignment Sheets have been prepared, prescribing site-specific species protections. These protections include preconstruction surveys for listed species, monitoring for listed species during construction activities and site-specific environmental awareness training for workers. Project policy prohibits hunting and fishing by workers during working hours, on Project work sites or while living in company housing. Project workers are also prohibited from possessing firearms, snares and other hunting equipment when on Project work sites or while living in company housing.</i></p>	<p>The existing measures are expected to be <b>generally adequate</b> for the Infill Drilling Program. <b>Additional mitigation measures</b> (see section 6.2) <b>should be implemented</b> in respect of the riverine lowlands where incremental impacts are expected as part of the compensation and resettlement provisions discussed in <b>section 6.1: Resettlement and Compensation Plan.</b></p>
	<p><i>The oilfield will have air quality impacts from power plant engines and a topping plant, from the venting/flaring of hydrocarbons and from the oilfield area waste incinerator.</i></p>	<p><i>The Project facilities have been designed in accordance with the air quality standards of the World Bank Group and other internationally accepted organizations.</i></p> <p><i>Venting/flaring of natural gas will only occur in the event of emergency/upset situations. Although the amount of produced natural gas will be small from this oilfield, the produced gas will be routinely recovered and used as a supplemental fuel source for the oilfield development area power generating plant.</i></p> <p><i>The Waste Management Plan will help reduce emissions by specifying appropriate measures for operating incinerators</i></p>	<p>Impacts on air quality are regularly monitored by ECMG and recommendations are made for improvement. On the understanding that ECMG's remit includes all Project drilling activities, including infill drilling, and assuming the Project will continue to respond to ECMG's recommendations for improvements in respect of air quality, this impact/issue is considered to be <b>adequately addressed.</b></p>

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## 6.1 Resettlement and Compensation Plan

The adequacy of current EMP Chad Resettlement and Compensation Plan mitigations for possible incremental social impacts have been considered based on information gathered on the following issues, using various methods:

- At Risk individuals/households – Community and household visits within Komé and Bolobo infill areas, individual survey visits, “red flag” file review<sup>5</sup>.
- Sustainability of livelihoods – Review of Resettlement Options, NGO meetings, reconnaissance of OFDA and infill areas, and Socio-economic database review (i.e. Market Price Information); field work including interviews and land area review with households.
- Potential additional impacts of Project land use on village land resources – Includes LUMAP processes, EMP-IS data, queries and reports, reconnaissance trips within the OFDA, infill areas and other rural/urban areas, and Socio-economic database review<sup>6</sup>.
- Dry Land Agricultural production – Crop viewings in reclaimed areas, ongoing agricultural production, feedback from Socio-economic and LUMAP team members.
- Individual/village/community resources – Meetings with LCCs, reconnaissance of OFDA and infill areas, and meetings with local government representatives.
- Access to resources – Meetings with LCCs, reconnaissance of OFDA and infill areas, and meetings with local government representatives.
- Potential for relocation – Meetings with LCCs, reconnaissance of OFDA and infill areas, and meetings with local government representatives.
- Host Communities – Meetings with LCCs, reconnaissance of OFDA and infill areas, meetings with local government representatives, and feedback from Socio-economic and LUMAP team members.
- Community Safety – Meetings with LCCs, reconnaissance of OFDA and infill areas, meetings with local government representatives, and feedback from Socio-economic and LUMAP team members.
- Vulnerable groups (gender, age, skill, ethnicity) – Community and household visits within Komé and Bolobo infill areas, individual survey visits, “red flag” file review, feedback from Socio-economic and LUMAP team members, feedback from JMN, the EEPCI consultant working on resettlement, meetings with NGOs who are giving resettlement training on behalf of EEPCI (prior to and post training).
- Community consultation and engagement – Meetings with LCCs, reconnaissance of OFDA and infill areas, meetings with local government representatives, and Socio-economic database review (i.e. Consultation).

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<sup>5</sup> For a further discussion of the “red flag” function of the EMP Information Systems Database (EMP-IS) refer to section 6.1.2.4 of this report.

<sup>6</sup> Reports include: Market Surveys (inflation tracking), Public Consultation, Local Business Opportunities, Individual and In-Kind Compensation, and Resettlement among others.

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Two field visits were conducted in and around the OFDA in November 2008 and November 2009. Several Households were met with and many were either known directly and/or had family members who knew the social specialist from previous work on the Project<sup>7</sup>. Throughout completion of the field work, the most efficient approach was to use adaptive management for the usual incremental impact methodological steps when completing this assessment<sup>8</sup>. This approach assisted with the process and final findings.

### **6.1.1 Community and Worker Health (Community Safety)**

The Community Safety assessment was developed while completing meetings with LCCs; undertaking reconnaissance of OFDA and infill areas; conducting meetings with local government representatives; gathering feedback from the Project, Socio-economic and LUMAP team members; reviewing EEPCI's and TOTCO's Safety, Health and Environment Risk Matrix; and reviewing appropriate benchmarking documents.

**Findings:** Community safety aspects are being addressed through various Project mechanisms discussed in the EMP, LMM and LUMAP, and as a result of EEPCI's and TOTCO's Risk Matrix focusing on Safety, Health and Environment (SHE) as well as various Business considerations. In addition, comments provided by ECMG on Community Safety are being considered.

EEPCI is highly cognisant of the importance of community safety. Safety and risk management is highly valued by EEPCI and lessons are learned from previous (historic and ongoing) Project activities. The involvement of field personnel, particularly the LCCs and the appropriate Socio-economic and LUMAP team representatives, is particularly important in this regard.

#### **Recommendation:**

**Continue to reinforce and encourage the importance of Community Safety at various EEPCI EMP established weekly meetings. Ensure that ExxonMobil's Operations Integrity Management System (OIMS) is followed including completion of required SHE Risk Assessments. At these assessments follow normal protocol with representatives from the EEPCI EMP Department, including representatives from the Socio-economic and LUMAP teams, to ensure an integrated approach to stakeholder**

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<sup>7</sup> The social specialist worked on the Chad Export Project in both Chad and Cameroon from 1998 to 2001. Since this time she was not involved in the Project; however, she kept up-to-date on external Project documentation; remained in contact with Chadian Project personnel; and was involved in another exploration Project in Chad (EnCanaChad). Her breadth and depth of knowledge and understanding of Chad including Chadian culture, rural and urban approaches to livelihoods, community development, practical resettlement options, national MDGs, and overall social well-being elements is extremely strong.

<sup>8</sup> Steps may include the following: Definition of the Base Case, Definition of Options and Marginal Improvements, Estimation of Costs and Time Frames, Segmentation of Benefits, Segmentation of Users, Segmentation of Industry, Estimation of Marginal Benefits by User Segment and Industry Segment, Estimation of Marginal Benefits. The initial part of the study focused on the preliminary steps to gather data on the base case and to define the options and marginal improvements.

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**management, that lessons learned and other relevant elements are considered and weighted in an appropriate manner.**

**Disseminate information from this assessment widely among the LUMAP and Socio-economic representatives attending all planning meetings with EEPCI construction personnel and/or other EEPCI EMP representatives.**

**Continue to use information conveyed from these meetings to enhance safety outreach meetings with communities and PAPs within the areas.**

**Continue to ensure Project activity schedules are made clear to all levels within Socio-economic & LUMAP teams so proper planning for safety consultation and information sessions with PAPs are aptly executed.**

### **6.1.2 Compensation Principles, Compensation and Resettlement**

For the purposes of this assessment, the overall Philosophy, Goals and Objectives of the Chad Resettlement and Compensation Plan were considered; these were reiterated in the LUMAP<sup>9</sup>. The following section presents the philosophy, goals and objectives of the Plan; links these with initial findings; and presents recommendations. Further, the B&K report and the EEPCI data analysis (June 2009/update December 2009) are the major source material for the socio-economic findings of this Report. The EEPCI data analysis can be found in Annex D.

#### **6.1.2.1 Chad Resettlement and Compensation Plan Project Statements:**

*Construction activities will cause short term (approximately 3 months) disruption of agriculture as construction proceeds.*

*Construction activities have the potential to interfere with seasonal migrations of transhumant cattle herds going to market. Many of the migrant herder routes in the Project area are located in the Wooded Savannah Zone.*

#### **6.1.2.2 Resettlement and Compensation Plan Philosophy (Philosophical Goals)**

*The local population sees the compensation as fair and equitable based on:*

- *Local African Cultural Values:*

The B&K report notes (pp.6-19) the CRCP is not consistent with certain cultural elements especially with regard to patterns of fallow usage and inheritance.

The payment of community compensation rather than individual compensation for fallow land was purposefully completed in accordance with the CRCP in order to integrate feedback from the local population so as to address conflicting cultural elements within the society itself. The population by consensus and particularly the local and regional authorities proposed and supported the notion of

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<sup>9</sup> Land Use Mitigation Action Plan, Project Compensation and Resettlement Program, EMP Compensation and Resettlement Goals, p. 6.

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community compensation for fallow land as the best way of resolving internal cultural contradictions with the least conflict.

As Annex D demonstrates, some land holders have “very large” tracts of land that form part of a family land pool over which a particular land holder has rights of disposal amongst family members. Theoretically, this family land pool is accessible to the potentially vulnerable young male and/or female headed households. The reality is that without previous knowledge of this cultural norm, it is difficult to fully appreciate the complexity of this process including the various rights and procedures for accessing this family land. There are residual rights and access procedures and there is also the technical possibility of using excess land to resolve actual or potential situations where “vulnerable” persons have insufficient land. This technical possibility does not translate well into a practical approach. As a result of the hierarchy of residual rights in land and the transfer of land outside the family, there is a very strong inherent possibility that conflict over access to a particular piece of land will occur. For this reason the general consensus of the affected population is that any land over which residual rights could be contested (including land subject to direct requests from local chiefs and regional authorities), should be a part of community compensation. Hence, to avoid potential discrepancies over land not clearly being cultivated by one known individual, compensation is for all persons holding residual rights rather than just one individual. If individual compensation were given, individuals with more “traditional” and/or physical power would potentially gain more<sup>10</sup>. By implementing this community compensation approach, the Project is proactively managing the potential adverse impacts on vulnerable persons. It is also advocating the importance of all individuals within the community and their right to access community compensation assets.

During Project construction the issue of paying individual rather than community compensation for fallow land was a contentious issue with both NGOs and with the individuals who claimed that land not visibly cultivated was theirs. The CRCP distinction between individual compensation paid to land users and community compensation to the potential users of land currently out of cultivation was determined by the population and agreed to by the Project. Any intra-societal contentions over compensation payments are, as per the CRCP, dealt with by traditional and regional authorities as the Project cannot be involved in resolving internal cultural conflicts.

It must also be noted that legally the Government of Chad owns all the land and that customary users are to be paid only for the value invested. In order to respect the national law, the Project cannot pay individuals for land which they have not fructified. In this case, both the local consensus and national law coincide.

*-People receiving what is perceived as fair*

On the issue of fair and equitable compensation, the B&K report observed that the Project Affected Persons (PAPs) surveyed believed their compensation rates were fair (pp 6-14). Based on this finding and the fact that the Project annually reviews and updates compensation rates (which are based on market rates) and uses the Project’s inflation monitoring data<sup>11</sup>, there is no evidence that

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<sup>10</sup> This use of power has also been attempted in appropriating rights to land in cultivation; the farmer fears to contest the more powerful person’s claims. The EMP-IS mapping procedures obviate this possibility.

<sup>11</sup> The inflation monitoring system was first formally put into place in 2000; data is gathered from several markets in and around the OFDA.

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the population's assessment will change as a result of the Infill Program. Rather, as LUMAP continues to implement the information surveying process and database compilation, the EMP compensation group will continuously use and integrate information received during their various consultative sessions with the PAPs.

Further to the issue of compensation, the B&K report states that community compensation has not always been transparent; noting that a community's comprehension of the community compensation plan has not always been sufficient (pp 6-19). To clarify the qualifying criteria and level of community compensation the EMP adopted the policy, much aided by the EMP-IS, of basing the amount of community compensation (always paid in-kind to ensure that the entire community has access) on: *the amount of land surrendered by the village out of the total of all land used by that particular Project*. It is also apparent that for the majority of the community compensation choices, the PAPs are using these community assets on a continuous basis. Social indicators show that there has been a positive step change in their value system<sup>12</sup>.

What is very important to highlight is the feeling of "lack of trust" towards the World Bank and its affiliates due to their "non involvement"<sup>13</sup> in the execution of the 5% community and urban development Projects. On several occasions, the level of frustration communicated was intense. They made it very clear that EEPCI had come through with the community compensation assets. They use these assets on a frequent basis and were positive about their establishment. They felt the World Bank let them down. They knew about the link between the World Bank and IFC and understood it as a subsidiary of the World Bank. They do not see them as separate organizations as they are able to use the internet and see the links between these organizations. From a rapid appraisal, there appeared to be no 5% Projects directly in the OFDA although some results of the 5% Projects were seen in nearby urban centers (i.e. Doba)

The report also referred to the unfair "custom/norm" of local chiefs exacting a portion of the individual compensation from recipients. This practice was never condoned by EEPCI, who cancelled payments where it became clear that this payment was being demanded and was, at the behest of the International Advisory Group (under World Bank Group auspices), outlawed by the President of Chad. Nevertheless, from time to time the practice reappears and the population continues to think it unfair (not of EEPCI but of the authorities).

*-Compensation is as transparent as possible*

Individual compensation rates are based on a formula that weights the various areas of land under production in the Project area and multiplies this by the highest market price reached during the previous year. Should this price be lower than a price paid in earlier years, the higher price is used for calculating compensation. This formula is included in the CRCP and the monthly changes in market prices are posted outside the Local Community Contacts' offices. No grievances have been registered about compensation rates, only over miscalculations and, less frequently, over items which are considered worthy of "compensation" (in the latter case a specific market survey is

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<sup>12</sup> Children's attendance levels have gone up. Children wear uniforms to school which was not financially possible before. Children attended school the day after a National holiday; whereas previously often the children would stay away for a whole week or more.

<sup>13</sup> These were the words used by the PAPs themselves.

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undertaken to determine how often the item appears in the local “market basket” and whether it should be included).

Community compensation rates have been explained above. Their calculation is transparent; the only issue is whether the item compensated is fairly compensated to the community or to individuals.

The compensation process treats people and resources in exactly the same way wherever possible.

Based on this the Infill Program should not have any adverse effect on these philosophical goals.

**Findings:** The overall philosophical components are still being addressed and implemented by the LUMAP and Socio-economic teams; this process is proceeding well. , No adverse comments regarding these philosophies have been heard or received from local government authorities, PAPs, individuals within affected households or other community members. In addition, the LCCs are implementing the established grievance procedure. Based on information gathered thus far, the Infill Program should not have any adverse effect on these philosophical goals. By completing consultative sessions and analyzing the findings, EEPCI have implemented an approach that manages conflict and enables the management of issues and grievances (in addition to an established grievance mechanism). The Project follows international best practice with regards to consultation efforts. The Project grievance mechanism is handled in the field with the Local Community Contacts (LCCs) and various LUMAP and socio-economic field team members, and community concerns are addressed on a regular basis.

**Recommendation: Continue to enforce EMP and LUMAP philosophies and emphasise the importance of these elements.**

**Capture issues and/or grievances on a weekly basis, track them in the EMP IS and have a formalized close - out indicated within it. This action will assist the Project to further demonstrate their high level of activity with the PAPs and would assist with managing workloads. It may also assist with addressing Lender and/or IFC queries.**

**Review the grievance process on a bi-annual basis and amend as appropriate in order to adequately address the shift in development in the OFDA.**

#### 6.1.2.3 Resettlement and Compensation Plan Goals and Objectives - Compensation

*Affected people’s standard of living will not be less than their current conditions when compensation is complete.*

**Findings:** In many cases significant steps have been taken to ensure that affected individuals’ standard of living has not declined; indeed, in many cases it has improved. There are several socio-economic indicators, which support this outcome<sup>14</sup>. They include

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<sup>14</sup>The B&K report largely agrees with this finding. EEPCI’s data analysis is also in agreement presenting a strong example on (p 19). Further investigation has provided additional evidence to reinforce these findings.

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the change in value systems, especially with respect to health, education, and the more effective use of compensation – whether cash, in-kind or resettlement options. The Infill Program should have no effect on this element and should become stronger with the LUMAP’s implementation. LUMAP’s process and the Socio-economic team’s approach to working with the PAPs will also garner more positive results.

More specifically, according to the B&K report, monetary compensation had been “very effective” in restoring or enhancing Project affected people’s standard of living (about 25% of the cash compensation), namely: housing, education, health care, and productive assets such as cattle and farm equipment. Despite this positive assessment of monetary compensation, the report expressed a number of concerns. These concerns included the following:

- B&K wrote that people receiving compensation sometimes spent it on less productive items such as alcohol, bride price and prostitution. They did not, however, note the frequency of these expenditures. Nor did they note that expenditure on alcohol is a way in which cash (usually obtained by men in large lump sums) is recycled in the local economy to women who produce the alcohol and sell it to obtain a steady source of income to support their dependents. In many cases (information available from EMP-IS) the payment of bride price was for other kinsfolk to whom the compensation recipient had social/familial obligations which contributed to (from the sociological point of view) social reproduction and was therefore a critical productive investment.
- The B&K report recommended that compensation management classes be provided to recipients of monetary compensation. PAPs and other villagers have welcomed the Basic Business, Literacy and Arithmetic Training on business skills, now required of all vulnerable individuals in order to participate in skills training, and open to the entire population on a voluntary basis. Women especially have noted how these classes will help them manage their compensation and help them manage their husbands’ management of compensation. The results of these programs continue to be positive. Many choose to attend and impart knowledge gained to other family members. The carry-over effect is present in many household cases. As a result of the outcomes, further training options that create more opportunities for these households are in development<sup>15</sup> and will be focused to carry on from the existing training courses in order to build on already gained knowledge. The Project has encouraged the trainers to look into these options in an attempt to create longer and more viable sustainable situations for the households.

The LUMAP and Socio-economic teams have valued, and noted, the importance of continuously engaging with PAPs. Team members also appreciate the importance of working with the PAPs in order for these individuals to better understand the importance of managing cash compensation. As yet it is uncertain whether workshops, as per the B&K report (pp 6 - 30), would be an effective response to the opinions of several external and government stakeholders with respect to the misspending of compensation funds. Workshops are not necessarily the most effective approach within the Chadian culture; rather, continuous reinforcement at every opportunity may be more effective.

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<sup>15</sup> Meetings took place with the NGOs giving the resettlement courses and further course development was imparted to the Assessment team. The NGOs had obviously taken lessons learned and past knowledge to develop next stages for training. The information given was excellent.

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- The B&K report also noted that the standard of living increases resulting from one-off compensation payments would likely decrease with time. Being heavily dependent on subsistence agriculture, and noting that replacement land was difficult to find, the B&K report recommended that households having lost more than 20% of their land or were left with less than 2/3 corde per person be given assistance to find replacement land (pp8 – 14).

LUMAP did not adopt this recommendation in its entirety. The B&K report did not explain the basis for the 20% loss of land as a trigger for resettlement. A 20% loss of land from a land “trustee’s” holdings would probably have a very minimal impact on livelihood although it would ultimately reduce the circumstances of some residual rights holders. The use of 2/3 corde per HHM as the minimal amount of land per capita needed for a HH to produce adequate food and retain enough land in fallow to restore fertility, on the other hand, has been reinforced as a valid minimum according to many different indicators of viability.

Anyone who fell below 2/3 corde per HHM upon surrendering land to the Project, whether they were already at risk with less than 2/3 corde per HHM before Project land acquisition, or has been reduced to that level because of Project land needs, is eligible for resettlement. Since the amount of land per HHM is recalculated at each point an individual is compensated, someone previously compensated but agriculturally viable, will always be recalculated as to the most recent land acquisition. Anyone below 2/3 corde is immediately eligible for resettlement and is able to choose (in consultation with the family) among the various resettlement options. These options have been increased, through the LUMAP Management of Change process that is now incorporated into the EMP Land Management Manual. They include:

- Resettlement of the homestead and acquisition of adequate land in a new village
- Rainy season resettlement through creation of a farming homestead on adequate land within the same village
- Fulfilment of the two above, or simply of access to additional village land through 3rd party compensation
- Improved Agriculture Training in yield-increasing rain-fed technology and in off-season income-earning production
- In some cases, training in Off-Farm artisanal income earning skills.

In cases where the skills acquisition option is found to have been inadequate to restore livelihood after two years of monitoring, the eligible individual is automatically returned to the default position of 2/3 corde per HHM so that the HH can continue as a viable agricultural unit. In cases of skills training where, after 1 year the trainee is close to or has just managed to re-establish the previous level of livelihood, skills reinforcement training is instituted. If this reinforcement is not enough, then at the end of the 2nd year, the Project undertakes to provide the person with the 2/3 corde of land livelihood minimum.

The B&K report found that in one of the three villages they surveyed there was not enough replacement land due to Project impacts. The Village Land Surveys have subsequently shown that there are no villages in the OFDA which lack land; the issue is finding a way in which land-poor individuals/HHs can access some of the land held by others. To accomplish

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this, the LUMAP team instituted various land access measures which have been included in the revised EMP Land Management Manual.

**Recommendation: Continuously engage with PAPs via LCCs, LUMAP and Socio-economic team representatives. Ensure the Socio-economic team representatives continue to work as an integrated team with LUMAP & EMP team members. Ensure feedback from PAPs with respect to grievances; concerns should be brought forth and addressed in weekly LUMAP and EMP meetings. These grievances should be closed out by LCCs and, if warranted, socio-economic managers. As stated in the recommendation pertinent to “Compensation is as transparent as possible”, capturing issues and/or grievances on a weekly basis, tracking them in the EMP IS and having a formalized close-out reported within it will assist the Project to further demonstrate their high level of activity with the PAPs and would assist with managing workloads.**

**Review the grievance process on a bi-annual basis and amend as appropriate in order to adequately address the shift in development.**

*Both holders of legal title to land and traditional land users are compensated.*

**Findings:** This is occurring and has been well established for many years. The LUMAP team is taking the extra steps required to ensure this continues. Government representatives must ensure this is tracked; they would be the first to register a grievance and/or follow-up with either a LUMAP and/or Socio-economic team member. In particular, it is essential the LCCs follow-up on any grievances that may occur as a result of landholders feeling they have not been compensated fairly.

The addition of the Infill Program will not have an adverse impact on this goal.<sup>16</sup>

In the context of land acquisition and compensation, an entitlement matrix was completed that summarizes the entitlements of affected people as per the existing CRCP<sup>17</sup>. The matrix was not included in the CRCP because the concept of a resettlement matrix had not yet matured within the World Bank Group when the CRCP was developed. Nor, therefore, was it a requirement. The EMP has subsequently developed a Resettlement Matrix that has been approved by the IFC and posted on its web site. The matrix reiterates in a formal manner the same entitlements that were

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<sup>16</sup>An entitlement matrix has been completed and summarizes the entitlements of affected people as per the existing CRCP. During the inception of the Chad Export Project and when precedent for the Project was being set, the IFC Operational Directive OD 4.30 on Involuntary Resettlement was the World Bank basis for resettlement. The Project, to the best of its abilities, followed this directive. As the Project has gone on The Handbook on Preparing a Resettlement Handbook (2002), IFC PS5 Land Acquisition & Involuntary Resettlement (updated July 31 2007) documents have come into existence. While both can be said to be followed as guidelines by the Project, to radically change the approach to resettlement would cause more adverse impacts for the Project Affected Persons (PAPs) as it will cause confusion and will have a negative impact on the already strong stakeholder relations with the affected community members.

<sup>17</sup> The B & K report emphasised the importance of this matrix and was aligned with the Project’s development of this implementation and tracking process.

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contained in the original CRCP and adds the additional entitlements developed through LUMAP. The matrix is included in the Land Management Manual.

*Project is conducted in a manner that assures the land is available for use when needed for Project construction and operations.*

**Findings:** Although this is written on behalf of the Project, as opposed to the affected individuals, the LUMAP team is making many attempts to improve its coordination efforts with the Drilling team for the Infill Program. The LUMAP team strives to ensure the land acquisition process is managed in an efficient manner complete with social parameters addressed as best as possible.

*Compensation is perceived as fair by the local population.*

**Findings:** It is doubtful that the Infill Program will have an adverse effect on the local economy so as to render the compensation rates too low. EEPCI has continuously updated compensation rates throughout the duration of the Project. .

**Secondary findings:** LUMAP advisors have established various indicators to track vulnerable PAPs. The EMP Information Systems Database (EMP-IS) generates sufficient Project data to tie into socio-economic livelihood indicators. Socio-economic indicators must be tracked and included in Village Quarterly and Project Annual Reports. In addition, the EMP-IS should be able to generate reports showing how PAPs and HHs are living. The EEPCI's data analysis also provides such information.<sup>18</sup>

**Recommendation:** Data on village households whose level of livelihood have remained the same versus those who have heightened their livelihoods should be reviewed as there appears to be a number of affected individuals who have already heightened their livelihood levels as a direct result of Project activities and the benefits received. As some will now receive more benefits (compensation and/or resettlement options) as a direct result of the Infill Program, it would be useful to examine the extent to which their livelihoods have heightened, remained the same and/or declined. Tracking the changes in their livelihoods would be helpful for the Project when identifying and evaluating the benefits generated by the Project.

Tracking the assessment indicators should be part of the EMP-IS and tied directly to PAPs livelihoods. A sample survey situating HHs within the Infill Program area that includes grading their livelihood levels by examining how they have managed their compensation and their resettlement options would be beneficial. For example, reports generated through the EMP-IS would be useful to identify clearly the indicators and the tracking method; minimize the descriptive wording; and show a more direct link to the indicators.

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<sup>18</sup> Chad's Millennium Development Goals were part of the KPI development process

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**Recommendation:**

It is recommended that the key performance indicator for the Red Flag (potential vulnerable household) files and/or files that may become Red Flag files be:

- All cases in the *Ok to Marginal, Ok to Non-Viable, Marginal to Non-Viable* categories will proactively be consulted. The goal will be to either:
  - Review the households and their situations and proactively intervene prior to the households becoming a Red Flag file and/or potentially vulnerable household<sup>19</sup>;
  - Ensure a tracking and follow-up system is in place to ensure that if deemed a Red Flag file, a timeline of no longer than 2 – 3 weeks between data capture and input into EMP IS adhered to. The findings of this monitoring sample will be integrated into the EMP-IS. The data set will be consulted on a bi-monthly basis to monitor the ongoing effects of the Infill Drilling Program.
- Lessons learned from the monitoring to be integrated into the LUMAP and Socio-economic teams' activities, continuing the Project's usual process.

These actions are tracked and options that assist with the ever-changing needs of the Project due to the augmentation in development levels of the PAPs will be put forth for review and potential implementation (Example: different and more advanced training options).

Extended indicator information can be found in Annex E.

#### 6.1.2.4 Resettlement and Compensation Plan Goals and Objectives – Resettlement

EMP Project statement: *Some resettlement will be required in the oilfield area (no more than an estimated 150 households).*

*Need for resettlement is limited through Project design.*

**Findings:** Reviews of the EEPPI Village Land Use Survey data and initial In Fill drilling impact analysis indicate that, at the upper limit, 50-60 more households may become vulnerable as a result of In Fill Drilling. The lower limit appears to be 30-37 households rendered vulnerable.

The original CRCP projected the number of 150 households to be resettled as the number of households that would have to acquire additional livelihood resources either by physically moving to another location or by acquiring supplementary income or production through skills training. Households whose economic resources remained intact but who needed to move because their homesteads lay within the construction footprint were considered "relocated" within their own village rather than as needing economic resettlement. A World Bank management decision post-adoption of the CRCP included any "relocated" people

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<sup>19</sup> The LUMAP team via EEPPI has implemented Management of Change Process for further managing households that have vulnerable characteristics.

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among the projected 150. Hence, from Project inception up to the beginning of the In Fill Drilling, the number of “resettled” households had already exceeded 150.

The incremental impact of the In Fill Drilling should, therefore, be considered in the light of the number of additional people who will be affected and of the ability of current livelihood restoration measures in the LMM (implementing procedures for the CRCP) to cope with the additional number.

Upon review of EEPIC village land use survey results and a review of initial In Fill Drilling impact, it appears that the In Fill Drilling may make an upper limit of 50-60 households vulnerable. This finding was drawn from the “red flag” household data within the EMP IS database. EEPIC analysis of completed survey data from In Fill villages, plus the rate of impact of In Fill land acquisition on households (always rounded up to the next whole number) indicates a probable number of 37 households (highlighted in EEPIC’s 4Q2008 and 1Q2009 Quarterly Village Reports – posted on IFC and [www.essochad.com](http://www.essochad.com) websites); Calculations performed for this assessment using the same data projects about 30 households.

The design of infrastructure layout by maximizing the reuse of existing infrastructure for In Fill wells (see Annex C on Fault Block Concept) will help limit additional resettlement through Project design. Also, it is also noteworthy that changes in Project governance requiring contractors to reclaim land before receiving pay have now resulted in greater land return and prevented the Project footprint from increasing beyond 2006 levels in Kome, Bolobo, and Miandoum fields. Upon further review of Project documentation, including the B&K report and the EEPIC analysis of the Infill Program, the findings reveal the percentage of adversely affected PAPs is less than anticipated.

The EMP-IS, as a reporting tool, plays an increasingly invaluable role in the early identification of vulnerable HHs and HHMs who may be eligible for resettlement vis-à-vis its “red flag” function. The Project implemented this function into its EMP-IS in 2007, largely in response to both the B&K survey team’s learnings and the findings of the B&K report (January 2007). The “red flag” function alerts various members of the Project Team (LUMAP & Socio-economic) to those HHs that qualify as “red flag”, and therefore potentially vulnerable. Recognizing the importance of this “red flag” function the Project has implemented yet another upgrade to the EMP-IS that automatically identifies “red flagged” HHMs who may be eligible for resettlement and resettlement options. The “red flag” function uses the already established criteria of less than 2/3 corde factor per HHM to determine whether a HH qualifies. The “red flag” function purposefully and rapidly prioritizes these HHMs in order to place them into the livelihood restoration resettlement options lists thereby ensuring representatives meet with the HHMs as soon as possible. The goal is to manage HHMs’ cases to ensure they are not subjected to further adverse impacts; and to make certain their livelihoods are maintained, and even enhanced, when possible. As the Project moves forward, the LUMAP and Socio-economic teams are making more and more concerted efforts to make this process more useful for the affected HHM.

The EEPIC data analysis can also be used to extrapolate for the number of vulnerable HHs in the non-surveyed villages. Hence, if 7HH were made vulnerable in the three surveyed infill villages with 96 wells drilled then another 204 wells would create another 15 vulnerable

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HHs for a total of 21 vulnerable HHs. Alternatively 9% of marginal and vulnerable HHs were rendered non-viable in the three surveyed infill villages. If the rate (9%) is the same for the non-surveyed villages this implies the creation of a further 109 vulnerable HHs.<sup>20</sup>

**Recommendation: Continue the “red flag” analysis system within the EMP-IS and ensure that LUMAP and Socio-economic teams work in an integrated fashion. It is also essential that team members report potential vulnerable cases during weekly LUMAP meetings. Discussions on the best go-forward approach to manage these potential vulnerable cases must be decided by the LUMAP and Socio-economic team members. Finally, all input must be valued equally.**

**Secondary finding:** EEPIC’s assessment has developed some potential vulnerability indicators that could be used for vulnerability profiling. These indicators include size of HH land holdings; gender of HHH; and age of HHH. Small land holdings, HHs with female heads, and HHs with 20-30 year-old male heads, and ~40 female heads were all shown to be at greater risk to become vulnerable as a result of Project land acquisition.

**Recommendation: Project uses the characteristics listed above and highlights the files so these potential vulnerable cases are a primary focus beginning in the information surveying stage.**

*Desirable alternatives to resettlement are provided to affected people.*

**Findings:** The majority in the past chose Off Farm skills training and Improved Agriculture skills training, with only a few opting to move elsewhere. With the LUMAP initiated introduction of third party compensation and the Basic Business Skills (BBS) requirement for other skills training, many vulnerable people chose third party compensation. Once, however, they had managed to make it through the BBS, 130 of 168 resettlement eligible HHH in the 2008 promotion chose to complete Improved Agriculture Training (IAT) (given the infancy of third party compensation for land replacement and EMP’s need for time to qualify potential land donors, the IAT course without a grant had been offered to all non-viable households which had chosen 3<sup>rd</sup> party compensation) and receive their grant compensation versus continuing on the path of land replacement. Initially, they feared they would not pass the business training course. The new option of “Resettlement to Distant Arable Land” (the so called “Rainy Season Resettlement”) to farm fallow lands within the same village has also been selected as one of the forms of resettlement. Therefore, the existing and new options appear desirable for affected individuals.

Third Party Compensation, however, appears to have some delays in its implementation and has only recently begun.

Upon review, the individual receiving the land appears to achieve a longer term gain versus the individual receiving compensation for giving up the land, who appears to achieve a short-term gain. Assuming this initial longer term versus short-term gain finding is correct, problems may arise among the individuals opting for the compensation alternative, as they

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<sup>20</sup> The calculation is 9% of (461+212+381+86+27+47) = 109. The numbers in brackets are from EEPIC’s data analysis (p. 3); these are based on declarative data, and thus may be high.

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realise, fully, they have lost their rights to the land, forever. Thus far, it is unclear whether instituting a one-month waiting period will add real value as this approach does not lend itself to the Chadian culture or their normative value system.

The B&K report recommended a one-month waiting approach. This approach was not part of WB Directive 4.30, which was the standard at the time the CRCP was developed. However, to follow the B&K recommendation the EMP introduced a Management of Change (MoC) that required a one month waiting period. This month supplemented the time between an individual meeting with the Project to show the piece of land and his agreement to enter into the compensation process. The time between the individual's agreement to enter into compensation negotiations and the final agreement, which is in itself in the most expedited cases a two (2) week process (and normally consumes one month or more), was maintained and provided additional time. However, in the two plus years that this additional waiting period was enjoined, only one individual out of the many compensated expressed reluctance and he had changed his mind by the time the regular land identification dossier development process began. Since the affected people did not desire this "no action" alternative to resettlement, the above MoC was not included in the 2008 revision to the Land Management Manual.

If third party compensation is a viable resettlement option, it requires assurance that sufficient land is available. The EEPPI data analysis demonstrates that vulnerability is not the result of a dearth of village land. Actually, very few HHs have become vulnerable from Project land take, and for the most part, their "Project-deemed vulnerability" has resulted from uneven intra-village land distribution. This assessment noted that the projected number of HHs that would become vulnerable from the Infill Drilling Program was 37. Of this small percentage, only a small portion will require third party compensation, as agricultural training has been sufficient to restore most affected HHs to sufficient livelihood levels, according to EEPPI's data analysis. Therefore, there is ample land to distribute to the few needing third party compensation. EEPPI's data analysis further qualifies the claim of sufficient land availability. According to the analysis it appears there is land that is over the 20 year fallow threshold in four of the surveyed infill villages. (p. 37, June 2009).

**Recommendation: Seriously consider dropping the 3<sup>rd</sup> party option as not viable. The Project has attempted to implement but has been unsuccessful. This lack of success is due to the fact that this option is counter cultural. The potential PAPs will never fully appreciate the consequences of this option. They much prefer the training options.**

**If the Project decides to retain this option, once implementation takes place review cases on a scheduled basis to ensure input from the LUMAP and Socio-economic team field representatives as well as input from government officials is used to ensure this option is continuously being managed and to evaluate fully the viability of this option.**

*Affected people have adequate time and resources to re-establish themselves.*

**Findings:** After careful review of the EMP-IS, there appears to be minimal adverse impacts as a direct result of the Infill Program. The EMP-IS has various tracking methods within its

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systems to highlight if households that may or may not be put into a more “vulnerable” situation. Tracking ‘Ok to Marginal’ category will create a proactive approach for these households, if any of them change categories and move into the most vulnerable category ‘Non-Viable’. There are many positive cases of livelihood restoration despite some of the initial resettlement options not working out as originally planned.

**Recommendation: Continue to use the EMP-IS and review impacts on households for all categories.**

*Resettlement follows traditional procedures of local culture.*

**Findings:** Resettlement does follow traditional procedures of local culture and the Project should be applauded for this approach.

**Recommendation: Ensure that this approach is followed consistently.**

*Compensation and resettlement do not create dissension within local population.*

**Findings:** Compensation and resettlement do not appear to create dissension within the local population, with the possible exception of the Third Party Compensation option. This was the only negative feedback received from local government officials. They believe the third party compensation option will create adverse reactions amongst their population. It is difficult to ascertain the real ramifications amongst the population without further evaluation, as insufficient field data was available during the assessment. The LUMAP and Socio-economic team members can help in further evaluating this aspect.

**Recommendation: As future individuals become non-viable and select the 3<sup>rd</sup> party compensation option, a thorough review of the proposed donor’s land holdings should be completed in the EMP-IS, and team members should have time in the field to determine the nature of social relations between the family of the donor and the family of the recipient to address the positive and negative impacts of choosing that option.**

*Compensation and resettlement activities are fair.*

**Findings:** Compensation and resettlement activities appear to be fair. The local population did not provide any negative feedback. Meetings with local government officials went well. Participants had ample opportunities to raise their concerns. Further evaluation is required to fully complete this analysis.

**Recommendation: Common cause analysis of the EMP grievance cases will reveal whether complaints of unfair compensation are happening and indicate potential system deficiencies. At present this analysis shows most complaints concern either miscounting of assets to be compensated or damages to assets. I.e. the local population want only to rectify mistakes made in the compensation and resettlement process, not change the process itself.**

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### 6.1.2.5 Continuing Support

*People in both impacted and surrounding areas continue to be supportive of the Chad Development Project.*

**Findings:** Thus far, both the people impacted and those in the surrounding areas continue to be supportive of the Project. Many realise that the Project has afforded them more options and most are cognisant of the importance of the compensation the Project provides to them. Much less compensation waste is now evident. In addition, there are definitely step changes in the value system that are positive for livelihood enhancement.

**Recommendation: The LUMAP team is considering potential indicators; this information appears in Annex E. The EMP group will need to integrate the suggested indicators into the Annual Individual reports.**

### 6.1.2.6 Additional Recommendations for Mitigation of Incremental Impacts

Households were visited during both of the assessment field visits to the OFDA. The initial field visit was largely to allow the assessment team to become reacquainted with the area and to initially develop information related to the potential impacts created by the proposed In-Fill program. Visits were made to various households, government officials, training organisations and PAPs for the overall Project area. Project documentation was reviewed and meetings took place with many team members under the EMP portfolio. Meetings also took place with the IFC environmental and social team and the External Monitoring and Compliance Group (ECMG).

#### Assessment of Red Flag Files

First and foremost, a more consistent approach for the “Red Flag” Assessment must take place for both review and management of these files.

Additional mitigation measures may include:

- Integrated approach to managing data and use of Socio-economic team members alongside LUMAP team members
- Conduct focus groups with community representatives, community members and Project personnel to identify problems, impending changes, and opportunities for the vulnerable persons affected by the resettlement process. Analyze the results of these surveys and focus groups. Identify the indicators and review these on an appropriate timeline.
- Continue to review international norms and approaches for working with vulnerable populations.
- Gather input and feedback on ways of ensuring that support from management is as effective as possible for the LCCs, Socio-economic and LUMAP team members; encourage their feedback and ask team members to provide information when designing, implementing and evaluating resettlement options.
- Include Socio-economic Key Performance Indicators (KPIs) in Annual Reports. The following will help the LUMAP and Socio-economic teams to develop KPIs, which should be tracked

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and reported in the LUMAP Annual reports. Only a few key indicators should be tracked; this information should be input into the EMP-IS so the LUMAP outputs are adequately portrayed.

The process of performance measurement can be conceptualized in terms of the following cycle:

*Planning:* Involves defining the goals and priorities of the organization, and articulating the strategy to achieve those goals. This occurs at government, organizational, and departmental levels. The planning at each level must be aligned with the other levels.

*Performance Management:* Involves the evaluation of progress towards the goals established in the planning stage. Data is collected through a number of lines of enquiry, possibly including information systems, document review, interviews, workshops, and surveys. The data is analyzed to uncover issues and evaluate performance.

*Reporting:* Involves sharing progress and achievements with stakeholders, potentially including the general public, government, strategic management, and operational management.

*Feedback:* Involves using the conclusions drawn from the information to plan strategic and operational strategies to ensure that goals and priorities are achieved during the next cycle.

### Other Options for Resettlement

Examples may include:

- Ensure PAP's are provided with either *Mucuna pruriens* seed or fruit tree saplings to allow them to receive some value from the previously stranded fragments of the cultivated field.
- Resettlement Options Targeted at Youth

If resettlement options are not appropriate for an affected person within a HH, and if a youth member is part of the HH, resettlement options should take into account the importance of working with youth and the longevity of implementing youth focused programs for livelihood enhancement, where appropriate. Youth focused programs are not meant to detract from existing education and/or family working situations but are intended to enhance the youth's short-term and long-term options. If the Project decides to move this type of option forward, information must be gathered from educational specialists at the "secondary" level (after primary); local authorities; and families with youths. Skills training, programs that will enhance their educational levels (better mathematical skills), and initiatives that will enhance their involvement in activities assisting their family's well-being (agriculture, initiating concepts of financial management) may all be options to explore.

- As stated previously, develop training modules that add on to already established positive impact training options.
- Review the possibility of developing a Futures Fund option, whereby families with children would be able to use compensation and/or equivalent amount allocated to resettlement to manage for their future. They would be able to put a portion of these funds into the banking system and be able to draw out allotments to pay for school fees and other components that would assist for the Future Generations. The most likely option at the Bank would be some

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sort of interest bearing deposit. The Project would have to facilitate the banking process and develop information sheets for the PAPs to review.

- Review the vulnerable cases and the state of their homes. When their homes are deemed as unfit or basic minimum, attempt to work with them by providing advice on the merits of better living conditions. Potentially engage local villagers to help build them more sturdy homes, addressing their vulnerable needs with a proactive measure.

## **6.2 Mitigations in Respect of Conversion of the Riverine Lowlands in the OFDA**

As discussed in section 6.1, the decrease in the amount of land available in the OFDA for agricultural purposes is an incremental, though significant, impact of the Infill Drilling Program. As a means of mitigating this incremental impact the Project has proposed the conversion of riverine lowlands to high value agricultural land, which will then be made available to the local population.

### **6.2.1 Background to the Riverine Lowlands Mitigation**

The Project has long recognised that the availability of land for agriculture is a limiting factor in local production systems in the OFDA (e.g. Chad EA Executive Summary section 1.5). This knowledge was reflected in the compensation and resettlement strategies adopted by the Project, which emphasise agricultural intensification and the development of off-farm livelihoods. The additional land takes associated with the Infill Drilling Programs are adding to the pressures on land availability, and the Project is investigating further strategies that have the potential to provide increased agricultural output from community land that is currently either under-utilised or not utilised at all. One such strategy is the conversion of riverine lowlands to agricultural production, particularly for rice.

While the principal agricultural crops cultivated in the OFDA are sorghum and millet, rice is also cultivated, although not widely. The local population values rice for direct consumption and as a cash crop, but its cultivation is restricted by the limited availability of suitable sites as well as the availability of water to sustain the crop.

The attractiveness of rice cultivation to the local population is illustrated by the efforts currently being made to reinstate rice-growing infrastructure in the vicinity of the village of Mboh-Nyah, which lies immediately to the northeast of the OFDA. To the south of this village lies an area of engineered rice fields (with supporting infrastructure) that was constructed as an aid Project in the 1960's (see photos 1 & 2). The Project subsequently fell into disuse but is now the subject of a rehabilitation program begun with the assistance of the NGO Africare; it is being sustained by the '5% Fund', which is the vehicle by which the Government of Chad invests 5% of its oil revenues generated from the Project into the communities of the Project area.

Rice is also grown more informally, when climatic conditions are suitable. For instance, in 2008 the rainy season was considered to have started late, but to have produced heavy rains. This resulted in conditions conducive to rice cultivation at various locations throughout the OFDA, as illustrated in photos 3 to 8 inclusive.

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### 6.2.2 Field Assessment of Riverine Lowlands in and adjacent to the OFDA

Riverine lowlands in relatively close proximity to the communities affected by the infill drilling of the Bolobo and Kome oilfields were inspected as part of the current assessment. This inspection was conducted by overflight and on the ground at six locations as shown in figure 8. Figure 8 also shows locations, as red polygons, where rice cultivation has previously been recorded in the EMP-IS. Field observations were as follows:

#### Overflight of OFDA

The flight plan included flying over the Pendé river from a point east of the Project airstrip to north of Doba, and along the Nya drainage from the Doba area to the main road crossing of the Nya, between the Bolobo and Miandoum oilfields.

- Extensive lowlands were seen to be associated with the Pendé river.
- In the Nya drainage the northern areas seem to be more developed (e.g. channels dug, fields delineated) than the southern areas; however, in both cases there appears to be large areas of currently unutilised land in and adjacent to the Nya floodplain. Rice cultivation was observed to be intermittent, and appears to be restricted to a narrow band of land on the south bank between the savanna and floodplain proper.

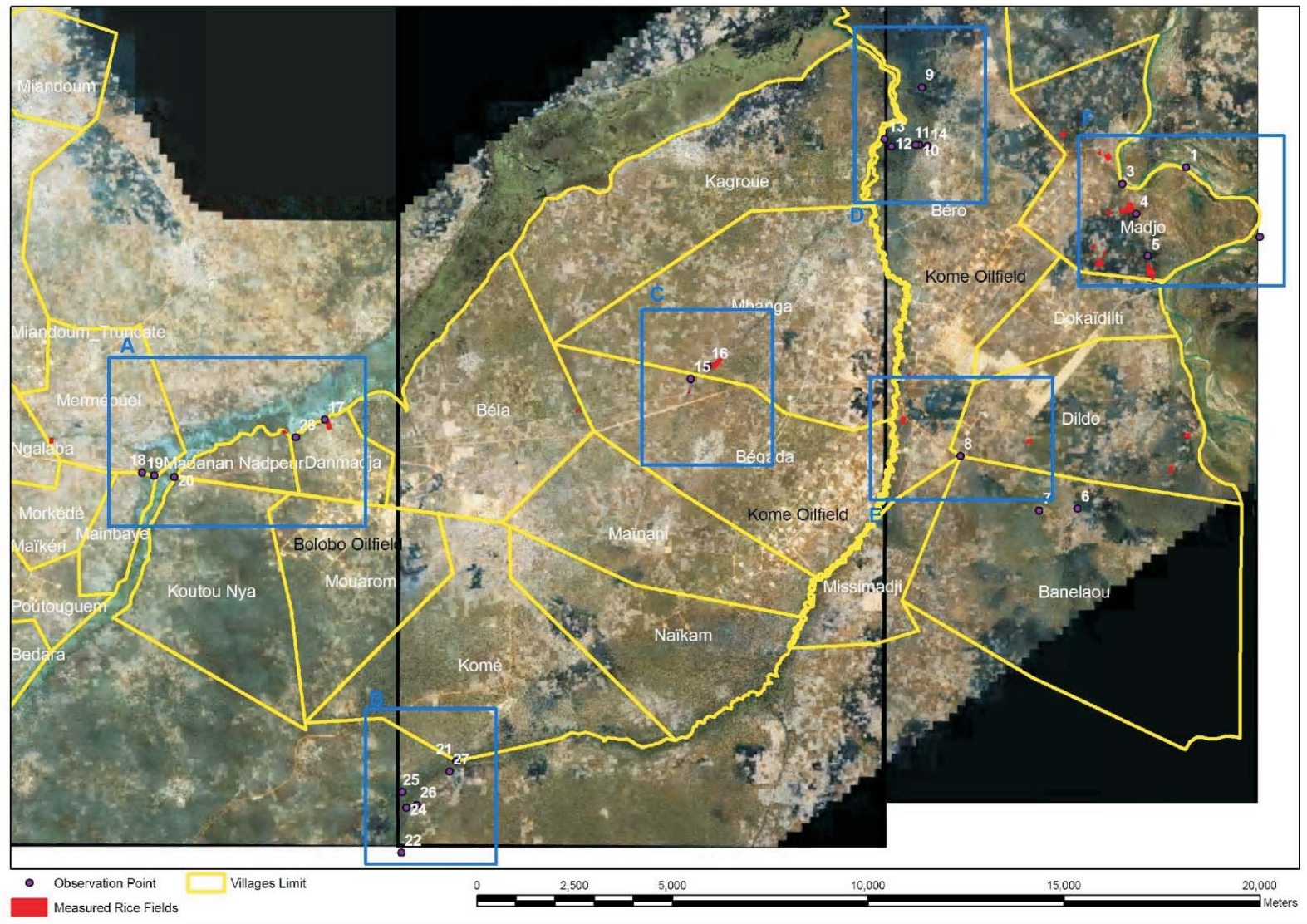
Area F, on the Pendé river near the village of Madjo (see figure 9)

- Rice farming was observed alongside road south out of Madjo.
- Extensive areas of low-lying land that appears currently unused for agriculture was evident in the GPS 1/2 area.
- Nomadic cattle-herders were observed on the right bank at GPS 1 and on both banks of the Pendé at GPS 2.
- Evidence of artisanal fishing (a discarded net) was seen at GPS 1.
- A substantial lake was observed (and is evident on the satellite image) south of GPS 1 and west of GPS 2, on which significant numbers of birds were to be seen.
- Where rice farming was observed (GPS 3,4 & 5) it was 'dry', as the soil in which the rice stems were growing was not inundated (as compared to the 'wet' rice observed in the Nya and Loule rivers).
- Where observed, the plots of rice were interspersed with bush/fallows and other crops (principally sorghum and millet), and appear to have been located in marginally lower-lying land.

Area E, on the Loule drainage in the Komé oilfield (see figure 10)

- River channel is narrow and well-defined both topographically and by a gallery forest.
- No rice cultivation was seen in the river channel.
- However, a small plot of 'dry' rice was observed immediately adjacent to well pad 214, outside of the Loule gallery forest (~50m away).

Area D, on the Loule drainage west of Bero village (see figure 11)



Original document courtesy of EEPIC – EMP

Scale **As shown**

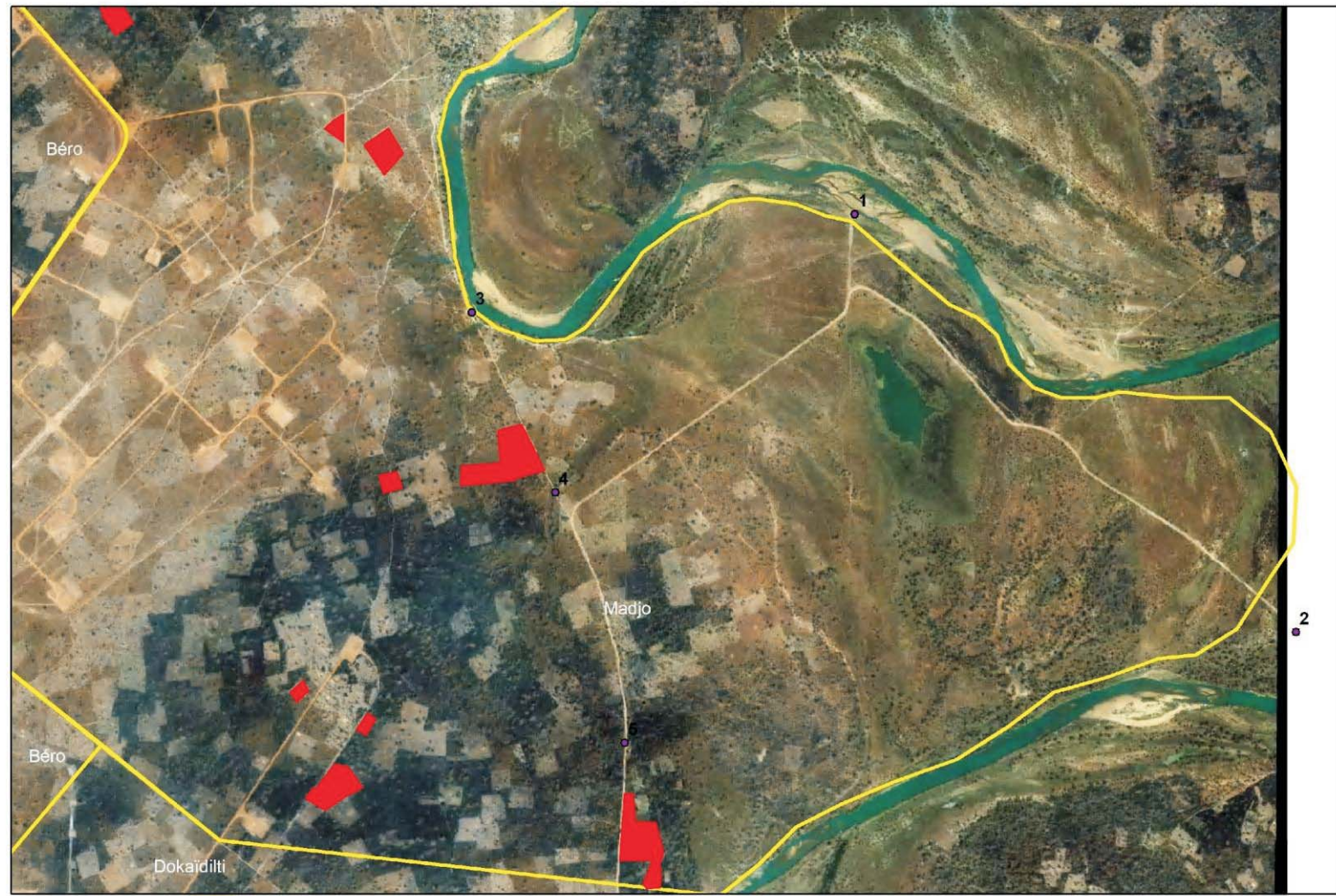
Title	<b>Figure 8</b>	
Project	<b>Chad Export Project</b>	
Site	<b>Komé and Bolobo Oil Fields, Chad</b>	
Client	<b>Esso Exploration &amp; Production Chad Inc Chad</b>	
Date	<b>December 2008</b>	Drawn by <b>DM</b>
Project No.	<b>61-C14017</b>	Approved

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### Zone F



● Observation Point    □ Villages Limit  
■ Measured Rice Fields

0    500    1,000    2,000    3,000  
Meters

Original document courtesy of EEPCI – EMP

Scale    **As shown**

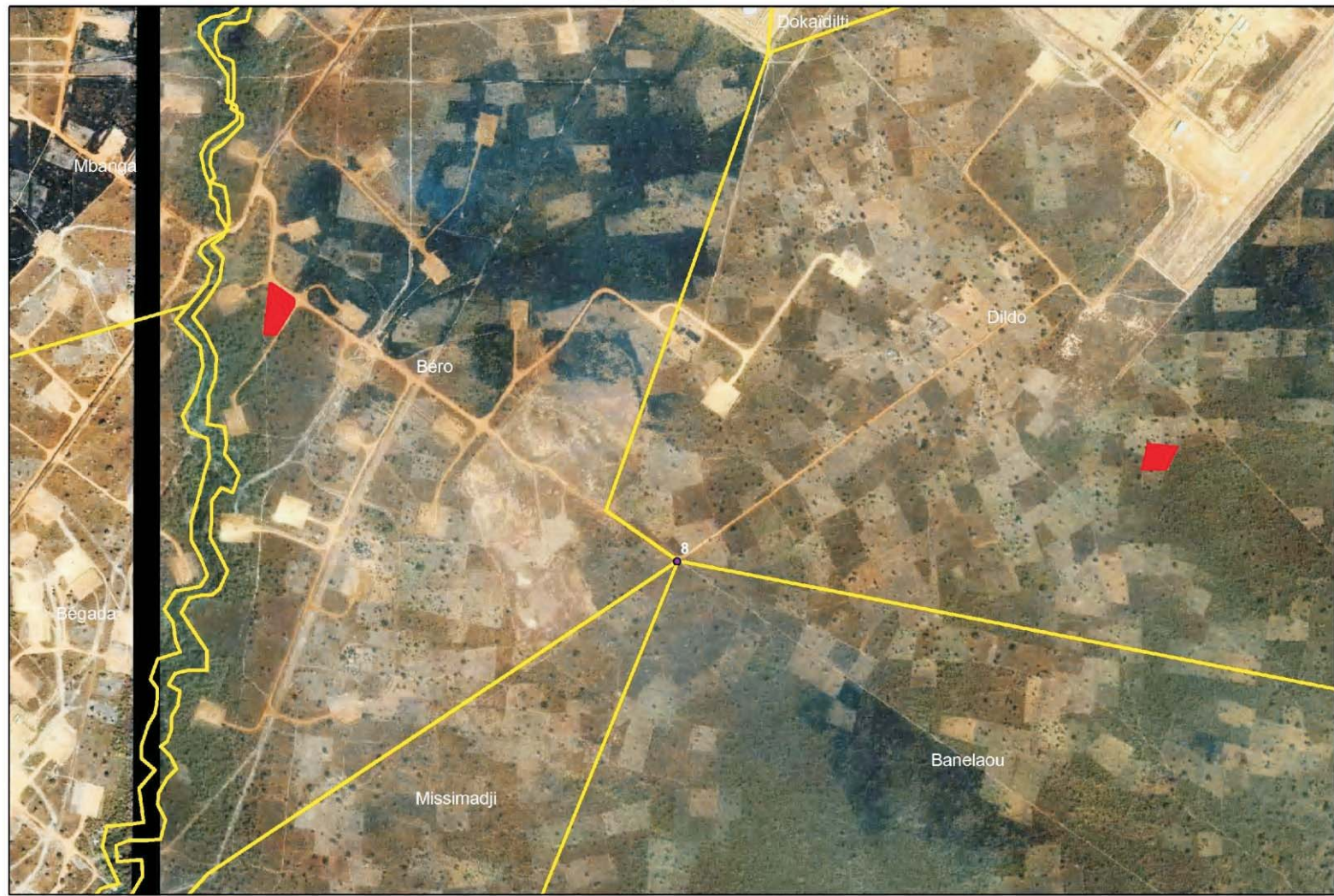
Title		<b>Figure 9</b>	
Project		<b>Chad Export Project</b>	
Site		<b>Komé and Bolobo Oil Fields, Chad</b>	
Client		<b>Esso Exploration &amp; Production Chad Inc Chad</b>	
Date	December 2008	Drawn by	<b>DM</b>
Project No.	<b>61-C14017</b>	Approved	

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### Zone E



● Observation Point    ■ Villages Limit  
■ Measured Rice Fields

0 250 500 1,000 1,500 2,000 2,500 Meters

Original document courtesy of EEPCI – EMP

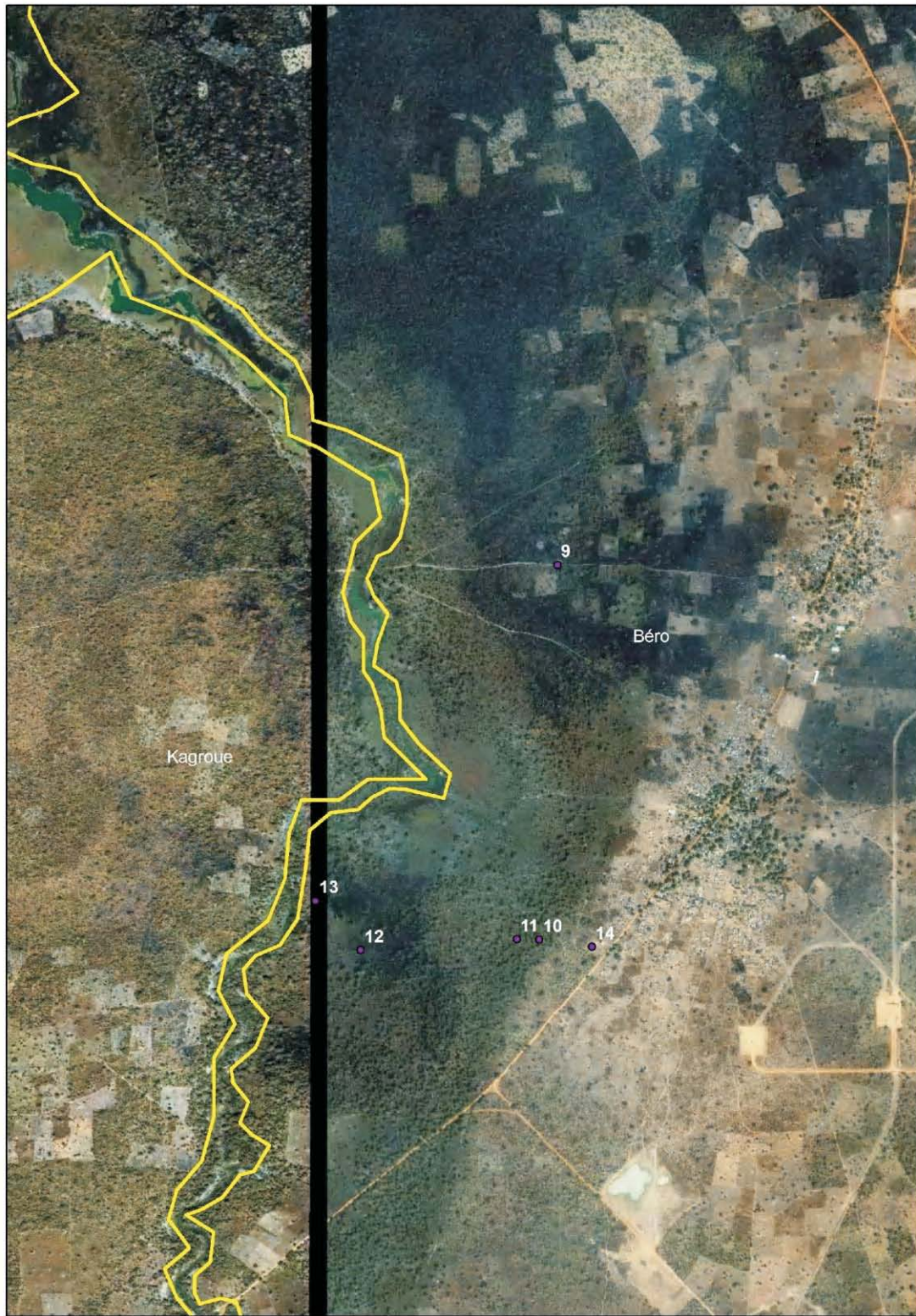
Scale      **As shown**

Title	<b>Figure 10</b>	
Project	<b>Chad Export Project</b>	
Site	<b>Komé and Bolobo Oil Fields, Chad</b>	
Client	<b>Esso Exploration &amp; Production Chad Inc Chad</b>	
Date	<b>December 2008</b>	Drawn by <b>DM</b>
Project No.	<b>61-C14017</b>	Approved

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# Zone D



● Observation Point     Villages Limit  
 Measured Rice Fields

Original document courtesy of EEPCI – EMP

Title		Figure 11		Site		Komé and Bolobo Oil Fields, Chad	
Client		Esso Exploration & Production Chad Inc Chad					
Date	December 2008	Scale	As shown				
Project No.	61-C14017	Issue	1	Drawn by	DM		
						 5 Stratford Place, London, W1C 1AX Tel: +44 (0)20 7478 9800 Fax: +44 (0)20 7478 9801 <a href="http://www.environcorp.com">www.environcorp.com</a>	

- The Loule channel where crossed by a road due west of Project borrow pit EPB4 is also well-defined and narrow.
- No rice cultivation was observed in either the river channel or along the road to the north-east.
- The Loule channel due west of the northern Bero village (due west of GPS point 9) is also relatively narrow, with a poorly developed floodplain.
- A plot of 'dry' rice was observed (GPS 9) some distance east of the Loule and well east of any obvious floodplain.
- A traverse was made towards the Loule from the southern end of the southern Bero village, starting at GPS 14, and progressing via GPS points 10,11 & 12 to a westerly termination at GPS 13.
- The Loule itself was not intersected on this traverse, but standing water was observed on the path between GPS 10 and 11, and where standing water was absent the surface soil was noticeably moister than in a typical savannah location.

Area C, on an unnamed tributary of the Loule drainage, north of Begada village (figure 12)

- EMP-IS polygon indicates rice cultivation at this point (most southerly of three), but no rice was seen.
- At this point the Loule is as observed before – narrow channel, no evident floodplain of more than a few metres width, gallery forest restricted to the drainage channel and its immediate banks.
- GPS 15 is at the central EMP-IS polygon indicating rice cultivation in river channel – 'wet' (i.e. inundated) rice plot present. No development outside the channel.
- GPS 16 is at the most northerly polygon – 'wet' rice evident in river channel, but no rice on either bank (polygon appears to be incorrect – occupies land on east side of channel, but this is currently under sorghum)

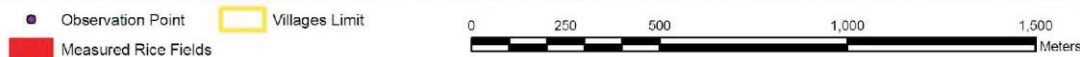
Area B, on the Loule drainage, south of Bolobo and Kome villages (figure 13)

- GPS 21 at culverted crossing of old seismic line with Loule – well developed and somewhat diffuse gallery forest; no cultivation evident (of any type); narrow stream channel and no evident floodplain.
- GPS 25 on south side of Loule. Diffuse gallery forest of some significant width (as evident on imagery), but no developed floodplain and poorly developed channel. No cultivation of any type evident – use of non-timber forest products?



Area A, on the Nya drainage, near Danmadjia village (see figure 14)

- Band of 'wet' rice cultivation between savannah cultivation to south and open water/wetland vegetation to the north. Band is approximately 30 to 50m wide.
- Margin of wetland is well defined by vegetation but poorly defined by topography.
- Some market garden development at savannah/rice margin.

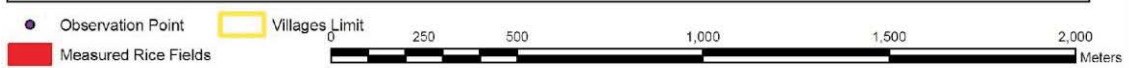
# Zone C



Original document courtesy of EEPCI – EMP

Title		<b>Figure 12</b>		Site		<b>Komé and Bolobo Oil Fields, Chad</b>	
Client		<b>Esso Exploration &amp; Production Chad Inc Chad</b>					
Date	<b>December 2008</b>	Scale	<b>As shown</b>				
Project No.	<b>61-C14017</b>	Issue	<b>1</b>	Drawn by	<b>DM</b>		
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# Zone B

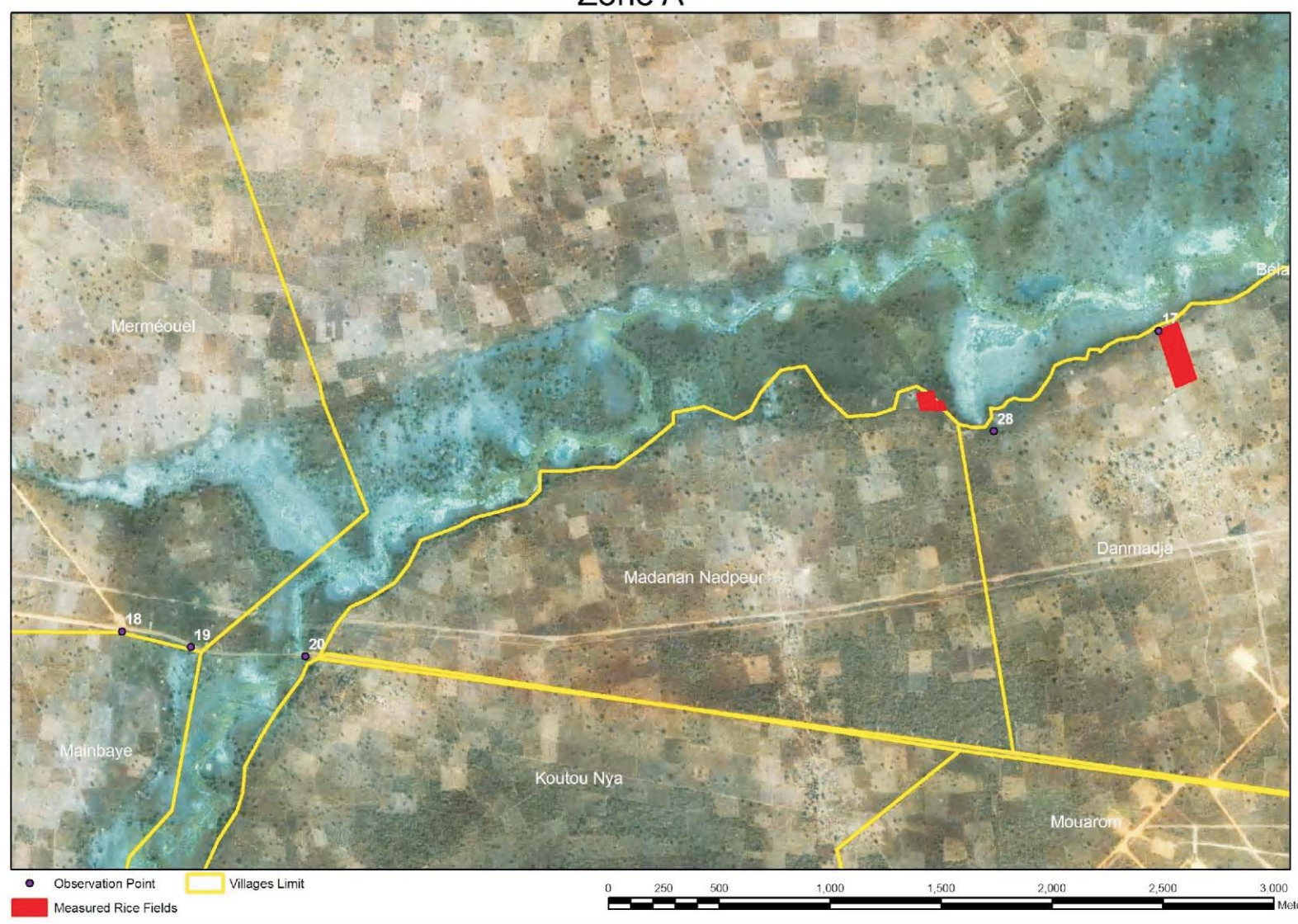


Original document courtesy of EEPCI – EMP

Title		Figure 13		Site		Komé and Bolobo Oil Fields, Chad	
Client		Esso Exploration & Production Chad Inc Chad					
Date	December 2008	Scale	As shown				
Project No.	61-C14017	Issue	1	Drawn by	DM		



### Zone A



Original document courtesy of EEPCI – EMP

Scale **As shown**

Title	<b>Figure 14</b>	
Project	<b>Chad Export Project</b>	
Site	<b>Komé and Bolobo Oil Fields, Chad</b>	
Client	<b>Esso Exploration &amp; Production Chad Inc Chad</b>	
Date	<b>December 2008</b>	Drawn by <b>DM</b>
Project No.	<b>61-C14017</b>	Approved

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- 
- Extensive wetland to north, appears relatively shallow (trees and bushes scattered throughout).
  - Extensive 'wet' rice cultivation (particularly to the south) between the Bebedjia road junction at the western end of the Nya crossing (GPS 18) and GPS 19. (GPS 20 is the eastern end of the Nya crossing.)

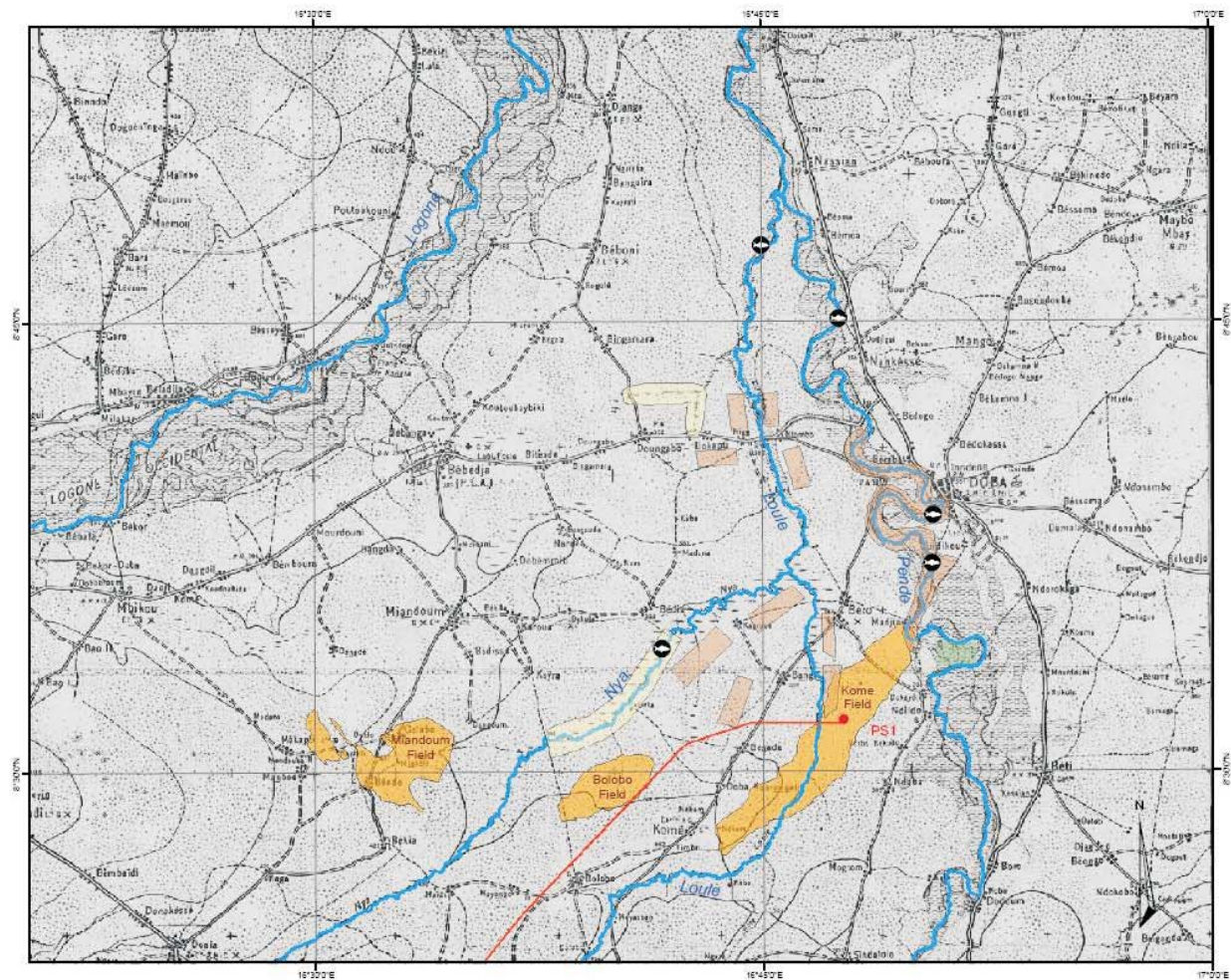
### **6.2.3 Evaluation of Biophysical Baseline Data for Riverine Lowlands of the OFDA**

As indicated in section 3 above a substantial quantity of biophysical baseline data exists for the OFDA, some of which is directly relevant to this assessment of the riverine lowlands. Relevant extracts are presented in Annex J. Key conclusions are:

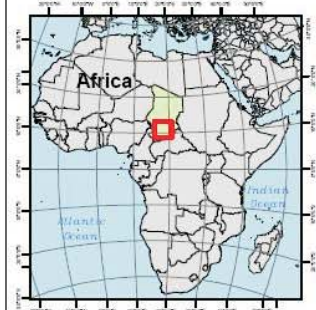
- The shallow but extensive floodplains of the Nya and Pendé rivers have excellent potential for recession agriculture and irrigation (Chad EA section 6.2.3).
- A unique grassland savanna is located in the vicinity of an oxbow lake on the west side of the Pendé River, east of Mogrom and near the eastern extremity of the OFDA. (Chad Export Project Environmental Documentation Volume 6 – Chad Biological Studies section 5.4.1.1). (See figure 15.)
- The Nya River appears to be unique. Although small in size, it reportedly flows throughout the dry season (Chad Export Project Environmental Documentation Volume 6 – Chad Biological Studies section 5.1.3.2).
- The Nya River has a relatively wide floodplain and appears to support a productive and important local fishery. (Chad Export Project Environmental Documentation Volume 6 – Chad Biological Studies section 5.2.3).
- The Loule River is used for fishing during certain periods, particularly on the rising flood and during the first part of the dry season. (Chad Export Project Environmental Documentation Volume 6 – Chad Biological Studies section 5.2.3).
- In general, habitats in the OFDA have been substantially modified by fire, livestock grazing, and cultivated agriculture. The potential of the area for wildlife, especially large mammal species that are sensitive to habitat modification and disturbance by humans and livestock, appears to be largely limited under existing land use practices with the exception of the Nya River floodplain and a few other wetland and riparian habitats (gallery forests). (Chad Export Project Environmental Documentation Volume 6 – Chad Biological Studies section 5.4.1.1).
- In places the Nya river valley and floodplain contain valuable gallery forest and marsh habitat that support relatively diverse bird and mammal populations and provide important grazing habitat for resident and transhumant livestock. The Nya River is rich in fish, 18 species of fish were reported by villagers and this corresponds with prior studies of the area. (Environmental Document Maikeri [Poutouguem] Project).

### **6.2.4 Conclusions Regarding the Potential for Conversion of Riverine Lowlands in the OFDA**

- Rice growing in the OFDA is a long-established and attractive proposition for the local population, both for home consumption and for sale.



- Oil Fields
- Pipeline Route
- Agricultural Land
- Concentrated Livestock Grazing
- Grassland Savanna (Special Status)
- Pump Station 1
- Fish



Horizontal datum: Clarke 1866; coordinate system: Universal Transverse Mercator (UTM); Zone 33N. Data provided by JUBA Corporation.

**EEPCI - TOTCO**

Sensitive Areas Downstream of the Oil Field Development Area (OFDA)

SCALE: 0 2,5 5 Kilometers      FIGURE: 7:1

Lyinc:00039.mxd, June 14, 2002, Rev 1

Scale **As shown**

Title **Figure 15**

Project **Chad Export Project**

Site **Komé and Bolobo Oil Fields, Chad**

Client **Esso Exploration & Production Chad Inc Chad**

Date **December 2008**      Drawn by **DM**

Project No. **61-C14017**      Approved

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- 
- Rice cultivation is only possible on any scale when rainfall patterns result in suitable farming areas being inundated at the right time in the growing season. 2008 may have been an exceptional year for rice cultivation.
  - Areas suitable for rice cultivation appear to be naturally limited.
  - Potential exists to increase the available area artificially, as has been done in the Mboh-Nya area.
  - Two categories of riverine lowlands have been identified in the OFDA:
    - Well-developed floodplain, as in the wide-channel Pende and narrow-channel Nya rivers.
    - Narrow channel, little or no floodplain development, as in the Loule and various small tributaries of Pende, Nya and the Loule.
  - Any plan to convert riverine lowlands to agricultural production must consider existing users and the conservation values of the lowlands.
  - No IUCN-listed bird or fish species have been identified in the OFDA.
  - The potential of the OFDA for wildlife, especially large mammal species that are sensitive to habitat modification and disturbance by humans and livestock, appears to be largely limited under existing land use practices with the exception of the Nya River floodplain and a few other wetland and riparian habitats (gallery forests).

#### **6.2.5 Recommendations Regarding the Potential for Conversion of Riverine Lowlands**

- 1. EEPCI should proceed with its stated intention to engage one or more agricultural research institutions to evaluate further the potential to generate new agricultural land from riverine lowlands in the OFDA. (EEPCI advises that it budgeted \$1.5 million for investigations in 2009, which were expected to evaluate the sustainability of this initiative and will involve sociologists with experience in similar Projects in southern Chad, research institutions, and an engineering company with relevant irrigation experience.)**
- 2. The available baseline data on the Nya and Loule rivers must be updated and expanded regarding their:**
  - Existing use for agriculture.
  - Use as fisheries.
  - Use by pastoralists (including nomadic and sedentary cattle herders).
  - Importance for wildlife.
- 3. The updated and expanded baseline should be used together with the results of the evaluations referred to in item 1 above to conduct an appropriately detail social and environmental assessment of the proposed conversion of riverine lowlands in the OFDA.**
- 4. The grassland savanna located in the vicinity of an oxbow lake on the west side of the Pendé River, east of Mogrom and near the eastern extremity of the OFDA was identified by the Chad EA biological studies as ‘unique’. If this area is a potential**

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**source of riverine lowland for conversion to agricultural land, a comprehensive impact assessment should be conducted, focussing on the biological values of the area.**

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## 7 Summary, Conclusions and Recommendations

Esso Exploration & Production Chad Inc (EEPCI) is currently producing oil from oil fields in the Oil Field Development Area (OFDA) located in the Doba basin of southern Chad (the Project). The Project includes an ongoing Infill Drilling Program that adds wells to the existing Komé and Bolobo fields, and this assessment has been commissioned with the following objectives:

- Examine whether existing mitigation measures are sufficient to deal with any increased impacts that may occur as the result of continued drilling.
- Recommend additional mitigation measures if needed, based on the assessment of the incremental impacts due to the additional wells that will be drilled in the Komé-Bolobo program.

Impacts and an assessment of the adequacy of existing mitigation measures is presented in Table 1 below.

<b>Table 1: Summary of Impacts and Assessment of Adequacy of Existing Mitigations</b>					
<b>Chad Export Project Impact (from EA/EMP)</b>	<b>Relevance<sup>21</sup> to this Assessment of Infill Drilling</b>	<b>Significance of Impact<sup>22</sup></b>	<b>Existing Mitigation (from EA/EMP)</b>	<b>Assessment of Adequacy of Existing Mitigation for Infill Drilling</b>	<b>Mitigation Measures for Further Evaluation</b>
Oil spill prevention and response	Directly relevant	Significant but mitigable	Design to prevent spills; develop OSPR; plan and drill for spills.	Adequate	Not required
Benefit and cost analysis	Not relevant				
Revenue management plan	Not relevant				
Regional development plan	Not relevant				
Community and worker health	Relevant	Significant but mitigable	Mitigation plans to help protect community and worker health and safety including: community health outreach; confronting AIDS and other STDs; other disease prevention; accident prevention	Adequate	Not required
Compensation principles	Directly relevant	Significant but mitigable	Compensation and Resettlement Plan for Chad	Evaluated in detail in section 6.1	

21 **Not relevant** – the Infill Drilling Program will not induce incremental effects.

**Relevant** – the Infill Drilling Program will induce incremental effects of similar types and at similar levels to those already induced by the Project.

**Directly relevant** – the infill drilling has the potential to induce incremental effects of a type and scale not previously induced by the Project.

22 Utilising Project standard significance criteria, and the following Project standard significance categories: Beneficial; Less than significant; Significant but mitigable; Significant and unavoidable.

<b>Table 1: Summary of Impacts and Assessment of Adequacy of Existing Mitigations</b>					
<b>Chad Export Project Impact (from EA/EMP)</b>	<b>Relevance<sup>21</sup> to this Assessment of Infill Drilling</b>	<b>Significance of Impact<sup>22</sup></b>	<b>Existing Mitigation (from EA/EMP)</b>	<b>Assessment of Adequacy of Existing Mitigation for Infill Drilling</b>	<b>Mitigation Measures for Further Evaluation</b>
Compensation and resettlement in Chad	Directly relevant	Significant but mitigable			See Section 6.1
Waste management	Relevant	Significant but mitigable	Waste Management Plans to manage and monitor the disposal process	Adequate	Not required
Decommissioning	Relevant	Significant but mitigable	A Decommissioning Plan will be developed to manage and monitor the decontamination and disposal processes	Adequate	Not required
Management plan for cultural properties	Relevant	Significant but mitigable	Management Plans for Cultural Properties	Adequate	Not required
Greenhouse gases	Not relevant				
Environmental monitoring plan	Relevant	Significant but mitigable	Environmental Monitoring Plan to manage biophysical, socioeconomic and health aspects	Adequate	Not required
Boom-bust effect at end of construction	Not relevant				
In-migration to Project area	Not relevant				
Resettlement in the OFDA	Directly relevant	Significant but mitigable	Compensation and Resettlement Plan for Chad	Evaluated in detail in section 6.1	See section 6.1

<b>Chad Export Project Impact (from EA/EMP)</b>	<b>Relevance<sup>21</sup> to this Assessment of Infill Drilling</b>	<b>Significance of Impact<sup>22</sup></b>	<b>Existing Mitigation (from EA/EMP)</b>	<b>Assessment of Adequacy of Existing Mitigation for Infill Drilling</b>	<b>Mitigation Measures for Further Evaluation</b>
Disruption to agriculture	Directly relevant	Significant but mitigable			
Disruption to transhumance	Directly relevant	Significant but mitigable	Scheduling of Project activities to limit effects.	Evaluated in detail in section 6.1	See section 6.1
Disposal of produced water	Directly relevant	Significant but mitigable	Reinjection to producing horizons.	Adequate	Not required
IUCN-listed species potentially found in OFDA	Directly relevant	Significant but mitigable	Site-specific protection measures on Environmental Alignment Sheets. Project policies on hunting, fishing, bushmeat, etc.	Evaluated in detail in section 6.2	See section 6.2
Air quality	Relevant	Significant but mitigable	Design in accordance with the air quality standards of the World Bank Group and other internationally accepted organizations	Adequate	Not required
Pipeline reinstatement	Not relevant				

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The assessment has concluded that existing mitigation measures are being implemented in accordance with the requirements of the existing Environmental Management Plan (EMP), the Chad Resettlement and Compensation Plan (CRCP) and the Land Use Mitigation Action Plan (LUMAP). Nonetheless, the implementation of the existing mitigation measures can be improved, and further mitigation measures should also be evaluated and implemented.

Recommendations for improved implementation of existing mitigation measures and for additional mitigation measures are as follows:

1. More Informal Direct Interaction between the Land Management Manual (LMM) Socio-economic and Land Use Mitigation Action Plan (LUMAP) teams.

Land Use Mitigation Action Plan (LUMAP) team members would benefit from more informal direct interaction with all other socio-economic team members so LUMAP outputs can be integrated with Socio-economic outputs, thus allowing the Project's full accomplishments and synergies to be realised and conveyed. While there are formal weekly meetings between these groups, more informal communications should be encouraged by managers. Also lessons learned information should be conveyed amongst groups. If there is not time to conduct a lessons learned exercise, a small amount of time can be taken during the weekly meeting on a bi-monthly basis (frequency may become less once established). Lessons learned information is captured and the information should be shared with individuals who attend the weekly meeting, individuals on rotation, individuals who do not attend the weekly meeting (LCCs and others).

For the LUMAP team to use the knowledge base assets of the socio-economic team members, decisions made on LUMAP activities should be vetted with socio-economic team members to ensure appropriate long term cultural aspects are appropriately recognised. While this has taken place for specific issues, it is unclear if this approach is taken for the majority of decisions made.

For example, many of the Local Community Contacts (Socio-economic team member) have a longstanding association with the Project and their historic knowledge should be highly regarded – frequent (weekly or thereabouts) meetings should take place in LCC offices with LUMAP supervisors, socio-economic supervisors and LCC personnel present to discuss issues that need to be addressed and resolved; it is important for the OFDA villagers to see that all are on one team; if an issue is too sensitive the meeting could take place at the Project Kome 5 offices. The intent is to work more cohesively and that “on the ground” team members be involved in decision-making.

E.g. The EMP-IS database specialists could review information found within the socio-economic database based in N'Djamena to find out ways to incorporate certain data sets which would make the EMP-IS even more encompassing. The review should begin with information on Public Consultation and Market Surveys but all areas should be reviewed.

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2. EMP, LUMAP and socio-economic team members.

As part of the ongoing approach to work in the most efficient manner when managing issues within the LMM, it would be useful to set-up an internal review/audit process whereby Project staffs engaged in the implementation of the LMM are critically reviewed to ensure they are working as effectively as possible, and LMM positions and outputs are attaining required levels. Such a review should also ascertain most advantageous way to capitalise on Project's outputs and to properly demonstrate Project accomplishments. These outputs and accomplishments would be useful to include in various reports (Updates to IFC) and within reporting mechanisms EMP-IS and/or socio-economic database.

3. Updating of Land Management Manual (LMM) In-Kind Compensation Options

Individuals in the various Project-affected communities are clearly attaining a higher level of development and gaining a better financial situation, and better livelihoods. People's livelihood requirements are altering and accordingly, in-kind catalogues updates should reflect these changes. In-kind options should be altered to reflect the current livelihood enhancement needs. There is a definite step change in the development level of the areas within and around the OFDA. Project

4. Upgrading of the LUMAP Reports

EEPCI Village Impact Monthly and Quarterly Reports

A section that considers other types of impacts on villages would be beneficial to either the Quarterly Village Reports or the Semi Annual Project Reports. The latter are automatically posted on the [www.essochad.com](http://www.essochad.com) website which would facilitate outside access. Inclusion in the Quarterly Report would provide more current information. EMP and IFC should seek the optimal form in which to present the additional information.. This section should include information from the Socio-economic and EMP teams that are pertinent to the activities taking place. Information directly gathered from Local Community Contacts (LCCs) along with statistical data gathered from the socio-economic team that forms the Socio-economic database. Market Survey, Public Consultation and all other data should be reviewed and potentially included. Other high level aspects that could be included in this section are:

- Relationship and tasks accomplished with communities via LCCs and Local Hiring Coordinators, etc
- Messages conveyed and consistency in messaging; relationships and grievances amongst and between communities
- Response from local stakeholders – more than just the household (HH) survey regarding land and ownership
- Identification of other impacts, including Health and Safety
- Issues management – relating to more than compensation
- A certain level of this type of information is touched on at the end of section 4.2 Compensated and Returned Land by Facility Type.

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## 5. Consideration of the “Integrated Stakeholder Engagement” (ISE) methodology

The concept builds on the Project’s “touch” concept, but takes it to a more inclusive level and looks at “touches” on a stakeholder basis as opposed to an activity basis. (In other Projects, a more open yet managed approach has proven to afford more options and a better strategic approach when interacting with stakeholders.) Therefore, every time the Project “touches” an individual stakeholder or group of stakeholders, the information is shared amongst team members to:

- Capitalise on lessons learned and help develop the best go-forward approach; ISE allows individual teams to be more efficient and enables teams interacting with affected stakeholders to work together and to realise that each of their actions affects the other persons work. It also assists Project personnel to better understand affected stakeholders decisions/and or reactions to Project activities. It can also minimise the “silo” effect, whereby not all Project information is shared with Project personnel who could easily be assisted in their everyday work activities by knowing this information.
- Ensure that no mixed messages are conveyed
- Focus on each team’s efforts, ensuring that they are contributing positively to the Project’s “licence to operate”, and all efforts are valued equally. Information on Corporate activities and meetings also need to be conveyed (i.e. Corporate community investment and new Projects being funded). By sharing this type of information, Project personnel have a full perspective of Project activities and are better able to work with affected stakeholders.

In the Land Management Manual, EMP, Socio-economic and LUMAP Supervisors/Managers job descriptions, responsibilities and key duties should also include the following:

- Ensure team members are cognizant of Integrated Stakeholder Engagement (ISE) and its importance for managing stakeholder expectations and that they follow the ISE approach<sup>23</sup> in everyday business activities. As no changes are going to be made to these documents, perhaps this can be conveyed in the various meetings that take place.

Key Performance Indicators (KPIs) were discussed at length with EEPCI and IFC representatives. The LUMAP team has reviewed Chad’s Millennium Development goals and will develop four KPIs they will track on a regular basis<sup>24</sup>. These KPIs will be made part of the Operations Integrity Management System. OIMS is an ExxonMobil-wide process that sets out clear and measurable goals to be met on a regular basis. LUMAP will add the KPIs to OIMS section 6-5 on Environmental

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<sup>23</sup> The concept of Integrated Stakeholder Engagement is that all actions affect stakeholders and if teams work in an integrated fashion, there is a stronger possibility for better Project management. Currently, these three EEPCI groups interact but the interaction is not as formalised as would best suit Project and lender needs. More detailed data can be conveyed, including ISE parameters along with other examples if the Project decides to adopt this approach

<sup>24</sup> A general list of socio-economic indicators is included in the Annex D.

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Management. In so doing LUMAP will set this process up as a sub-system containing: Scope of Work for KPI monitoring; Procedures; Roles and Responsibilities; Verification Measurements; and Continuous Improvement. This will ensure that this environmental task is handled in a deliberate and ratable fashion and that, as the EMP department evolves over time, these specific metrics will continue to be collected and reported. See Annex G.

It will be difficult to compare these KPIs within other non impacted Project areas within Chad as the national statistics are most usually not available. Although they will be unable to compare this data against a like survey within Chad, the Project can tie their own data back to the MDGs for Chad because they have been conducting socio-economic surveys over the life of the Project.

Other recommendations include:

- Ensuring that the Socio-economic team has sufficient resources to carry out the Socio-economic monitoring.
  - Continue to work with NGOs to implement the sorts of training and development Projects which NGOs know well. For example, the NGO doing Business/Literacy/Arithmetic Skills has suggested several additional activities that would support their training results and EMP has accepted the ideas.
  - Continuous field interaction reinforcing the valuing of PAPs, Households, Traditional and Local authorities.
6. Potential for conversion of riverine lowlands in the OFDA: EEPIC should proceed with its stated intention to engage one or more agricultural research institutions to further evaluate the potential to generate new agricultural land from riverine lowlands in the OFDA
  7. Potential for conversion of riverine lowlands in the OFDA: The available baseline data on the Nya and Loule rivers needs to be updated and expanded in respect to their:
    - Existing use for agriculture.
    - Use as fisheries.
    - Use by pastoralists (including nomadic and sedentary cattle herders).
    - Importance for wildlife
  8. Potential for conversion of riverine lowlands in the OFDA: The updated and expanded baseline should be used together with the results of the evaluation by agricultural research institutions to conduct an appropriately detailed social and environmental assessment of the proposed conversion of riverine lowlands in the OFDA.
  9. Potential for conversion of riverine lowlands in the OFDA: The grassland savanna located in the vicinity of an oxbow lake on the west side of the Pendé River, east of Mogrom and near the eastern extremity of the OFDA was identified by the Chad EA biological studies as 'unique'. If this area is a potential source of riverine lowland for

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conversion to agricultural land, a comprehensive impact assessment should be conducted, focussing on the biological values of the area.

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## **Annex A: Terms of Reference**

## **Esso Exploration and Production Chad, Inc**

### **Terms of Reference (ToR)**

**For**

### **A Focused Environmental and Social Assessment of Incremental Impacts**

#### **Introduction**

The purpose of the ToR is to provide an incremental/focused Environmental and Social Impacts Assessment (ESIA) of the planned infill drilling program in the Kome and Bolobo oil fields in the Oil Field Development Area (OFDA). The assessment will use as a starting point the Environmental Management Plan (EMP) prepared for the original project in May 1999. The assessment will examine whether the mitigation measures proposed in the Environmental Management Plan and the 2007 Land Use Mitigation Action Plan (LUMAP) are sufficient to deal with any increased impacts that may occur as the result of continued drilling. The assessment should not last longer than two weeks in the field in Chad (Kome and N'Djamena).

#### **Background Information**

The Esso Exploration & Production Chad Inc (EEPCI) objective is to produce, transport, and sell oil from three oil fields in the Doba basin of southern Chad (Kome, Miandoum, and Bolobo fields) to world markets in a manner compatible with the balanced environmental, social and economic needs of the people of Chad.

EEPCI includes the oil field development in Chad, and a pipeline transportation system originating in Chad that traverses Cameroon, including a marine terminal facility off the coast of Cameroon. The original design for the Three Fields called for drilling approximately 287 wells. However, as a result of well productivity issues, this number of wells increased to approximately 450 wells.

Due to continuing difficult reservoir conditions, production levels are decreasing. In order to address this issue, a new infill program is being developed to meet production targets. The infill program essentially adds wells to the existing Kome and Bolobo oil fields reducing the current forty (40) acre well spacing to twenty (20) acre spacing .

This ToR addresses assessment of the potential increased environmental and social impacts regarding the planned in fill drilling program. Given that EEPCI's EMP department is in the process of conducting Village Land Use Surveys in the seven villages that will be impacted by the planned in fill drilling program (will not be completed until mid 2009), the proposed social impact portion of the assessment may require a phased approach, namely:

- Assessment of the results available when the team is in the field
- Subsequent assessment of the additional data collected and analyzed by the third quarter 2009

Other, biophysical, considerations include:

- The workforce will not significantly increase with the infill drilling program
- EEPCI will use existing camps
- No additional gas wells are planned in the infill program
- Volume of contact rain water with well heads, well pads, and roads will increase
- No changes to the Central Treating Facility nor Utilities Plant are planned in the Kome-Bolobo infill program

EEPCI and the International Finance Corporation (IFC) recommend that the consultants review the company's Chad website at [www.essochad.com](http://www.essochad.com). The following materials found on the website will be helpful in preparing your proposals:

1. Project Update Reports (web site) and the External Compliance Monitoring Group (ECMG) (June 2008 report attached to this ToR)
2. Land Use Mitigation Action Plan
3. Independent Evaluation Study of Compensation and Resettlement, and
4. The Library

## Objectives

### Task 1: Scoping Document(s) and Initial Consultation

At the beginning of his mission to Kome, the Consultant will meet with EEPCI's staff to receive a formal presentation on the planned Kome and Bolobo fields infill program. Based on this presentation, the Consultant will assess and request from EEPCI the specific documentation and database information that will be required to begin their assessment.

- The Consultant will use the May 1999 Environmental Management Plan as a baseline for the focused Incremental Environmental and Social Impact Assessment for the infill program.
- The Consultant will confirm with EEPCI the following:
  - Thresholds:**
    - 2/3 corde of dry land per compensated household member threshold
    - Appropriate equivalent threshold for riverine cereal farming
    - Appropriate equivalent threshold for riverine vegetable farming

**Objectives:**

Livelihood restoration Key Performance Indicators (KPI)

- Equivalent value of land assets surrendered
- Equivalent value of prior production
- Threshold land holding

Environmental protection KPI established in the EMP

- Air Emissions
- Surface and ground water emissions

**Physical Boundaries:**

The two oil fields involved in the infill drilling program (Kome and Bolobo)

**Time Frame:**

Summer 2008 through year end 2013 (five year outlook)

- The Consultant will identify:
  - PRIOR Potential socio economic issues that may result from additional drilling in Bolobo and Kome fields
  - Assess potential impacts of generating new farm land from the riparian zones of the following riverine lowlands

<b>River</b>	<b>Village</b>
Pende	Madjo
Nya	Danmadjia
Loule	Mbanga, Bero, Mouarom
  - Identify potential impacts due to actions and possible effects of the planned infill drilling program for Bolobo and Kome fields, i.e.:
    - Biophysical: air emissions, sewage/wastewater discharges, surface water and groundwater protection, surface and groundwater consumption, soil, vegetation, solid waste generation, treatment and disposal;
    - Socio-economic analysis of:
      - At Risk individuals/households
      - Sustainability of livelihoods
      - Potential additional impacts of project land use on village land resources (given LUMAP addresses cumulative prior impacts)
      - Dry Land agricultural production
      - Individual/village/community resources
      - Access to resources
      - Potential for relocation
      - Host Communities
      - Community safety
      - Vulnerable groups (gender, age, skill, ethnicity)
      - Community consultation and engagement.

## **Task 2: Analysis of Impacts**

- The Consultant will analyze the incremental impacts on the above aspects using existing data already available from EEPCI's extensive monitoring programs and the newly developed EMP Information System (EMPIS).
- The Consultant will assess the potential impacts of the proposed infill program in all of the above parameters, extrapolating, if necessary, from primary data.

## **Task 3: Identification of Mitigation**

- The Consultant will recommend additional mitigation measures if needed, based on the assessment of the incremental impacts due to the additional wells that will be drill in the Kome-Bolobo program.
- The Consultant will make recommendations regarding the EMP implementing procedures as per EEPCI's Operations Integrity Management System (OIMS) Management of Change (MoC) process.
- The consultants will assess the mitigation measures and procedures currently in place and the mitigations currently under investigation by EEPCI.
- The Consultants will review, from an environmental and social impacts perspective, the new mitigation measures EEPCI is proposing for the land use impacts which include the following below. These measures will be reviewed in order to ensure that the activities are compatible with local farmers production systems and capabilities as well as sustainable over time:
  - Generating additional farm land from Riverine Low Lands, including environmental impact on the Riverine low Lands from engineered levees and berms for rice farming
  - Determining mitigation steps:
    - Soil enrichment for fallow land
    - Market Gardening
    - Fish Farms
    - Livestock pens
    -

## **Task 4: Evaluation of Significance**

- The Consultant will also evaluate and provide in a matrix form the significance of the incremental effects and compare the results against thresholds as per the principles in the EMP.

## **Task 5: Preparation of a Report**

The Consultant will:

- Debrief EEPCI EMP Department and IFC in a conference call at the end of their two weeks in the field
- Prepare and provide to EEPCI EMP Department and IFC a Draft report within one month of the conclusion of the field activities. The draft report will include the findings, conclusions and recommendations, supported by summaries of the data collected/reviewed, and citations for any references used in interpreting data.

The IFC and EEPCI EMP Department will review the draft report and provide comments.

The Draft Report shall be submitted by the consultants within two weeks of receipt of the IFC and EEPCI EMP comments.

The consultants will send the Final Draft Report to the IFC and EEPCI EMP for approval prior to publication.

### **Selection of Consultants**

The selected Consultant must demonstrate specific skills, experience and externality. The consultant shall include in its technical proposal a multidisciplinary team to perform the activities described in the above sections.

The multidisciplinary team should include a:

1. Senior Environmental Specialist
2. Senior Social Specialist (agronomic background preferred)

Both of the above specialists should have sufficient background to assess the Community Safety aspect of the Focused ESIA.

The Consultant will include in its technical proposal the curriculum vitae of the above mentioned specialists. The Consultant will have relevant experience in the oil and gas industry, and relevant experience in similar Land Use/Resettlement projects.

Consultant's proposals must include:

1. Technical Proposal
2. Curriculum vitae of their team members
3. Commercial Proposal
  - a. Professional services rates and expected hours
  - b. Travel costs
  - c. Report Preparation Costs – non professional services costs and out of pocket expenses

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## **Annex B: Extract from EAESU**

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## Annex B: Extract from EAESU

### **Wooded Savanna Zone**

*Oilfield area to the general vicinity of Mararaba  
Pipeline kilometer 0 to approximately kilometer 495  
Environmental Alignment Sheets 1 through 72  
— Zone Map on page 6-8*

### **Human Environment**

Two main groups populate the Wooded Savanna Zone. There is the permanently resident rural population of subsistence farmers and there is a transient population of transhumants who migrate through the area as their cattle herds follow the seasonal availability of fodder and water.

#### **Population**

Population density in Chad, in the oilfield area, is low and rural. However, even at that low level, the population density in the oilfield area is relatively high for Chad. That has to do with the fact that southern Chad is relatively well-watered and fertile compared to the arid desert terrain of northern Chad.

The primary administrative unit in the oilfield area is the prefecture of Logone Oriental, where 80% of the population are rural farmers. Population centers in Logone Oriental include Doba (population 18,000 and the regional capital), Bébédjia (9,000 and subprefectural center for the oilfield development area) and Baibokoum (population 10,500). The town of Moundou (98,000) is across the river from Bébédjia in the prefecture of Logone Occidental.

The population density in the Cameroonian portion of the Wooded Savanna Zone is even lower than that in southern Chad. This reflects the fact that the conditions in the Wooded Savanna Zone are a sharp and relatively desolate contrast to the rest of Cameroon to the west, with its much higher rainfall and large tracts of forest.

#### **Health Care, Schools and Roads**

People in southern Chad are very poor and health care in the oilfield development area is nearly nonexistent. World Bank Group statistics indicate that average life expectancy in Chad is less than 50 years. One out of five children die before reaching the age of five. (For more details, see the table of Socioeconomic Conditions in Chad on page 2-4.)

In addition to health problems related to poverty-induced malnutrition and poor sanitation, six diseases rank at the top of the many diseases that

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burden the population throughout the project area. Those six diseases are malaria; sexually transmitted diseases, including AIDS/HIV; tuberculosis, which is on the rise due to the incidence of AIDS/HIV; hepatitis; onchocerciasis (river blindness); and schistosomiasis.

The river systems of southern Chad create year round habitat for several vectors that contribute to this list of six most prevalent diseases. For example, malaria is a year round issue in southern Chad, whereas it tends to be a seasonal one elsewhere in the project area, ebbing and flowing with the annual rains. The river systems also contribute to greater problems with water borne parasitic diseases, including river blindness and schistosomiasis.

AIDS/HIV infection, although generally a problem throughout west Africa, rises to very high levels (an estimated 40% incidence rate) among truck drivers and other transient trades people who utilize the services of prostitutes. There is, for example, a concentration of AIDS/HIV infection among the population at the Cameroon/Chad border in the vicinity of Touboro where there is a frequently used dry season river crossing.

Church schools are the reason that a relatively large number of people in this part of Chad have primary school educations. The earliest missionary activity in Chad began in Logone Oriental and the Catholic and Protestant churches still have a strong presence. The farming population of southern Chad is primarily Christian in religious belief although animism is also widely practiced. The transhumants tend to be Muslims.

The main highway through Logone Oriental from the Cameroon border to Baibokoum and Moundou is a dirt road that has not benefited from serious maintenance since 1969. The national highway that crosses northern Logone Oriental from Moundou to Doba and on to Sahr is an "all weather" laterite road. However, it is closed after rain to protect its surface from damage when it is softened by the rainwater.

### **Mobility**

Although the western image of farming is one of stability and permanence, individuals and entire villages in southern Chad commonly move in a search for fallowed fertile land to grow their crops. Traditionally, when local farmers lack fertile land nearby, they move closer to their best fields or they settle in uncultivated bush.

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Thus, self-motivated resettlement is a common local phenomenon. A study showed that approximately half the population in the oilfield development area has voluntarily resettled at some time.

Another past reason for mobility has been civil strife, which has severely hampered the maintenance of a social infrastructure, particularly education. Most recently, civil war from the mid-1970s to the mid-1980s has been resolved, resulting in the relative calm that exists today.

### **Farming Life**

Farmers engage in the traditional subsistence farming technique common to the savanna, which is rotating slash-burn-fallow. They grow sorghum, millet and some sesame. Manioc increases in importance as one moves west and south towards Cameroon from the oilfield development area.

Cotton is the main cash crop. Good potential markets exist in Cameroon and the Central African Republic for peanuts, sesame, small ruminants and grain. However, the high cost of transportation, the poor roads, the poorly maintained vehicles and inadequate agricultural credit restrict people to subsistence farming.

Life in rural southern Chad follows the rhythm of agriculture and the rainy season.

- Agricultural activity starts in March through May with field preparation.
- June through September is the busiest time, when sowing and weeding demand constant attention. This busy time is also the time of year when people have little or nothing left to eat from the previous harvest.

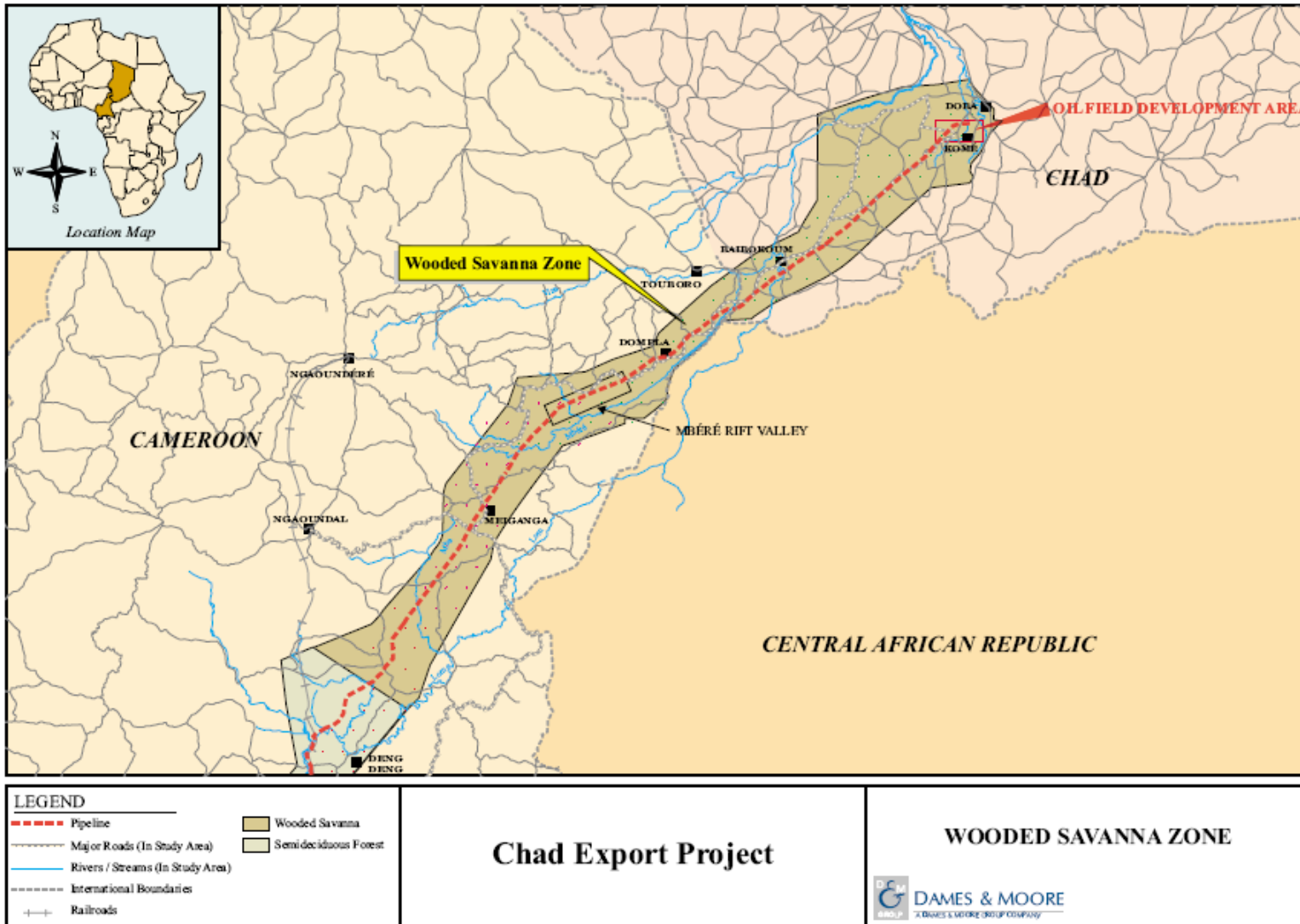
This busy season is also the rainy season, making roads and rivers impassable so that people generally cannot get to market to buy food, even if they have money to purchase it.

- Harvest takes place from September to January.
- The slow time of year is January through March, when people construct and repair houses. It is also a time of religious ceremonies.

### **Biophysical Environment**

The oilfield development area and the initial portion of the pipeline route is characterized by an extensive area of disturbed savanna that extends from the Doba Basin in Chad to the Chad-Cameroon border at the Mbéré River.

Aerial and ground surveys, village and hunter interviews as well as transect surveys were used to develop the large mammal information for the Wooded Savanna Zone. A total of 17 IUCN-listed species were reported in the zone including the African elephant, hippopotamus, cheetah and African wild dog.



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**Annex C: Data on the disposition of  
known well pads within the various fault  
blocks and in relation to local village land  
holdings**

## **FAULT BLOCK CONCEPT**

### **Definition of a Fault Block**

The infill drilling program is to be implemented in sections called “Fault Blocks”. A Fault Block is a geologic feature of an oilfield. A discrete section of the field, called a Fault Block, shares the same oil-bearing formation and characteristics. The formation and characteristics are first defined through seismic exploration but more thoroughly defined and understood through the behavior of oil wells as they continue to produce. Thus the comprehension of the extent and nature of fault blocks increases with experience in the oilfield.

With this developing understanding Reservoir Engineers attempt to optimize production of increasingly clearly defined portions of the oil field. They develop strategies for dealing with the characteristics of each particular Fault Block. Working on these small, defined geological areas they are able to exploit the good producing areas while making decisions not to disturb other, less productive areas.

### **How working with Fault Blocks reduces impact**

The Reservoir Engineers have also grown sensitive to minimizing land take. Fault block by fault block, Reservoir is giving the EMP team the location of all the wells which need to be drilled within the footprint of the Fault Block while in the past, locations of wells were known only one request at a time. The fault block process allows the minimization of land required for access roads, flowlines and electrical lines. Because land in a fault block has already been used for well pads, roads and facilities, these can be reused or reconfigured to minimize land take. Reservoir is working with the Environmental Management Plan group and with Construction to use over again or to modify existing construction – access roads to well pads, electric and flow lines. Much of the land to be used in a fault block is land already in use as pads, roads, electrical lines etc. From the construction standpoint it also becomes possible to recycle the laterite construction material already laid down from less productive areas of the fault block. This reuse means new areas of land do not need to be disturbed by mining. This is a bonus as finding nearby sources of laterite is difficult and moving it long distances is expensive.

Working by fault block allows most construction, drilling and initial reclamation work to be done within a shorter and limited period of time.

- Reuse takes less time than new construction.
- Moving laterite from abandoned area to new construction; moving topsoil from new construction to reclaim abandoned area, recycles already acquired land, reduces EEPCL costs and speeds up reclamation.
- Reduces BP surface area.

- Allows efficient and effective one time reclamation and return rather than continuous reopening of same trenches where land has been restored, returned and then reacquired and reused.
- Reduces loss of topsoil from reclaimed land that is then reopened
- Less disruption to community and to farming as work occurs within limited time
- More efficient use of construction equipment/labour is good for EEPCI
- Reduces number of quitus whose signature process has begun but not finished before the land is requested again. I.e. fault blocks costs the farmer nothing & reduces EMP paperwork/legwork.

By working block-by-block, the project will be able to optimize the pattern of access roads, flowlines and electrical lines, regulate the amount of land required, and reduce the period of construction needed to continue development of Chad's oil

### **How to assess social impact using fault blocks**

A fault block defines the maximum degree, or “worst case scenario” of impact on land and people. Only land within the fault block will be used and only those using this land will be affected. Fault blocks define where to look for people who will be impacted. With satellite photography and the EMP-IS database and maps the EMP team can identify who is farming in the fault block area, their houses, shelters, etc. Any area within a fault block for which such EMP-IS information has not yet been collected can be (and has been) immediately targeted for inclusion in the EMP-IS.

Working by fault blocks reduces the need for additional land, as discussed above. It also facilitates the identification of social impacts. On the surface the subsurface layout of productively producing areas circumscribes the area of land that will be targeted for more intensive exploitation. From the social standpoint this means that fewer people will be impacted because construction has already removed some land from agricultural use. It means, in fact, that the same people already impacted are most likely those who will be impacted again. The number of HH impacted will not increase by much, but the same HHs will be impacted again.

### **Fault Blocks outline who may be impacted but not the degree of impact**

Initial understanding of who could be impacted in a fault block can be rapid but approximate even without full village mapping. If EMP-IS identifies people already compensated for land in the fault block and already knows their resettlement status (based on earlier compensation data and resettlement choices), then it is likely these people could lose additional land, so EMP knows it must ensure that non-viable HH are still able to pursue effectively their chosen resettlement option, or else offer other options.

But determining the degree of impact on a household using land in a fault block depends on mapping all a household's fields. Individuals classically pursue a strategy of cultivating land in several areas in order to minimize crop risks; if pests get one field, or the river floods another, there will still be other fields elsewhere that escape. Taking land within the fault block does not, therefore, necessarily deprive a farmer of all his land (though it can).

The reason for which EMP Impact Teams were created is to measure all the fields of a person/household just identified for compensation and enter the up-to-date information into the EMP-IS. The new land acquisition is subtracted from the holdings and viability calculated. If non-viable the social team advises on resettlement options.

The Impact Team's information is a step in defining the impacted household's status. But for a clear picture of each household's land holdings LUMAP experience with mapping for the Village Site Specific Plans shows that mapping all the fields within a village area is needed for an accurate picture. As the mapping covers more and more of the area, the landholders of those fields that have not been claimed are identified and their total land holdings are known with accuracy. Hidden fields are uncovered that belong to seemingly "non-viable" households.

### **Predicting who will be impacted and by what degree**

Given the agricultural system used in the OFDA, the use of a piece of land shifts frequently between field and fallow, the contours change depending on the crop being planted and the energy of the planter. The planters change as well between different members of the family, neighbours, and relatives from other villages, etc. Who is cultivating what exactly where cannot be known until the compensation identification team hits the ground and makes an identification.

What complete village mapping does do is offer a tool for predicting impact. When a village is surveyed everyone's approximate status is known:

1. Already non-viable
2. Near threshold (between just over 2/3 corde/HHM to 2.5 c./HHM)
3. Land rich (2.5 cordes/ HHM)
4. Non-agricultural income sources

The maps reveal the land holdings of everyone within the fault block at the time of the mapping. Most of the people identified will be the people that will be affected by the new land requests. The impact of the request on their situation can also be evaluated. The EMP-IS can list:

1. The number of, and identity of, non-viable HH within the fault block
2. Same for HH near the threshold of becoming non-viable
3. The number of land-rich HH who are most unlikely to be greatly affected
4. HH with additional non-agricultural income sources to offset land take

The EMP-IS indicates the households that need to be monitored – categories 1 and 2. The EMP-IS can also indicate the large landholders with land OUTSIDE any fault block, to whom non-viable individuals can be oriented for 3<sup>rd</sup> party land.

Once the compensation team has brought up to date the people farming in the impacted area, then for recently mapped areas the EMP-IS can define the actual impact, subtracting the new compensated area from the amount available to the household. For areas not yet mapped, the Impact Team sets to work, but unless all the fields in the village have been identified it is less able to accurately define impact and more likely to overestimate a household's non-viability. But in either case any resettlement actions can be undertaken immediately.

For example, Fault Block 3-4, involving the village of Begada, shows how the possible impact can be predicted.

<b>Potential Impact of Begada Infill</b>		
HH status	# HH in Fault Block	%
# HH already < 2/3	6	5
# viable HH	22	20
# land-rich HH	34	31
# potentially at risk	22	20
# houses/structures in FB	0	0

**Definitions:**

- HH already < 2/3 c. Any additional land take will worsen their already non-viable status. Are the resettlement measures already taken still sufficient?
- Viable HH: HH with between 2/3c and 2.5 c of land per HHM. Depending on their current holdings and the amount of land to be surrendered they may become non-viable
- Land-rich HH: HH with more than 2.5 c per HHM. Only a massive land take would make a HH non-viable.

In fact all the construction requests for Fault-Block 3-4 have been received and the actual impact has been defined. Because the land take is occurring within the confined area of a fault block and where a number of people have already been compensated, then:

<b>Actual Impact of Begada Infill</b>		
HH status	# HH in Fault Block	%
# HH already < 2/3	6	5
# viable HH	22	20
# land-rich HH	34	31
# new non-viable HH	0	0
# houses/structures touched	0	0

Land take in the Begada Fault Block for Infill Drilling did not put any marginal HH below the viability threshold. Therefore the only resettlement action needed is to check with the HH already involved in resettlement about the continued tenability of their choice of option.

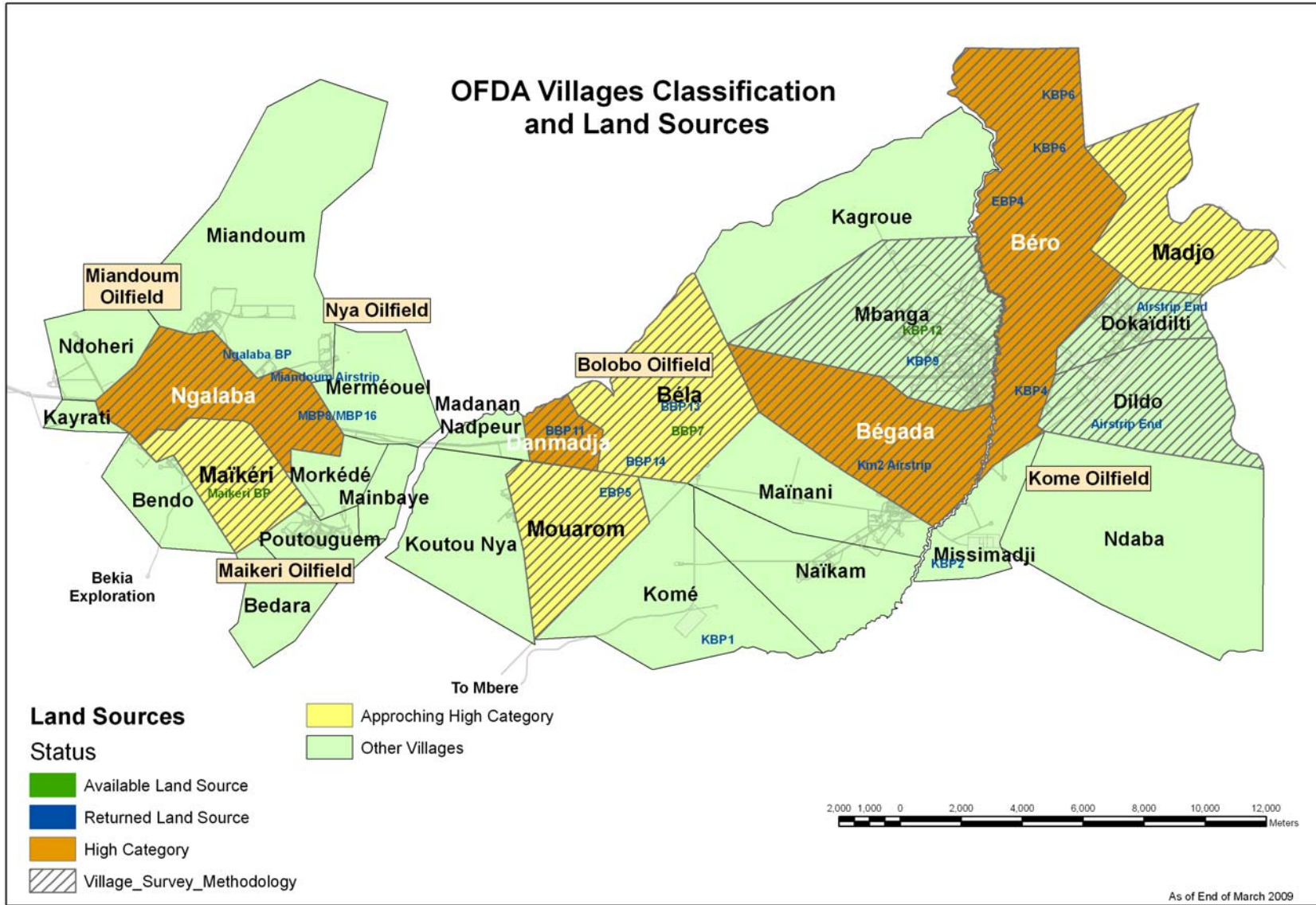
Conclusion:

- Working by fault block is the natural outcome of a learning process aimed at maximizing production and minimizing investment in drilling and construction.
- Construction is, additionally, minimized through the reuse and modification of existing project infrastructure above the fault block areas being maximized.
- Intensifying the use of an area means that the people already compensated for land in that area are most likely the people who will be affected again.
- The EMP-IS allows EMP to predict in advance the people who will probably be impacted and the probably outcome of that impact.
  - For HH already non-viable their situation can be monitored and resettlement options readjusted – in any case this happens automatically with resettlement monitoring.
  - For HH near the threshold, once compensation identification has been done then their resettlement status can be calculated and resettlement initiatives started.
  - For large land holders their situation will be recalculated to check that they remain viable.

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## **Annex D: EEPCI Data Analysis**

## OFDA Villages Classification and Land Sources



### **Note on Data**

Data in this presentation has been analyzed to reveal the relationship between the population and its land area. To understand this relationship prior to Project impact, the National Census figures from 1993 have been compared to the village chief's census figures from 2000 (collected in early 2001 by TCC construction contractor) and the chiefs' figures from 2007. In cases where a full village survey has been completed (2Q 2007 – 4Q 2009) the survey's population figure has been used for the size of the current population rather than the chiefs' declaration of 2007 population.

The data used for the year 2000 does not precisely present the pre-project situation. Land was acquired in 1998 (before the Consortium broke up) to be used for Camps, Lay-down Yards, and the Export Pipeline. Some of the compensated villagers continued to farm the land until the Project resumed in October 2000, but the vast majority stopped farming after the harvest in 1998. Therefore this land was withdrawn earlier from the village land pool than 2000. Because no population figures for 1998 were available, to calculate population density for the villages that had surrendered this land in 1998, the 2000 population figures were divided by the amount of village land remaining after 1998.

Likewise, the size of HH land holdings was not surveyed early in the Project. To arrive at an estimate of the HH's original situation the sum total of all areas compensated (GIS-measured to the meter square) has been added to the current GIS-measured holding of the HH. To determine the viability of the HH before the Project, the earlier holding is divided by the current number of HHM to arrive at the prior resettlement factor. These figures are approximate; the HH may have surrendered fallow land to the project which was not compensated except through Community Compensation, and so this land is not accounted for in the HH's pre-Project holdings. The HH's earlier land holdings are thus probably underestimated. Nor was the pre-Project HH size necessarily today's registered number of HHM. The reliability of declared number of HHM is, however, suspect whereas the village survey of numbers today is at least confirmed. Therefore probably a larger area of land has been divided by a bigger or smaller number of HHM to arrive at the original resettlement factor. But the result serves as an estimate.

The information derived from the village surveys consists of a demographic and economic survey of the all the HH heads and their dependents coupled with a measurement of all land within the village boundaries and its attribution to one household, or its classification as bush/sacred site or settlement area. When villagers indicated fields they possessed outside the village boundaries these fields were also measured. But other farmers may not have pointed out their fields outside the village limits and so under-represented their true land holdings. Only when adjacent villages are both subject to village surveys are all fields farmed in the other village determined.

Dokaidilti's survey was completed at the end of 2007, so its population figures are current as of that date. Ngalaba and Dildo were completed in mid-2008.

Danmadja, Mouarom and Bela were finished in 1Q 2009. Begada and Mbanga, were finished in 2Q 2009, Madjo in 3Q 2009 and Bero in 4Q 2009.

The total village land area has been calculated on the basis of lines drawn between various GPS points taken at spots where the village chief stated his village's border ended. In some cases the neighboring village also laid overlapping claim to the same land. These discrepancies were not resolved in order to avoid political problems, so the village land area equals the land within the boundaries shown by that village's chief. In villages where a neighbouring village has moved onto the targeted village's land, this area farmed by outsiders has still been counted as appertaining to the targeted village.

The household (HH) has been tallied as the Head of HH (HHH) plus all the individuals (HHM) s/he claims as dependents; these dependents have been cross-checked and do not belong to any other HH. However, some members of the HH (especially wives) may have their own land holdings derived from their own paternal family. As long as these women are dependent on the HHH, their land has been counted as part of the HH's available land, even though it does not make up part of the inheritable land pool of the male HHH and his dependents/siblings and other paternal relatives. Nevertheless the HH has access to the products of this land, which the dependent female contributes, according to her own wishes, to the maintenance of her dependents and husband plus his family.

The quality of the village survey must be contrasted with the declarative data of individuals who are being compensated for an area of land<sup>1</sup>. Recorded in the compensation database is their declaration of the area of their land holdings (fields, fallow) and the number of dependents supported by this land. When this declarative information given by an individual is compared to the information gathered in a village survey (in which no one can be claimed as a dependent by more than one person; all land within the village boundary is identified by its user) the results are striking. The number of dependents counted rather than declared decreases and the area of land measured tends to increase. In other words, the (smaller) number of people a land user supports on his land divided by the (larger) amount of land yields a "viability" or "resettlement" ratio (cordes of land available to each household member) that more often indicates that the household is viable than the declarative data tends to do.

The difference between the number of dependents declared and the number counted tends to be smaller, i.e. people declare a number of dependents closer to the number counted, than the difference between the amount of land declared and the amount measured (i.e. people tend to seriously underreport the amount of land they have available). The comparison of declarative and

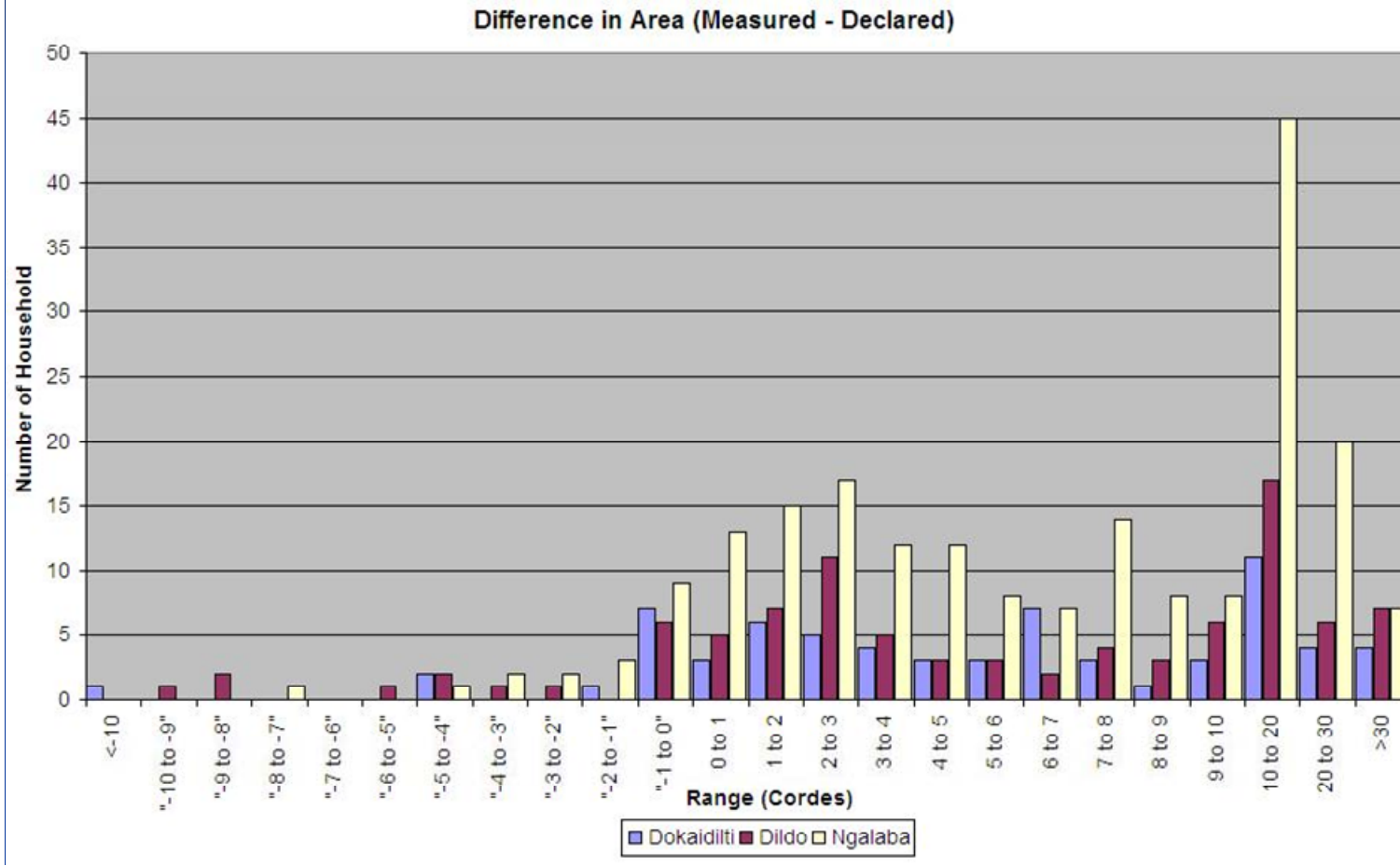
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<sup>1</sup> Since all land used through customary "rights" belongs to the State, the land itself is inalienable except through government-sanctioned land title and land registry. Use of inalienable customary land can be transferred through mutual agreement and payment for any investments made on the land. Hence the Chad Project arrives at mutual agreement on use of the land and pays the user for investments (crops, trees, structures, labour).

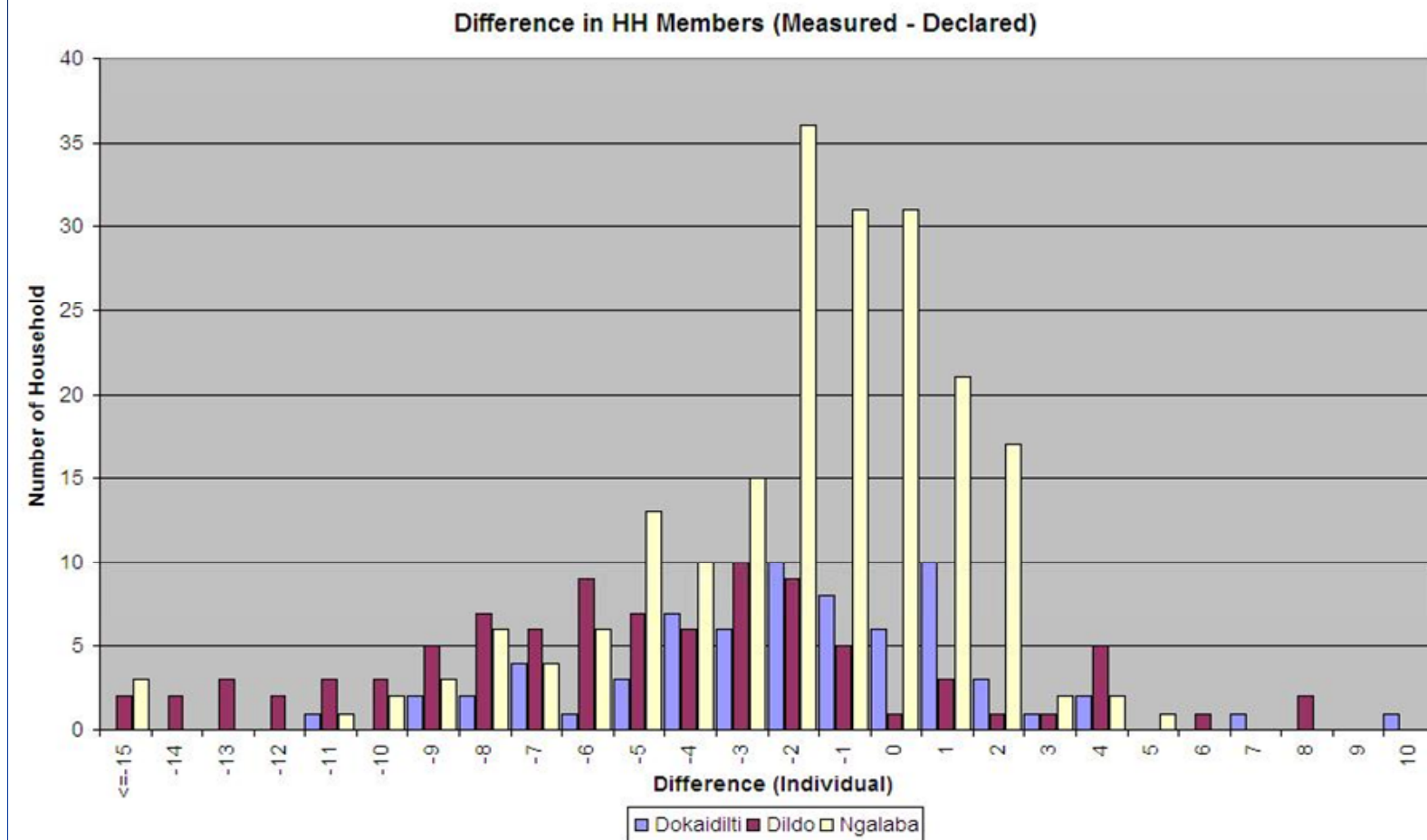
reported data appears in the three charts below. The differences between the declarative, village survey and the “Fast Track” data are shown in the third chart. The “Fast Track” team registers only HH Members who are counted in person and measures all the fields that the individual points out. But unless, as with the village survey, all land is accounted for and all HHM are assigned to a single HH, this information still tends towards the unreliable.

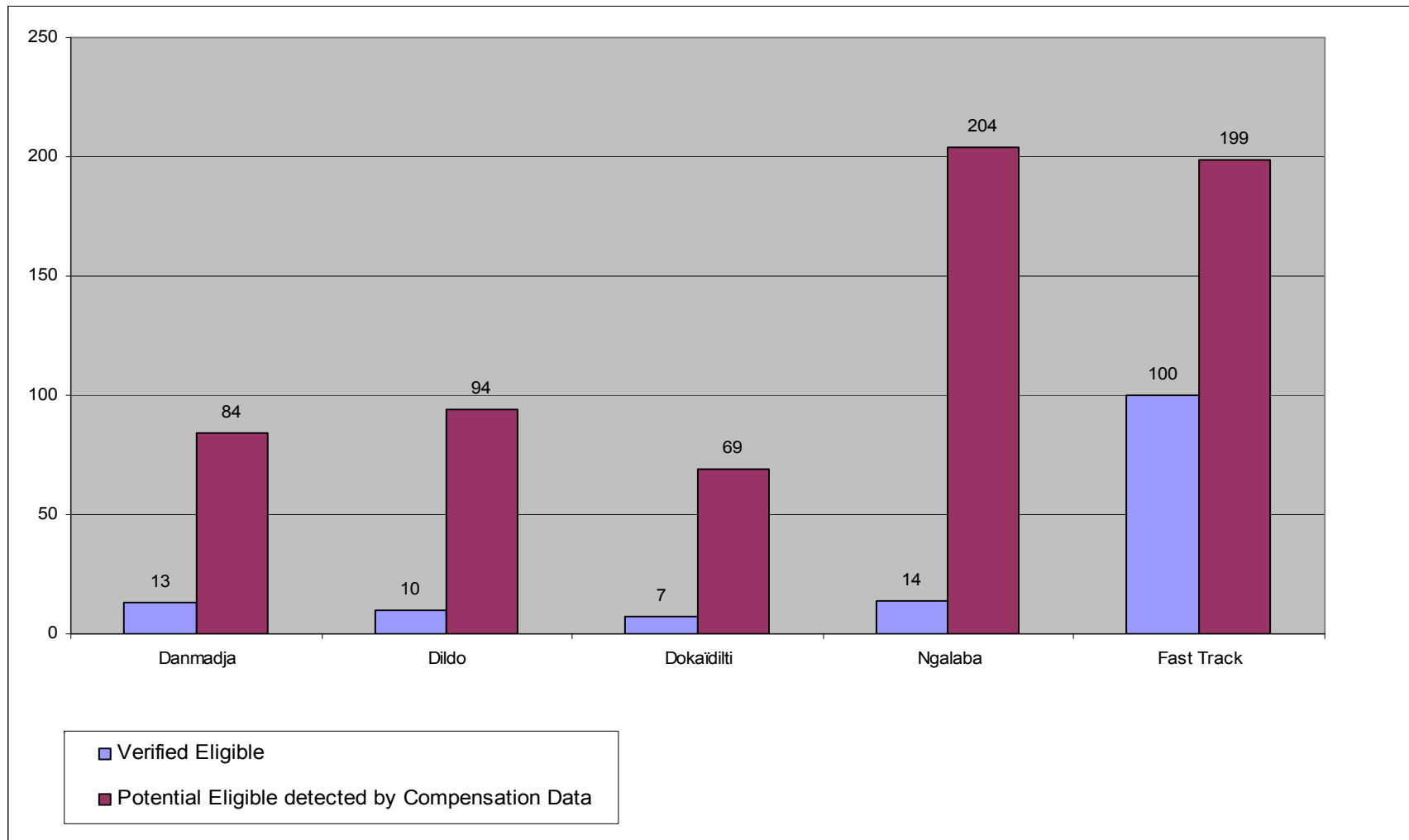
In conclusion, the Village Land Use Survey data is as close to a true snapshot in time of a village’s composition and resources as is available.

# Reported Village Land Survey Results – Charts Landholdings



# Reported Village Land Survey Results – Charts Household Size





(Fast Track = Individuals in Villages Not Subject to Village Survey)

## **Executive Summary**

Data analysis reveals that traditional coping mechanisms of population distribution and land access remain active and effective in the OFDA.

The data also demonstrate that even in areas of concentrated oil project land acquisition, land take has not caused a major impact at the village-wide level:

- First, the traditional means of balancing population and land have continued to play a major role.
- Second, direct increase in population due to the Project, rather than to natural demographic growth, has been minimal.

Land take has directly impacted compensated households (HH) whose landholdings are minimal in relation to HH size. This impact can be expressed as a “resettlement” or “vulnerability” factor of 2/3 corde per household member (HHM)<sup>2</sup>.

Other HH have seen the amount of land per HHM reduced, although they remain above the viability threshold. While many HH retain a great deal of land, some now find themselves in a “marginal” position (less than 1 corde/HHM), where any more land loss may render them vulnerable.

In the 9 village surveys where Project land take has been heaviest, less than 10% of HH are currently vulnerable. In a 1995-6 HH survey of 500 HH throughout the OFDA of 5% of HH were vulnerable (based on declarative data on land holdings and HHM). Likewise, 10% of HH of the villagers in these heavily impacted villages find themselves in a marginal situation (5% at the time of the 1995-6 survey—again, based on declarative data)<sup>3</sup>.

Multiple factors have contributed over the years to HH vulnerability, including a huge natural increase in the population between 1993 (last national census) and 2000 (inception of Project) and again to 2007. Project land acquisition has also played a role. In most cases, however, the amount of land the

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<sup>2</sup> The corde is the traditional land measure used to demarcate fields where cotton was planted as the first crop in the multi-year growing cycle. A “corde” is 71 x 71 m = 5 041 m<sup>2</sup>, or just over ½ of a hectare (10 000 m<sup>2</sup>) and has become an approximate rather than precise measurement since farmers are no longer obliged to lay out their fields with ropes. This “factor” reflects the amount of land available to most HH and their members prior to Project intervention (data gathered in 1995 and 1996 as part of Dames and Moore’s Environmental Baseline Assessment). With 2/3 corde (3 327 m<sup>2</sup>) an individual has enough land to produce the food s/he needs plus surplus land to put into fallow, which is necessary to maintain soil fertility. A person, or a HHM, with less than 2/3 c of land will find over several years that his or her fields are not able to maintain the same yield. At some point the individual will no longer be able to produce the minimum foodstuffs required for viability from the land which s/he retains and the HH becomes vulnerable.

<sup>3</sup> It is not worth speculating whether the apparent increase in number of nonviable and marginal HH can be attributed to one factor or another. The original sample size of 500 is small compared to the current 2 300 HH that are in the surveys being analyzed so its reliability is also smaller; secondly demographic increase between 1995 and 2000 has occurred even without the presence of the project.

Project has taken from any one HH is quite small (< 1corde), so the Project has had more impact on HH that were already at risk for other reasons.

The numbers in this Population Increase Table are not precisely comparable because there was not data available for all villages in all years.

Overall Pop Increase		
16 OFDA villages	1993-2007	148%
12 OFDA villages	1993-2000	67%
11 OFDA villages	2000-2007	62%

The HH that are “vulnerable” or “marginal” in all surveyed villages<sup>4</sup> demonstrate similar characteristics. These signs are similar whether or not the HH has been directly impacted by the Project by surrendering HH land, or are vulnerable/ marginal without any links to the Project. These characteristics can be used as “indicators of potential risk” in order to identify HH that may become non-viable or exposed with further land acquisition. The indicators are:

- Cordes of land per HHM – <1 corde/HHM increases risk
- Gender – women who are widowed, divorced or separated are at risk
- Age of HHH – male HHH (MHHH) in their 30s and older female HHH (FHHH) are at risk because at their age they would have accessed the family land pool if they could; either the pool is small or the HH demonstrates dysfunctional characteristics. Young men in their 20s may appear to be at risk because they have not yet accessed much of the family land pool; only a case by case examination reveals their vulnerability.
- Residence in non-natal village – residence in a village other than where one was born means that the family land pool is not immediately available; an individual may access land through kinship (e.g. mother’s village, husband’s village) but this land may be taken away.

There is little difference among the 9 surveyed villages in land access, HH size, or vulnerability, whether or not the HH fall outside or within the in fill drilling program. Not only do the 3 villages outside the in fill drilling program area (Dildo, Dokaidilti, and Ngalaba) resemble one another but their data are also comparable to the numbers from the surveys of 6 of the villages within the In fill drilling program area. Therefore the conclusions pertaining to one village pertain to them all.

- Traditional cultural mechanisms that balance land and population are still at work;
- The Project has not affected villages as a whole, even where Project construction has been concentrated;

<sup>4</sup> Surveys completed in Bela, Begada, Dildo, Dokaidilti, Mouarom, Ngalaba, Madjo-Bero, Mbanga and Bero. The data from Bero has not yet been entered and is not included in this analysis.

- Specific HH are agriculturally vulnerable (possessing less than 2/3 corde per HHM of land) or marginal (<1 corde/HHM)
- Vulnerable and Marginal HH demonstrate specific characteristics that make them so.

Project impact on HH is supposed to be offset by the various resettlement options offered in the Chad Resettlement and Compensation Plan (CRCP). Whether these options will be sufficient to offset the impact of additional HH made vulnerable by in fill drilling depends, in part, on whether these mitigations have succeeded with HH impacted in the past.

Where vulnerable HH have participated in a resettlement program (either training in a money-making skill/crop that replaces the value of the land lost or, more rarely, moving to get access to more land) most have been able to reestablish their livelihood. A number of nonviable HH have received training too recently (or are still in training) to have established a track record. Of those who graduated prior to 2007:

- 68 % have succeeded well or very well. Those who were succeeding but just on the cusp of restoring their livelihoods received reinforcement training and equipment in 2009;
- 89% of these recycled graduates made a major success of their options.
- 32% of the older graduates have not managed to reestablish themselves.
  - 2 Off Farm graduates were not at all interested in making themselves a career,
  - 1 did not succeed but is retraining in Improved Agriculture, and
  - Another in fishing and fish preservation.

Of the Improved Agriculture graduates,

- Two-thirds have succeeded very well.
- One is not interested in farming as he has a job as a menial worker for the Project, and
- One poor woman does very well at applying what she has learned but her deceased husband's family takes most of what she can make.

It should be noted that the Project has introduced a number of improvements to the CRCP from learnings over the years (access to distant village fallow, Basic Business Skills and Literacy training (BBS), reinforcement of Improved Agriculture and Off Farm skills being applied). The BBBS has been highly successful:

- 90% apply their new literacy skills
- 40% have mastered basic arithmetic skills
- 40% use their training to do basic household and business budgeting
- 30% do business planning and keep accounts
- 90% at least understand basic business concepts.

An additional mitigation that would offer vulnerable HHs an excellent means to reestablish their livelihoods is currently under study. The conversion of riverine lowlands to fields suitable for rice farming would allow farmers to conduct traditional rice farming in more areas than are currently available or to

employ improved techniques learned through the resettlement option of Improved Agriculture Training.

In all cases of HH which do not manage to reach viability within the 2 years after being affected by land acquisition for in fill drilling, the option of land through rainy season resettlement or 3<sup>rd</sup> party compensation remains. Access to unused riverine lands will add a positive option for farmers to access. Data analysis has shown that there is already ample land at the village level for these households if their access is facilitated through rainy season resettlement on distant fallow or resettlement with kin in another village. 3<sup>rd</sup> party compensation also remains an option, though it requires careful application in order to avoid multiple future claims to the same piece of land. The development of riverine areas will skirt this issue.

The information available at the end 2Q 2009 indicated that in the 4 villages where in fill drilling land-take had already occurred (Begada, Danmadja, Mouarom and Bela), the total number of HH that had been made non-viable by the additional acquisition amounted to 7592 HH (1.2%). Applying the various indicators of vulnerability, plus the simple measure of landholding per HHM for any future in fill drilling land acquisition will allow a rapid application of resettlement benefits to at-risk HH.

To date In fill land acquisition has affected a minimal number of people and village survey data indicates this will continue to be the case.

The currently projected number of HH that may be made vulnerable by the in fill program, based on measured village survey data and experience with in fill drilling to date is 46.

467 HHH in the in fill villages have land (fields/fallow) within the Fault Block areas where in fill activity will occur in specific spots. Of these, 31 HH have all their land within the Fault Blocks and no where else. Another 88 have the major part of their land holdings within the area. Thus, IF the Project were to acquire ALL the land belonging to these HH within the Fault Blocks (an extreme case), 31 would be left landless; 88 would have less than 2/3 corde/HHM; and another 44 would become Marginal (<1 corde/HHM). The greater part of the HH, 304 have some land within the Fault Blocks but most of their land lies outside of the Fault Blocks and they will be scarcely affected by in fill activities.

<b>Current Land Distribution of HH with Land in Fault Blocks = 467 HH</b>				
<b>Resettlement Factor (corde per HHM)</b>	<b>0.000-0.667</b>	<b>0.680-0.990</b>	<b>1.000-2.490</b>	<b>2.500 +</b>
<b>Total # HH with Land in Fault Blocks</b>	<b>32</b>	<b>31</b>	<b>172</b>	<b>232</b>
<b>% of All HH in 6 Villages with Land in Fault Block Villages</b>	<b>3%</b>	<b>3%</b>	<b>17%</b>	<b>23%</b>
<b># HH with ALL Land in Fault Block</b>	<b>31</b>			
<b>% All HH in 6 Villages with ALL Land in Fault Block (none outside)</b>	<b>3%</b>			
<b>% All HH in 6 Villages with Some Land in Fault Block</b>	<b>47%</b>			

Providing EMP mitigations for this number of HH (46, or even in the worst case scenario 113 over a 5 year period) will not be a challenge given the past performance of EEPCI executing the CRCP. In the past EEPCI has provided resettlement benefits to as many as 174 HH in a single year (2008).

A study of market demand for Off Farm skills (2007) in the area showed that most crafts had been saturated by earlier graduates in the OFDA; as a result this option is no longer offered in the OFDA and will not be available to in fill villages. This leaves the options of Land and Improved Agriculture Training – for which the data demonstrate there is more than adequate land in the in fill villages.

Improving the riverine areas will allow access to land for those whose family pools may be limited or non-existent (non-natives of the village). The potential for rice cultivation has been demonstrated and if nonviable HH succeed in applying improved rice seed and techniques succeed, this will add a powerful cash-earning agricultural option to the arsenal of mitigations available to HH in in fill villages.

The data has demonstrated that vulnerability is not a function of lack of land at the village or canton level but rather of the intra-village distribution among HH. The direct intervention on the part of the Project through various resettlement options is also bolstered by the vitality of traditional land distribution mechanisms in the OFDA.

## VILLAGE DATA ANALYSIS

### Population increase and traditional coping measures

The past history of the OFDA reveals several ways in which the population has traditionally maintained an even distribution of land among the area's population, even though the overall density of people per hectare of OFDA land increases.

- Villages separate and occupy new areas of land
- Villages split and the farmers in each exploit more of their underutilized fallow areas
- People farm land in nearby villages
- People change village residence according to their agricultural needs

Between 1993, when the last official government census was carried out, and the effective beginning of the Project in October 2000, the population of the OFDA grew by 64%. [This figure includes growth in OFDA villages which are not on the Project's list of severely impacted villages but have also undergone Project land take.]

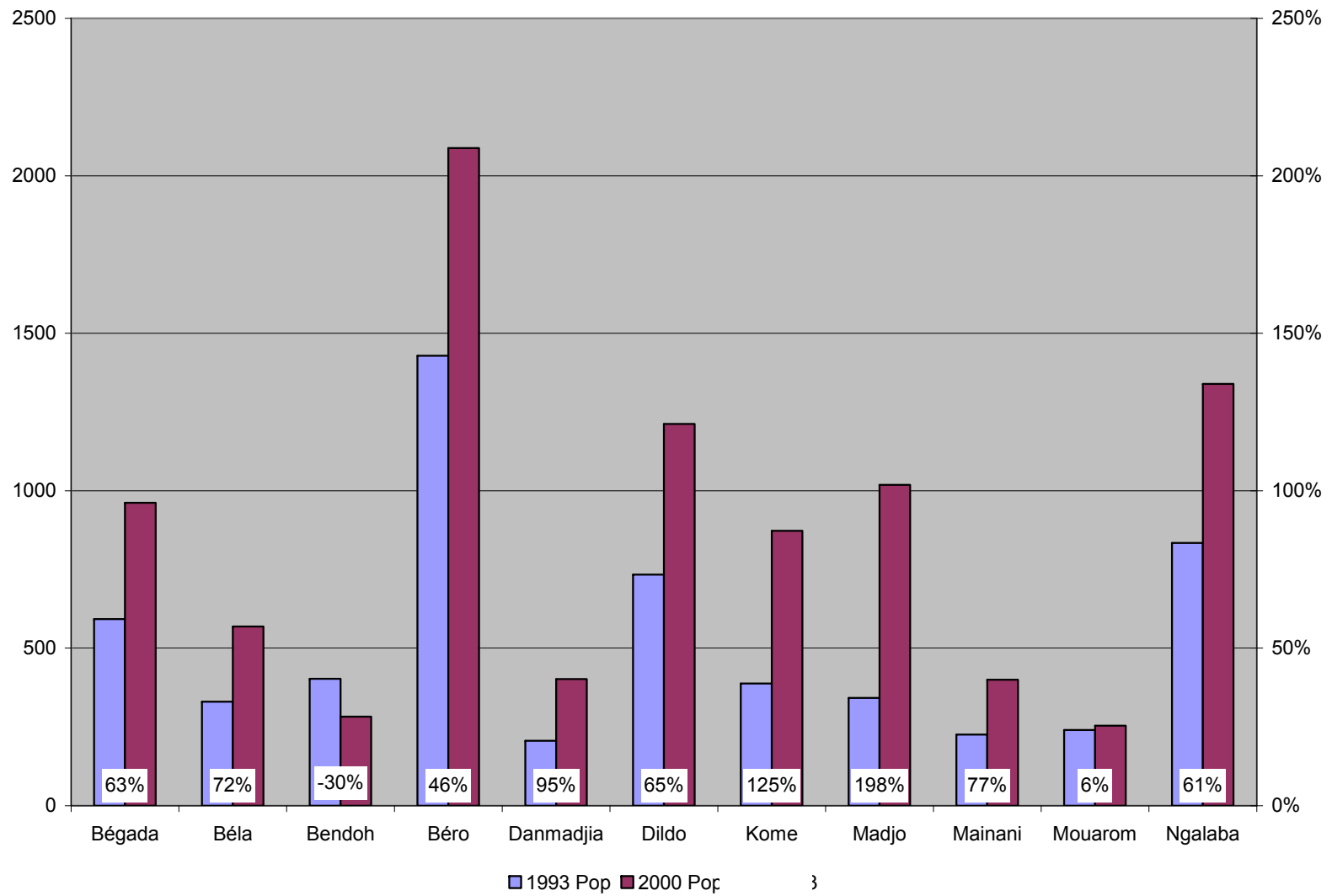
<b>Population Increase between 1993 and Pre-Project Employment</b>			
	<b>1993 Pop</b>	<b>2000 pop<sup>5</sup></b>	<b>93-00 pop increase</b>
Bégada	592	962	63%
Béla	330	569	72%
Bendoh	403	283	-30%
Béro	1429	2088	46%
Danmadja	206	402	95%
Dildo	734	1212	65%
Kome	388	873	125%
Madjo	342	1019	198%
Mainani	226	400	77%
Merméouel	389	475	22%
Mouarom	240	254	6%
Ngalaba	834	1339	61%

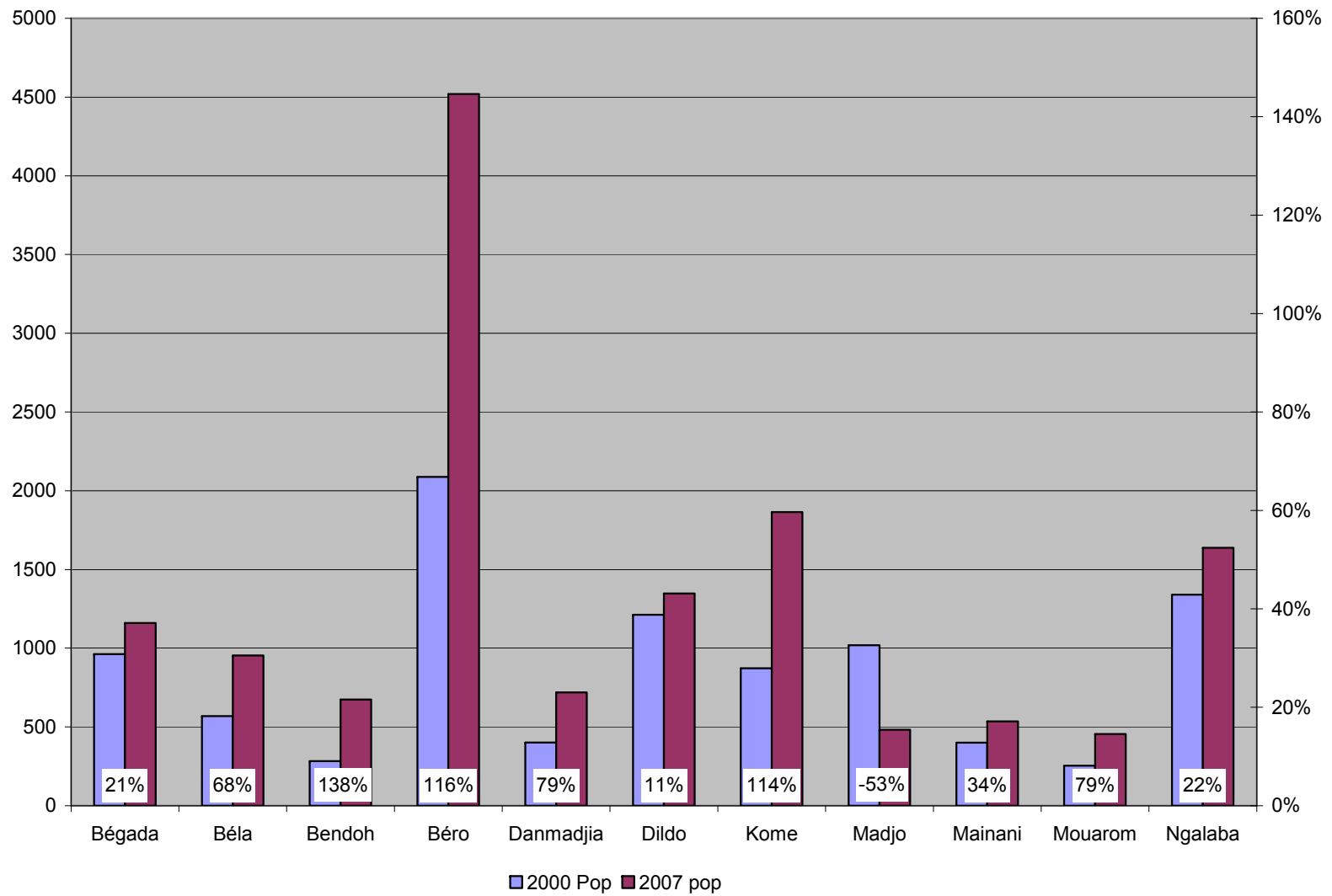
The decrease in population in Bendoh village between 1993 and 2000 occurred because part of Bendoh split off to form another village in order to access more land farther to the west. Merméouel and Mouarom demonstrate small increases because they were, at the time, farm hamlets that grew in size not because of births and deaths but because families were moving one by one from their original villages to these new farming areas.

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<sup>5</sup> Figures gathered from village chiefs by TCC, the main project contractor, as part of its monitoring of project impact.

The overall population explosion alongside the traditional population/land adjustment mechanisms can be visualized:





These traditional mechanisms for balancing population growth and available land kept on working after Project activities began. Villages continued to split, with part of the population emigrating out to entirely new areas, or moving to farm hamlets in areas of village land where land was less used.

Madjo, which had an increase of 198% in its population by 2000, has split into two villages. Part of the village emigrated across the Pende River to establish a new village, Madjo Doba, with extensive fields. The émigrés still possess fields in Madjo Bero but, apart from rice fields, do not for the most part return to their former settlement to cultivate them. As a result of the split Madjo-Bero's population density decreased by 0.14 people per hectare between 2000 and 2008, from 0.16 in 1993 to 0.53 in 2000 back down to 0.39 in 2009.

Bero village, which in 2000 consisted of two separate but adjacent villages and three farm hamlets, underwent 116% growth after Project start-up (using TCC and village chiefs' information). It has now multiplied into Bero 1, 2, 3 and 4 plus two farm hamlets to which families continue to migrate. Bero also counts a commercial settlement, Moudoudoigne or Kome 5, opposite the main Project facilities.

Ngalaba has split in to Ngalaba 1 and 2, plus its long-time hamlet, Hollo. Many Ngalabans cultivate land in neighboring Bendoh and Ndoheri.

Dildo village retained 127 of its households when the farm hamlet of Bayande, now up to 148 households, was recognized as an official village in 2008. Dokaidilti has a hamlet but has not made its geographical split official.

The exercise of the traditional balancing mechanisms does not put a burden on the inhabitants. Comparison of the sub-components or of geographically separated quartiers/villages shows the various parts are virtually similar. The splitting of a village does not leave one part or the other at a disadvantage.

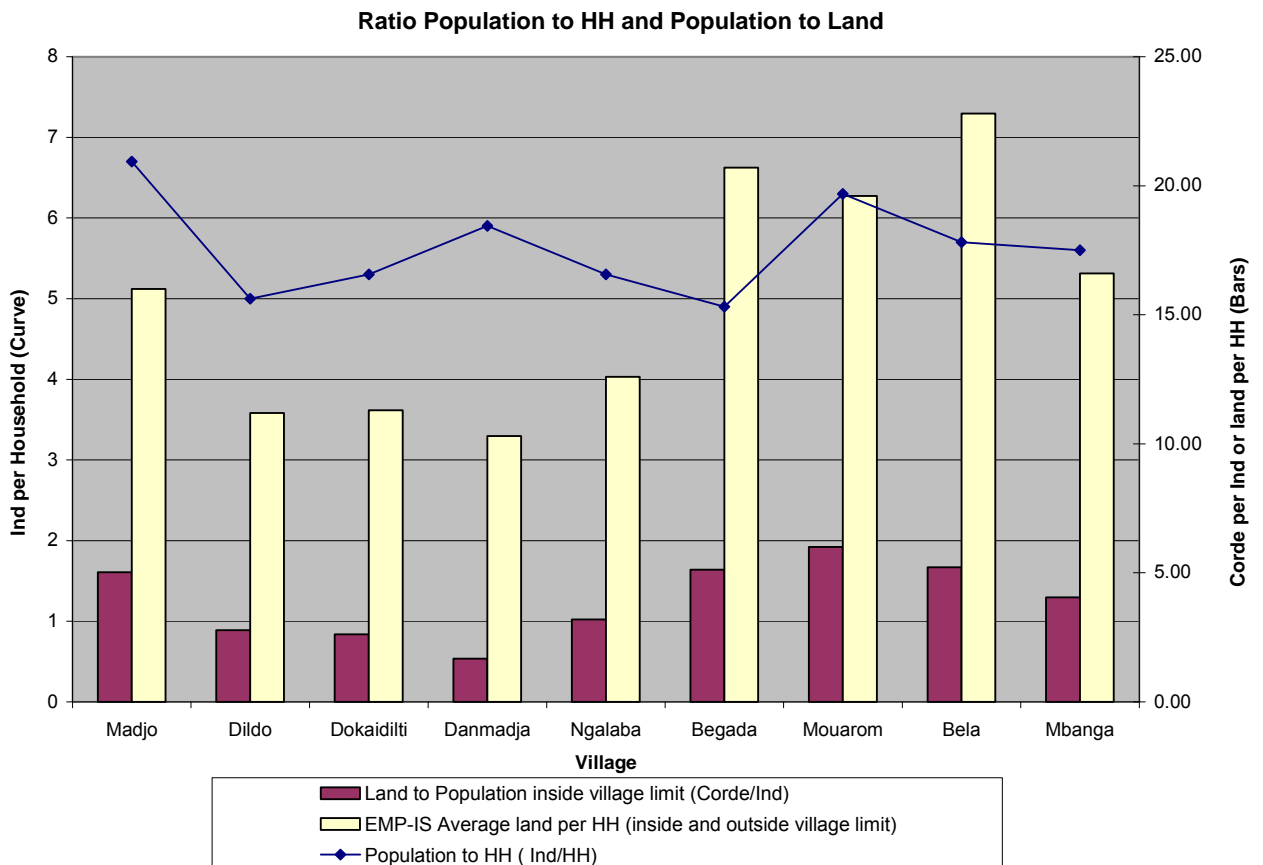
## Population Changes over Time

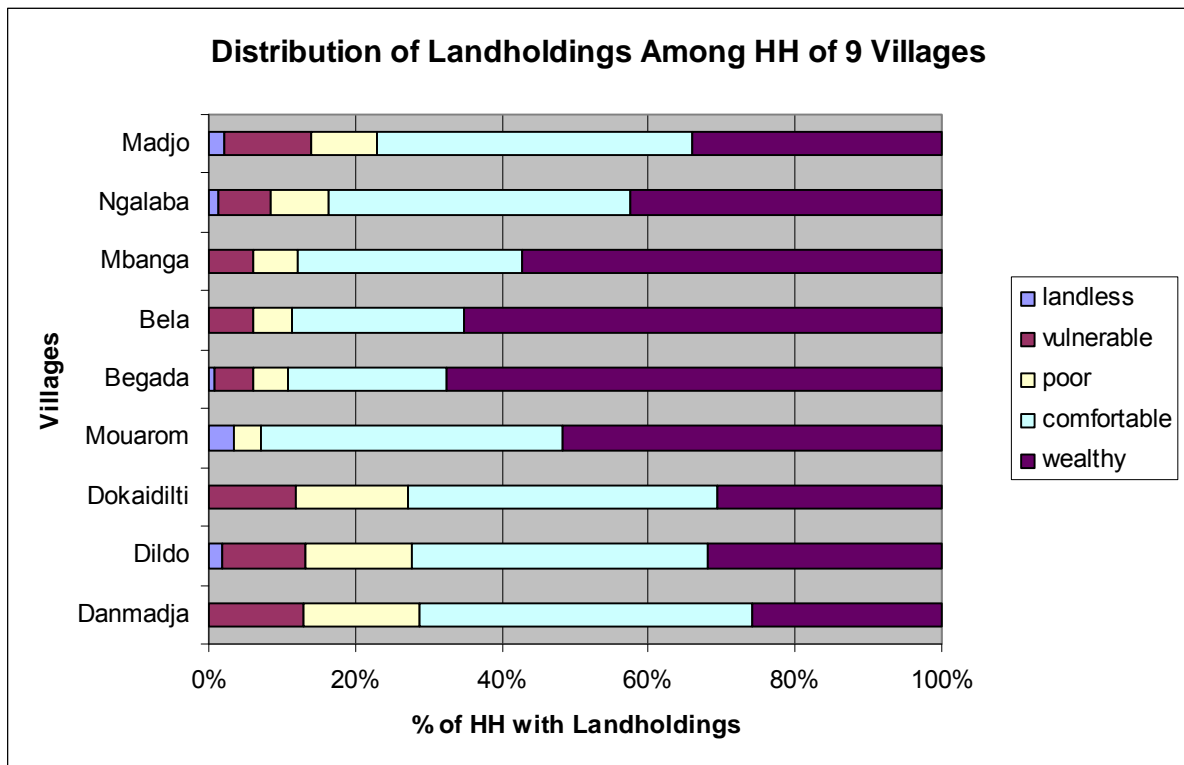
- Huge increase in OFDA population since last census in 1993
  - 151% from 1993 to 2007
- Increase between 1993 and 2000 (before Project take-off)
  - 64%
- Smaller increase in Project period between 2000 and 2007
  - 43%
- Population increases in some villages were greater than in others
  - 380%           Kome Ndolebe
  - 187%           Mbanga
  - 96%            Ngalaba
  - 96%            Begada
- Average village area
  - 1993 = 2149 hectares
  - 2000 = 2081 hectares
  - 2008 = 1307 hectares
- Average population density
  - 1993 = 0.25
  - 2000 = 0.53
  - 2008 = 0.86
- Increase in density in 10 OFDA villages
  - 1993 to 2000       = 0.95 times
  - 2000 to 2008       = 0.38 times
- Seeming anomalies, villages where the population shrinks or else grows at a very slow rate, are in fact signs that traditional adjustments between population and land have been taking place

### Findings of Village Surveys: Villages in Proportion

The village-wide surveys completed between mid-2007 and 3Q 2009 enumerate all households within the village (and their size) and tie each household to its available land resources, each field and fallow of which is measured by GIS. (Please refer to the tables at the beginning of this analysis for the village survey data available to date.)

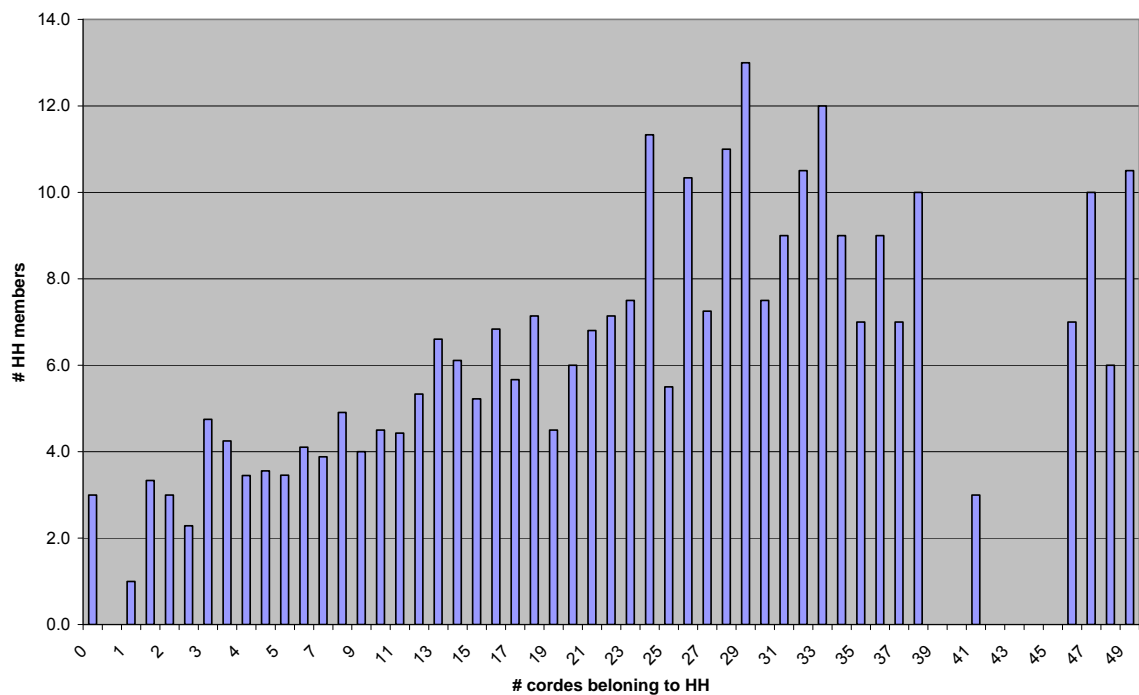
This survey data shows the proportional resource to population ratio. In general the population maintains an even ratio to its resources. (It should be noted that fishing villages supplement their agriculture with fish/revenues from fish, which gives these villages, such as Dildo, Dokaidilti and Danmadja some flexibility in respecting this ratio of population to land). This even ratio results from the workings of the traditional system discussed above.





Moreover, land distribution accommodates the increasing size of the HH and the distribution of land according to household size. The following graph shows how in the surveyed villages land distribution from the family pool is effective for most families. The bars at the very left show that Non Viable HH often have many HHM as well as very little land.

Size of HH Compared to Size of Land Holding (example of Ngalaba)



### What seems to be different:

- Dildo = 272 households
- Dokaidilti, just north of Dildo = 85 households
- Dildo = 1887 hectares of arable land
- Dokaidilti has only 686 hectares
- An average Begada household has 21 cordes of land
- Average Dokaidilti households have 11 cordes
- 21% of Dokaidilti land is cultivated by outsiders
- 23% of Danmadja residents cultivate land outside Danmadja

### Is really the same....

Through these traditional mechanisms OFDA villages which, on first glance appear to vary immensely in land area and population, have managed to keep similar population densities overall.

### Changes in Population Density

Village	1993 pop density	2000 pop density/ha	2007 pop density/ha	Village Survey Data
Bégada	0.24	0.29	0.38	0.39
Béla	0.14	0.27	0.45	0.38
Béro	0.34	0.92	0.56	
Danmadja	0.46	0.84	1.72	1.19
Dildo	0.37	0.70	0.79	0.71
Dokaïdilti	0.24	0.52	1.41	0.78
Madjo	0.18	0.27	0.54 <sup>6</sup>	0.39
Mbanga	0.18	0.44	0.53	0.49
Mouarom	0.15	0.19	0.38	0.33
Ngalaba	0.44	0.64	0.88	0.63
Average	0.27	0.53	0.74	0.59

In the light of other villages' past behavior, Danmadja and Dokaidilti would appear ripe for scission. This may happen but perhaps not immediately, as both villages have a "pressure relief valve". Many of their residents are fishermen who count on this for their main support. More recently people in these villages have taken up lucrative vegetable gardening which they have learned from Project training. For a dozen or so HH gardening provides their major source of income and livelihood.

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<sup>6</sup> Using Madjo's 2006 population, since 2007 is not available.

### **Traditional Mechanisms Still at Work**

- Villages divide
    - Dildo divides into Bayande and Dildo.
    - Bayande = 11 HH in 1998, is now 148 HH
    - Madjo divides into Madjo Bero and Madjo Doba
  - People farm land in nearby villages
    - See village maps of cultivators' village of residence
  - People switch village of residence
1. Villages split, remaining in same place but farming distant farmland close to new village
- Bero 1 & 2 → Bero 1, 2, 3, 4
  - Miandoum 1 & 2 → Miandoum 1, 2, 3, 4, 5
  - Begada → 1 & 2
  - Mbanga → 1 & 2

### **Village Survey Results Viewed at the Village Level**

When village survey results are analyzed, the average land holding of surveyed HH in the 9 villages is well above the level of vulnerability of <2/3 corde per HHM. (Please refer to the Village Survey tables below.)

### Village Survey Tables: Demographics

	Dokaidilti	Dildo	Ngalaba	Danmadja	Mouarom	Begada	Bela	Mbanga	Madjo
Village Area in Hectares	686	1887	2118	480	1352	3321	2200	3068	2148
Settlement area in Hectares (% village)	24 (3%)	46 (2%)	97 (5%)	34 (7%)	23 (2%)	56 (2%)	35 (2%)	62 (2%)	27 (1%)
Project Perm. Land Take + Temp. No Returned in Hectares (% village)	79 (12%)	185 (10%)	253 (12%)	61 (13%)	149 (11%)	288 (7%)	172 (8%)	189 (6%)	135 (6%)
Available Land inside the village limit in Hectares (% village)	583 (85%)	1656 (88%)	1768 (83%)	385 (80%)	1180 (87%)	2977 (90%)	1993 (91%)	2817 (92%)	1986 (92%) incl 483 of Flooded Area
Available Land Density inside the village limit (Hectares/Person)	1.09	1.23	1.34	0.68	2.64	2.32	2.38	1.88	2.34 1.77 excl Flooded Area
Cultivated (Field) or Owned (Fallow) outside the village in Hectares (% of total land of the residents)	40 (8%)	106 (6%)	69 (4%)	122 (23%)	217 (26%)	76 (3%)*	73 (4%)	70 (3%)*	114 (10%)
Total Cultivated (Field) or Owned (Fallow) of the residents in Hectares (% of total land of the residents)	490	1561	1601	487	850	2763	1666	2270	1110
Available Land Density inside and outside the village limit (Hectares/Person)	0.92	1.16	1.21	0.85	1.90	2.15	1.99	1.51	1.88 1.31 excl. Flooded Area

**Village Survey Tables: Land**

	Dokaidilti	Dildo	Ngalaba	Danmadja	Mouarom	Begada	Bela	Mbanga	Madjo
Cultivated (Field) or Owned (Fallow) by non-residents inside the village limit in Hectares (% of available land inside village limit)	121 (21 %)	141 (9 %)	141 (8 %)	17 (4 %)	531 (45%)	272 (9%)	389 (20 %)	577 (20%)	504 (25%)
Cultivated Field Farmed by Resident inside the village limit in hectares (% of available land)	302 (52 %)	668 (40 %)	1043 (59 %)	241 (63 %)	291 (25%)	1190 (40%)	755 (39 %)	1122 (40%)	443 (22%)
Fallow Owned by Resident inside the village limit in hectares (% of available land)	149 (26 %)	792 (48 %)	553* (31 %)	124 (32 %)	342 (29%)	1497 (50%)	838 (42 %)	1078 (38%)	553 (28%)
Ratio Fallow/Field	0.49	1.19	0.53	0.51	1.18	1.26	1.11	0.96	1.25

\* 63 ha of bush included in fallow

**Village Survey Tables: Field and Fallow**

	Dokaidilti	Dildo	Ngalaba	Danmadja	Mouarom	Begada	Bela	Mbanga	Madjo
Nbr of Residents	534	1346	1324	570	447	1285	837	1501	848
Men	243	657	668	284	216	608	434	718	418
Women	291	689	656	286	231	677	403	783	430
Avg Age in Years	19	20	20	19	19	19	18	18	17
Nbr HH	85	275	250	101	85	259	144	269	133
Avg. HH size (# HH Members)	6.3	4.9	5.3	5.7	5.3	5.0	5.9	5.6	6.4
Avg. cordes Land per HH inside and outside village	11.3	11.2	12.6	10.3	19.6	20.7	22.8	16.6	16.0
Avg. Resettlement Factor (Based on all land inside and outside village)	1.80 Corde/HhM	2.29 cordes/HHm	2.39 cordes/HhM	1.8 Corde/HhM	3.69 cordes/HhM	4.17 cordes/HhM	3.88 cordes/HhM	2.95 cordes/HhM	2.5 cordes/HhM
% Area cultivated (Field) or owned (Fallow) by women out of total area "owned" by village	15%	17%	29%	22%	14%	30%	12%	22%	28 %

residents inside and outside village									
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The average HH land holding is 3.397 cordes per HHM. Mouarom, Begada, Bela and Mbanga (all in fill villages) are even better off.

Another indicator of limited Project impact at the village level is the average number of cordes per capita of a village's inhabitants. Even excluding the fallow the average resident may have had before the Project, the current average of field and fallow per HHM is far above the threshold for viability and is close to or within the category of land wealthy (2.5 + corde per capita).

Average Change in Cordes per Capita in Village					
	Before Project	2008- 2009			
Village	Av. cordes per capita	Av. Cordes per capita	Delta 2008-9 and before	Land Area Ha per Capita	Acres Per Capita
Danmadja	2.531	2.167	0.364	0.84	2
Dildo	2.979	2.830	0.149	1.41	3 1/2
Mouarom	3.862	3.547	0.315	3.01	7 1/2
Ngalaba	3.168	2.827	0.341	1.6	4
Dokaidilti	2.553	2.325	0.228	1.29	3
Begada	6.228	5.808	0.420	2.58	6 1/2
Bela	4.828	4.597	0.231	2.63	6 1/2
Mbanga	4.089	3.734	0.355	2.05	5
Madjo	2.996	2.738	0.258	2.53	6 1/2
AVERAGE	3.693	3.397	0.296	1.993	5

In the OFDA a common complaint is that there is no more fallow land and that farmers have been reduced to leaving fields in fallow for only 3-5 years. Village Land Use Surveys do not indicate that there is an overall shortage of fallow land within the villages:

Village	On village land	On outside fields plus village land
Bela	23.4	24.4
Begada	23.4	23.9
Danmadja	4.1	6.6
Mbanga	18.3	18.3
Madjo	25.5	26.5
Mouarom	27.1	32.9
Dildo	10.7	11.6
Ngalaba	11.8	12.5
Dokaidilti	9.0	9.9
In fill villages	Allan & Brush fallow formula	

Danmadja – with the potential for only 4 years of fallow -- is the only village that matches the complaint. Rather the complaint arises from farmers’ unequal access to farmland, unequal for two reasons:

1. Some HH have little land/a small family land pool; they cannot maintain a sufficiently long fallow.
2. For convenience HH have a preference for cultivating fields closer to the village. When combined with a reluctance to engage in the heavy labor of clearing heavy trees and undergrowth, fields near the village tend to be worn out and less fertile. When settlers pick up and move to another space within the village boundaries, this hamlet helps to balance the field/fallow ratio.

### **Project Land Return**

Project land return has played a role, along with traditional mechanisms, in keeping these villages at a stable level.

<b>Land Area Returned to Offset Negative Impact (April 09)</b>	
<b>Village</b>	<b>Total Ha Land Returned (with Quitus<sup>7</sup>)</b>
Begada	228.5
Bela	134.1
Bero	282.9
Danmadja	24.8
Dildo	90.4
Dokaidilti	34.9
Madjo	28.3
Mbanga	202.1
Mouarom	280.6
Ngalaba	222.9
<b>TOTAL</b>	<b>1 529.5</b>

The table above shows the amount of land reclaimed and formally restored to each village as of April 2009; soon after this date reclamation stopped until the rainy season was over (end Oct).

The table below is a theoretical calculation of how much land the average person lost to the Project – the average loss per capita. Of course some people lost none and others lost more than the average. The columns “Cordes Short” and “Ha Short” represent the number of cordes/hectares of land must be returned to the village in order for the average person to be

<sup>7</sup> After the Project’s Construction and Environmental Groups have agreed that a large land area has been adequately restored, the Socioeconomic Department of the Environmental Group lists the names of all the users at the time of land acquisition and the coordinates of their land area. This list is officially signed by various local authorities as recognition of land return and the users are informed they are free to use the land. This document is known as a “Quitus.” In cases where small portions of land have been acquired from a large number of farmers, e.g. for constructing an electrical line, the Quitus is signed by local authorities and the village as a whole is informed of the return.

made whole. The final column, Ha Returned, shows the degree to which Project land reclamation and return has re-established the village in its earlier, village average position. It is clear that land return has been successful in a number of villages but 4 (Danmadja, Dildo, Dokaidilti, Madjo) are all far behind (returned area in red).

The Project's initiative to arrange local flood plains so that larger areas can be used to grow rice has the advantage, among many others, of being able to make up the shortfall, since these are all riverine villages.

The return of land cannot, however, ensure that every HHM receives enough land to become viable unless the nonviable individuals (or their parents/guardians) receive land directly. Such a reapportionment is not culturally realistic. It is for this reason that orchestrated land improvement of riverine lands that have remained unusable will allow targeting of nonviable HH for direct land distribution. The resettlement option of 3<sup>rd</sup> party compensation is another means to reach nonviable HH, but it is culturally appropriate only among close kin.

<b>Area Needed to Offset Village Impact</b>					
Village	Land Lost / Capita by Average HH	Village Population	Cordes Short	Ha Short	Ha Returned
Danmadja	0.365	570	241	122	24.8
Dildo	0.147	1338	535	269	90.4
Dokaidilti	0.227	533	140	71	34.9
Ngalaba	0.321	1324	470	237	222.9
Mouarom	0.308	449	162	82	280.6
Mbanga	0.355	1500	533	269	202.1
Madjo	0.258	848	219	110	28.3
Bela	0.231	837	194	98	134.1
Begada	0.352	1288	453	228	228.5
Total		8687	2947	1486	1529.5

### **Conclusions of Village Level Data Analysis**

- It is clear that at the village level “heavily impacted” villages do not show a negative impact
- “Heavily affected” villages appear currently viable
- Traditional social mechanisms have worked to offset natural population growth
- On average, families in these villages are in a viable situation
- Land return has been offsetting recent and ongoing land take

## **Project Impact**

With the approval of the Chad Export Project it was widely feared that, in addition to this population explosion, there would be a massive influx of job seekers, etc. Toward the end of 2000, Project activities increased significantly but the flood of workers and job seekers feared by some did not occur.

Post-Project Start Up of crude export (3Q 2003) construction activities have centered on the construction of well pads and their connections (roads, flowlines, etc.); activities are therefore at a much lower level than from 2001-4 and employ mainly skilled and semi-skilled workers kept on from the major construction period.

Two factors played a role in avoiding an influx:

1. No hiring at the gate but only in employment offices located throughout the country; once hired, transport was provided to the Project area.
2. Project-provided transport to and from the worksite to the major towns of Bebedjia and Doba as well as to-from surrounding villages.

In-migration during the height of construction, 2001 through 2004, remained mainly urban. 89% of workers from other parts of Chad chose to live in Doba and Bebedjia. Many local hires (41%) also moved to town because of ease of transport.

In contrast, in the village areas only minor growth occurred and was confined mainly to canton centers where emigrants returned hoping that their canton chiefs could obtain jobs for them:

- Kome Ndolebe = 2.29% village population increase
- Bero Center = 1.3%
- Miandoum Center = 0.50%

Within other villages the total population increase from outsiders and returnees equaled only 0.3%.

The exception has been the village of Kome Atan, located opposite the construction base. It grew principally as a service town for the workers, providing food and petty luxuries to the workers during the daytime, drink and lodging at night.

### **Kome Atan**

- 94 HH in 1997
- 140 HH in July 2001
- 180 HH in Feb 2002

Kome Atan has continued to grow, very much the de facto if not official center of Kome Canton, and is now the principle commercial center in the OFDA, second only to Bebedjia and Doba. Aerial and satellite photos clearly show the growth.

### **Project Impact on traditional population adjustment mechanisms**

How has the local population dealt with the growth of this commercial center, in which merchants supplement their revenues with some farming in the local area?

Prior to the Project, farmland rental was known and rates were fixed but it was not common. Land purchase, especially by educated local people posted elsewhere in paid government jobs was limited to acquiring lots in their home villages for retirement construction; such purchases were practically never subject to official titling. So the growth of Kome Atan introduced new mechanisms into the area which permit the reapportionment of land. Using these new techniques, compensated farmers commonly rent out the farm equipment they acquired with compensation and use the money to rent land and to pay others to farm it. In this way a number of households that seem non-viable in terms of land holdings (<2/3 corde) have actually improved their standard of living above their pre-project status. A few local farmers may have purchased additional farmland with their compensation money but the Village Surveys have uncovered only one (1) case. The sale required the agreement of the family members with rights in the land pool, some of which is being sold off, and the transaction, though witnessed by the village and canton chiefs, does not involve legal transfer of title.

But the traditional mechanisms for apportioning land and population retain their vigor, as has been demonstrated in the case of Madjo, etc. These mechanisms have been vital in helping the villages surrounding Kome Atan adjust to the area the new town has occupied. Mouarom – the farming hamlet created by villagers from Kome Ndolebe and Bolobo-- reveals these mechanisms at work:

- The reassignment of village land as land belonging to the new village created from its hamlet;
- The redistribution of land among land users without reassignment.

The two photos of Mouarom from 1998 and 2008 show the increase in Mouarom as a geographical entity, as Kome Ndolebe and Bolobo inhabitants moved to underutilized areas of Kome Ndolebe villages<sup>8</sup>. Mouarom was recognized as an official village in 2004, with official boundaries carved out of Kome land by the seismic lines which had become commonly traveled roads. In other words, the hamlet of Bemou was reassigned some of Kome Ndolebe and Bolobo land when it became Mouarom. But Mouarom is not alone in exploiting this heretofore underutilized area. Kome Atan has taken over part of the area and, as the following map shows, farmers from many other neighboring villages also have fields within Mouarom's boundaries. These farmers use fields belonging to the village of Mouarom

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<sup>8</sup> Mouarom also goes by another name, which was its original hamlet nomenclature: Bemou, or village in the grass.



**Kome Atan in 1998, located across from the Exploration Camp (rectangle)**

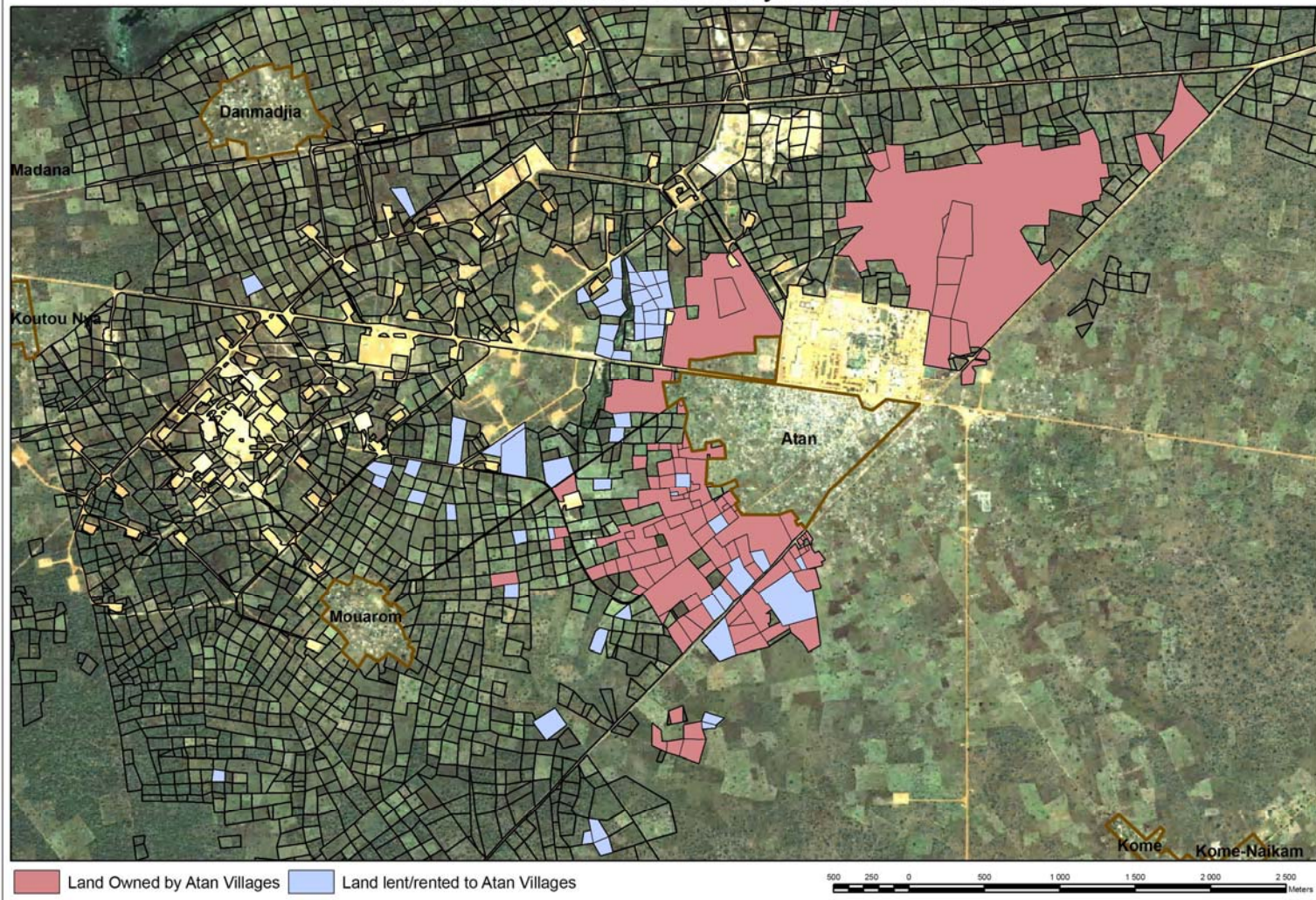


**Kome Atan 2003, Atan fields & Project-constructed road from OFDA to Cameroon border**

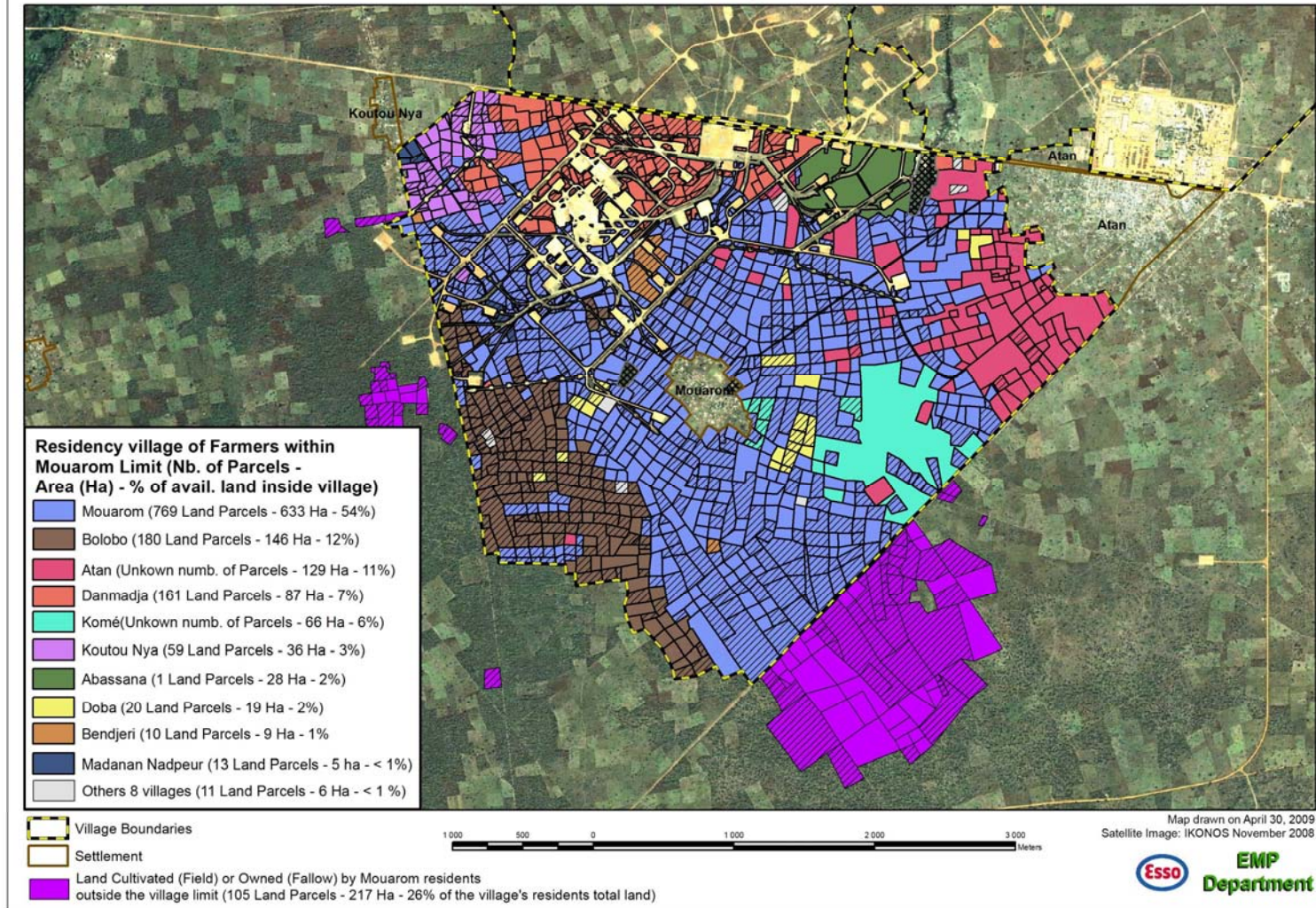


**Kome Atan in Nov 2008, showing settlement and cultivated areas**

### Land Cultivated and Owned by Atan Residents



## Farmer's Residence in Village of Mouarom



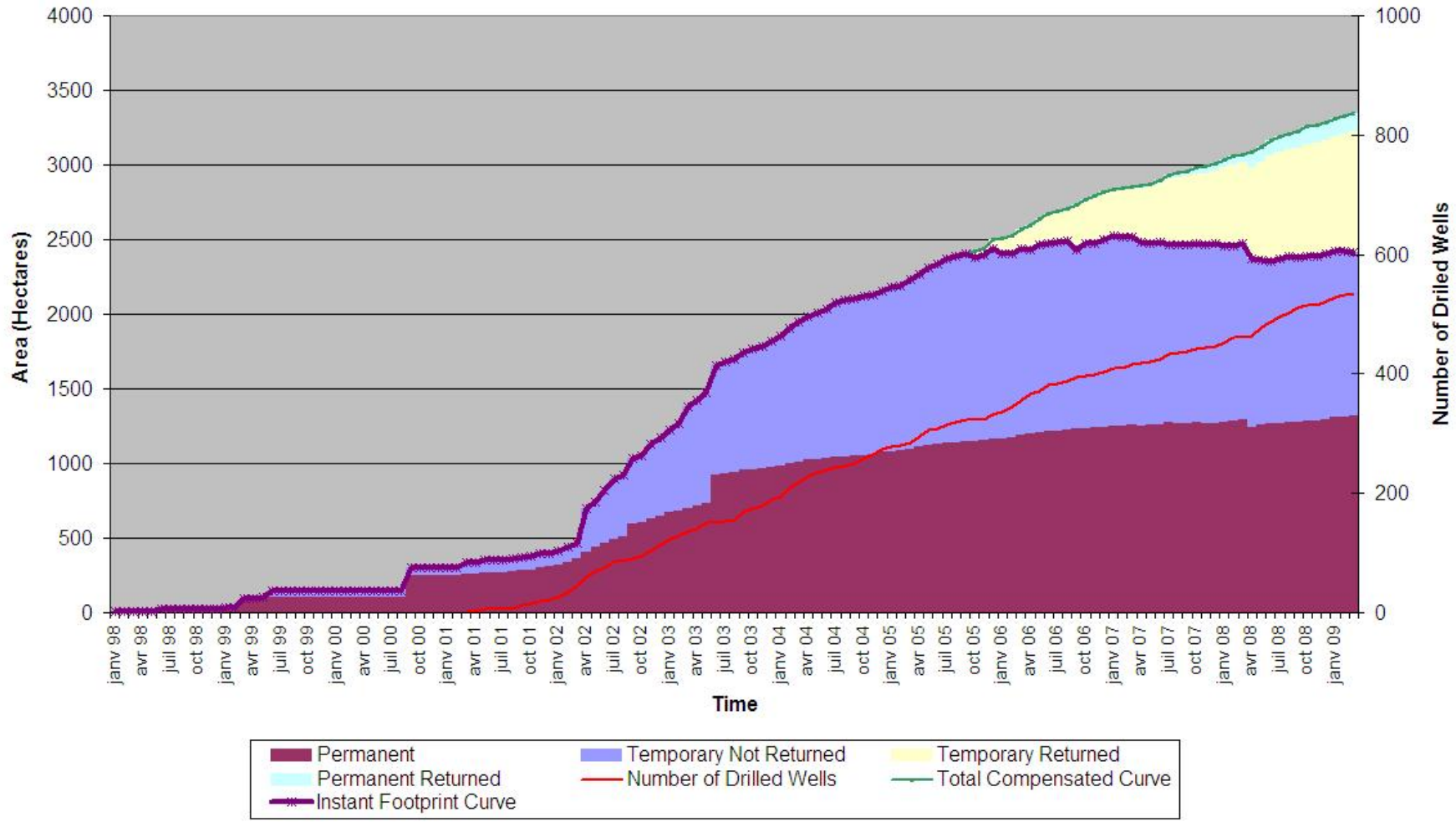
### **Project Land Acquisition and Return**

The Project initially estimated that it would drill approximately 300 wells to develop the three fields of Kome, Bolobo and Miandoum. As production began it became clear that more associated water was being produced than expected so additional “injector” wells were drilled to re-inject the water into the oil-bearing formations and more producing wells were developed to offset the low oil – high water ratio.

Meanwhile land reclamation and return stalled until EMP issued a Non-Compliance Situation notice in 2005. Land reclamation and return began and was accelerated by the creation of the Land Use Mitigation Action Plan in 2007. Land reclamation and return has been immensely facilitated by a change in contracting mechanisms. Earlier, the construction of well pads, roads etc. was an activity contracted – and paid – separately from reclamation. For a well pad’s reclamation to occur the Project had to apply and wait for a second budget to be approved. Now the reclamation is part of the well pad, etc. construction process and the contractors must speedily reclaim land in order to be paid.

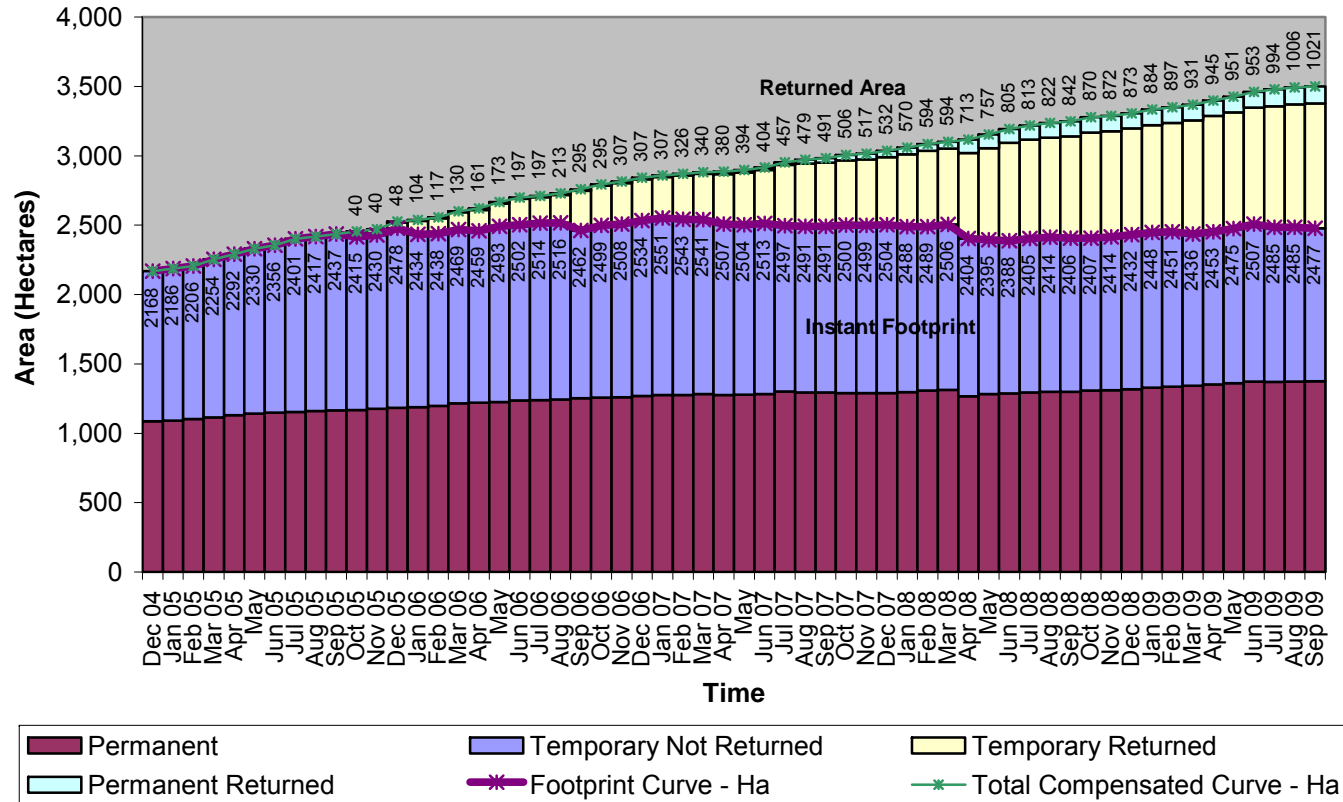
The following diagrams show the increasing land acquisition and growing number of wells drilled up until 2006 and the subsequent land return that has prevented the Project “footprint” or area of occupied land from growing since then, and indeed to decrease despite continued land acquisition. The same information has been depicted for each of the villages that have undergone the most land take.

**Land acquired and returned since beginning of project and  
Number of drilled wells in 3-fields (Kome, Bolobo, Miandoum)**

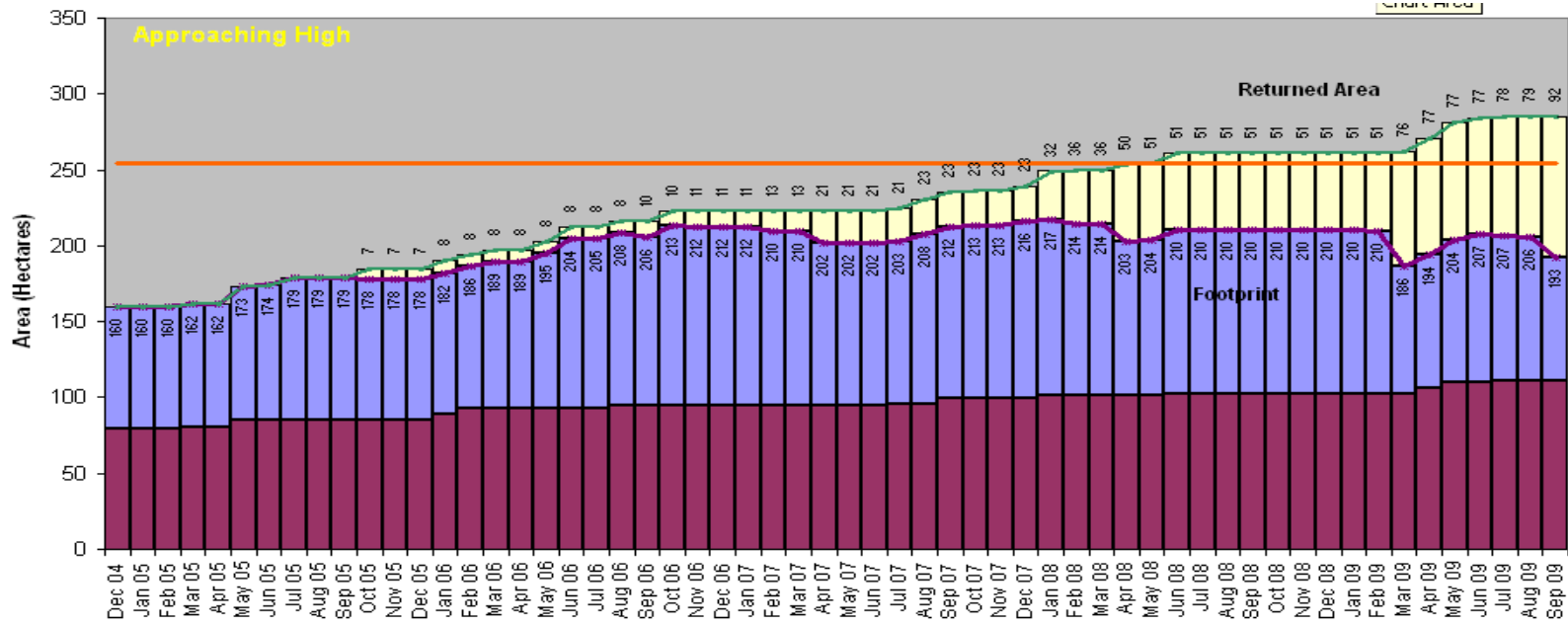


(Data in the following village tables is current as of 3Q 2009)

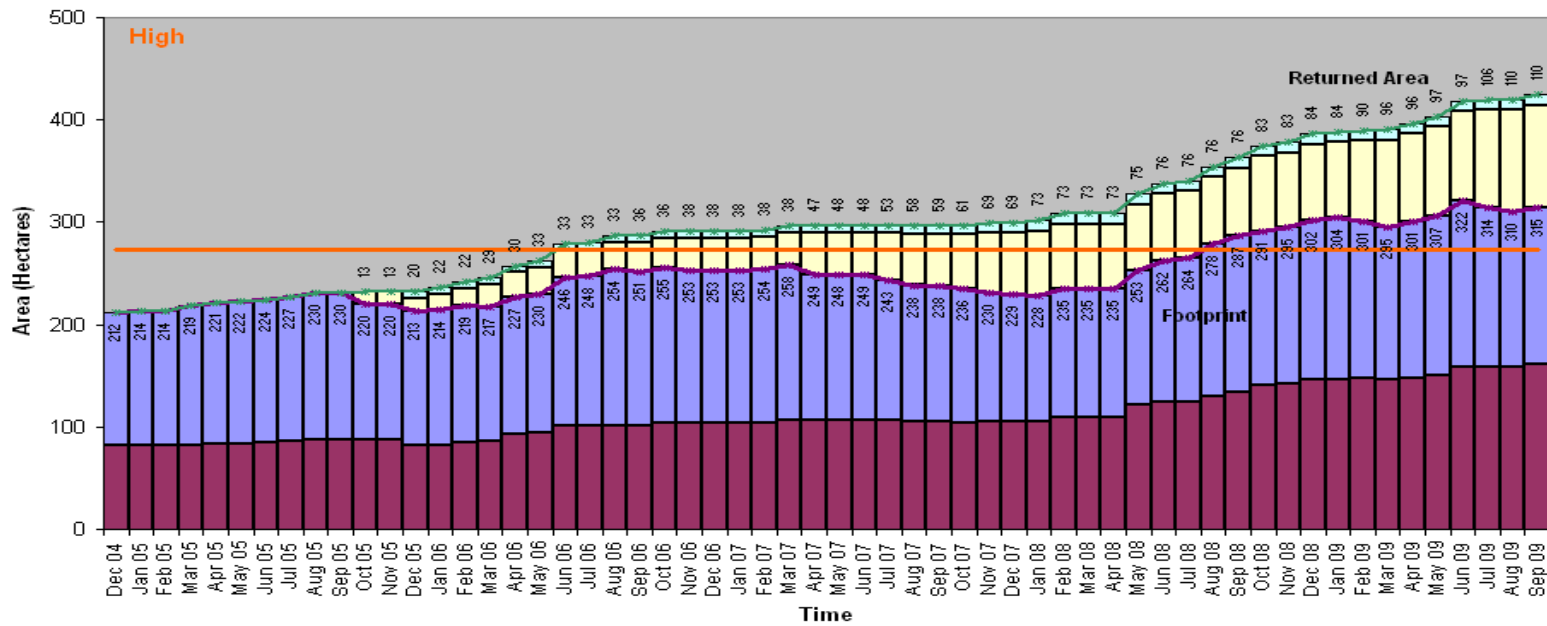
### Land acquired and returned since January 2005 in the 3-Fields (Kome, Bolobo, Miandoum)



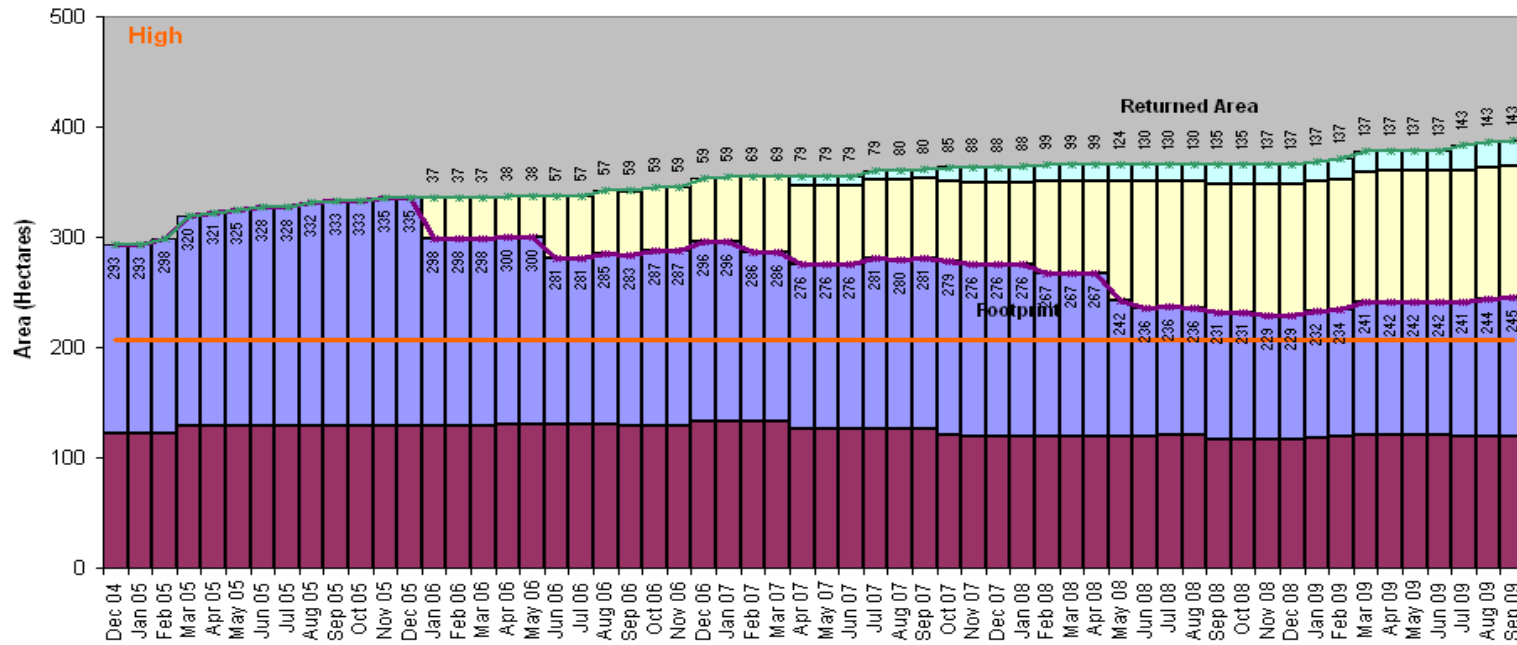
## Bela Village Land Acquired and Returned Between January 2005 and 3Q 2009



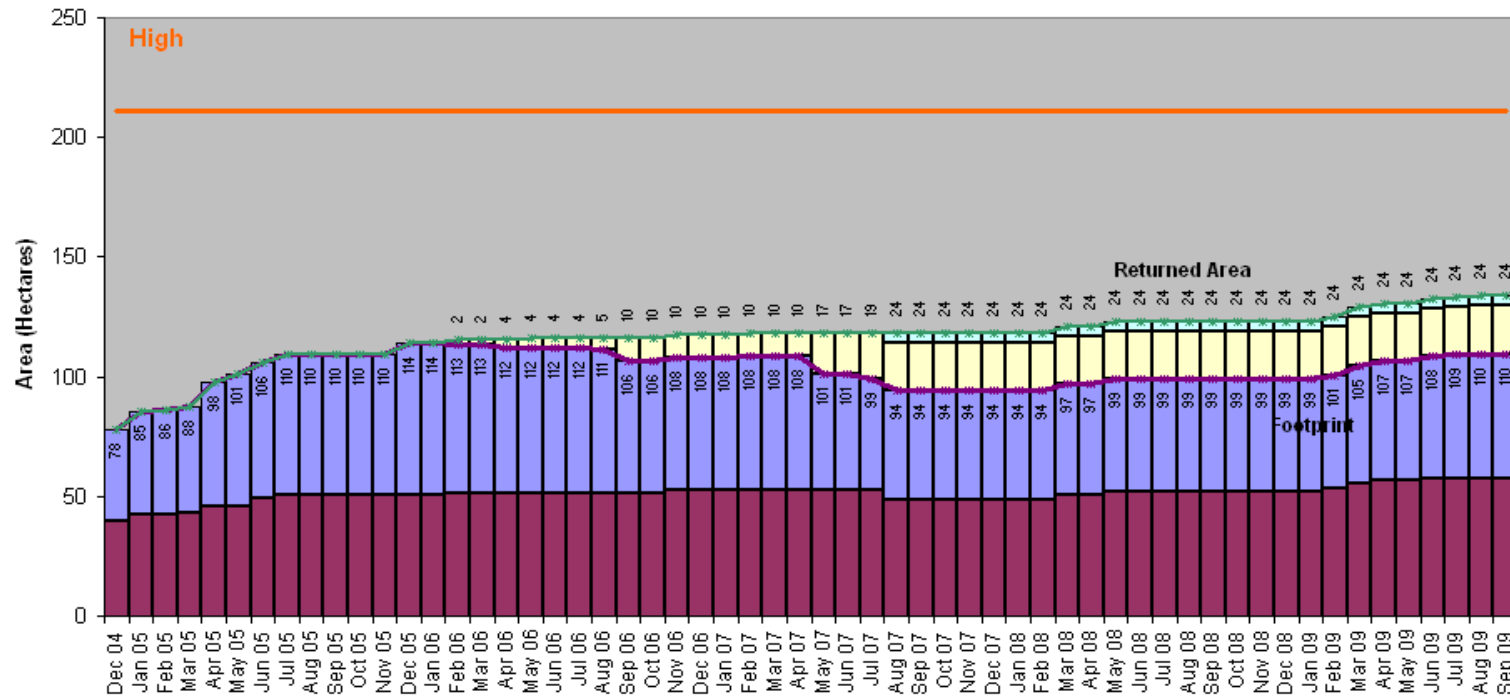
### Begada Village Land Acquired and Returned between January 2005 and 3Q 2009



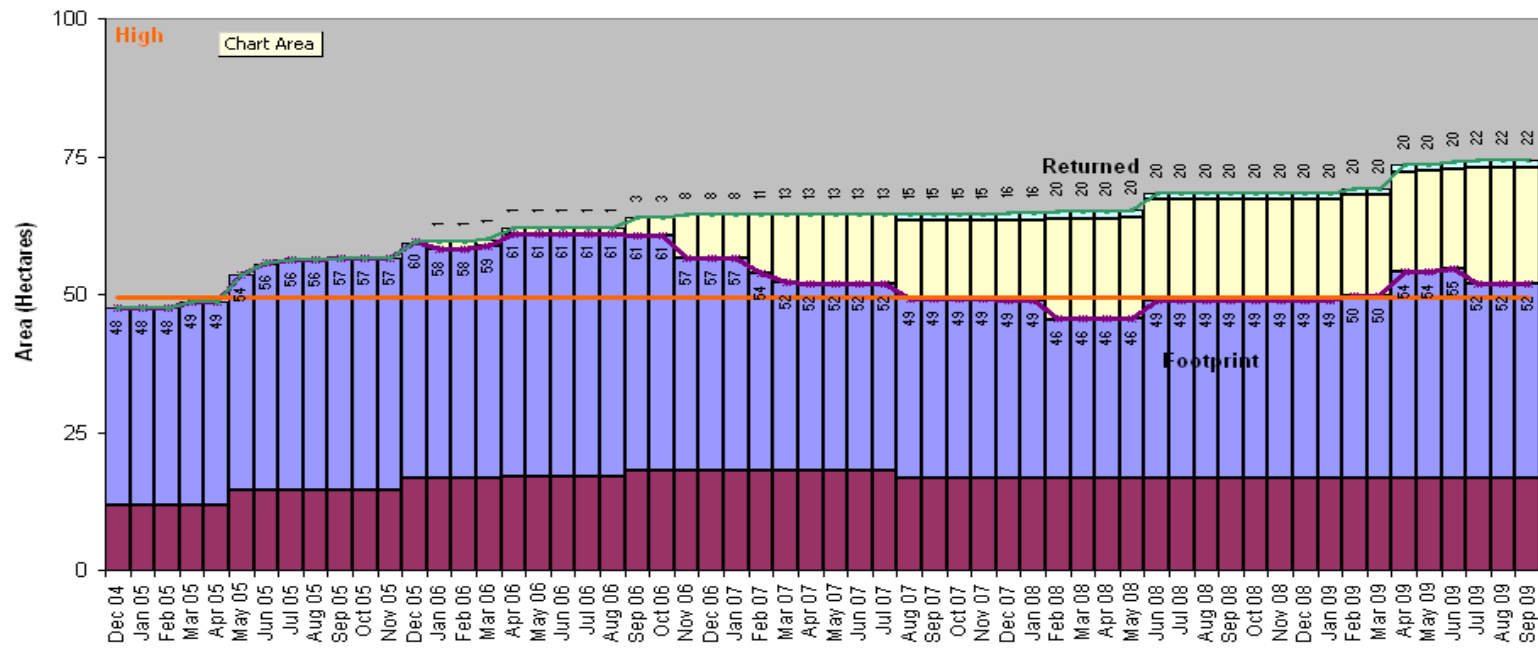
## Ngalaba Village Land Acquired and Returned between January 2005 and 3Q 2009



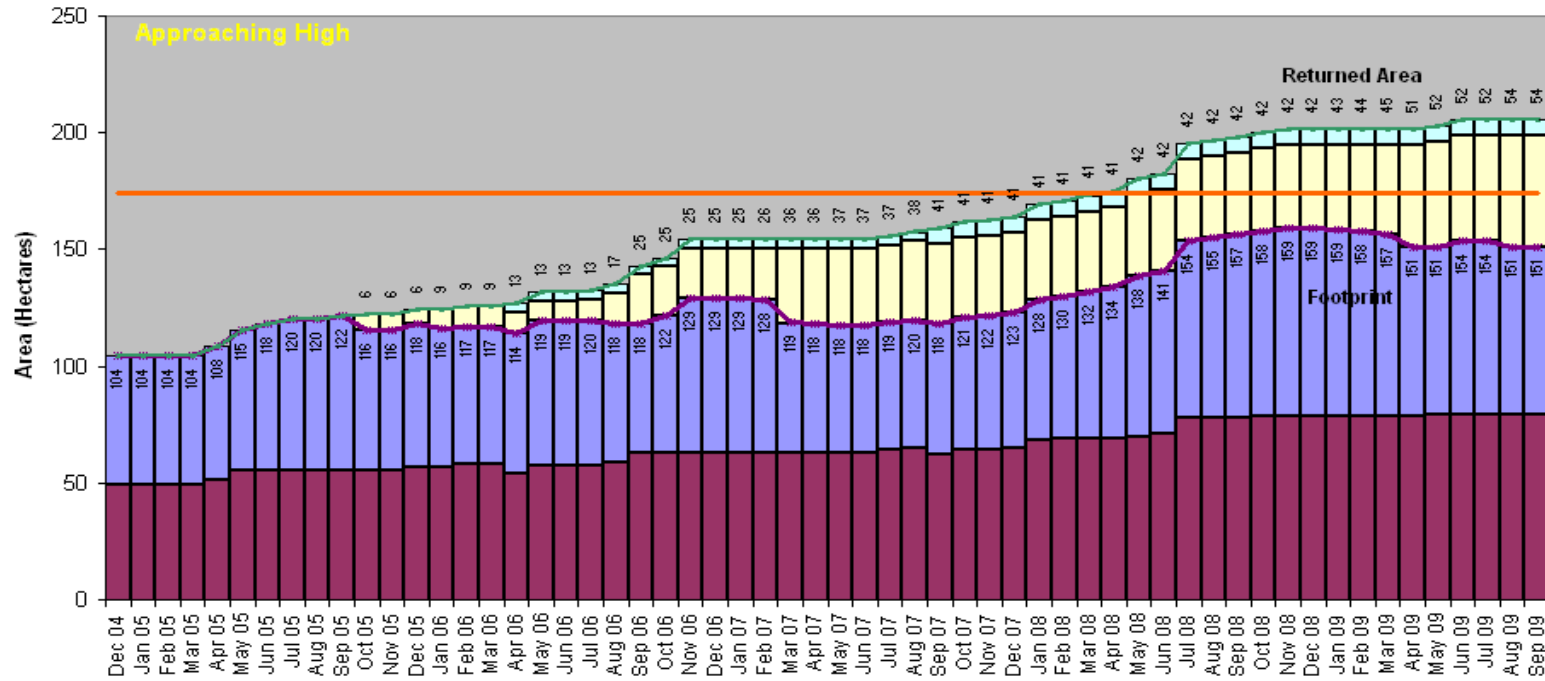
## Madjo Bero Village Land Acquired and Returned between January 2005 and 3Q 2009



**Danmadja Village Land Acquired and Returned between January 2005 and 3Q 2009**

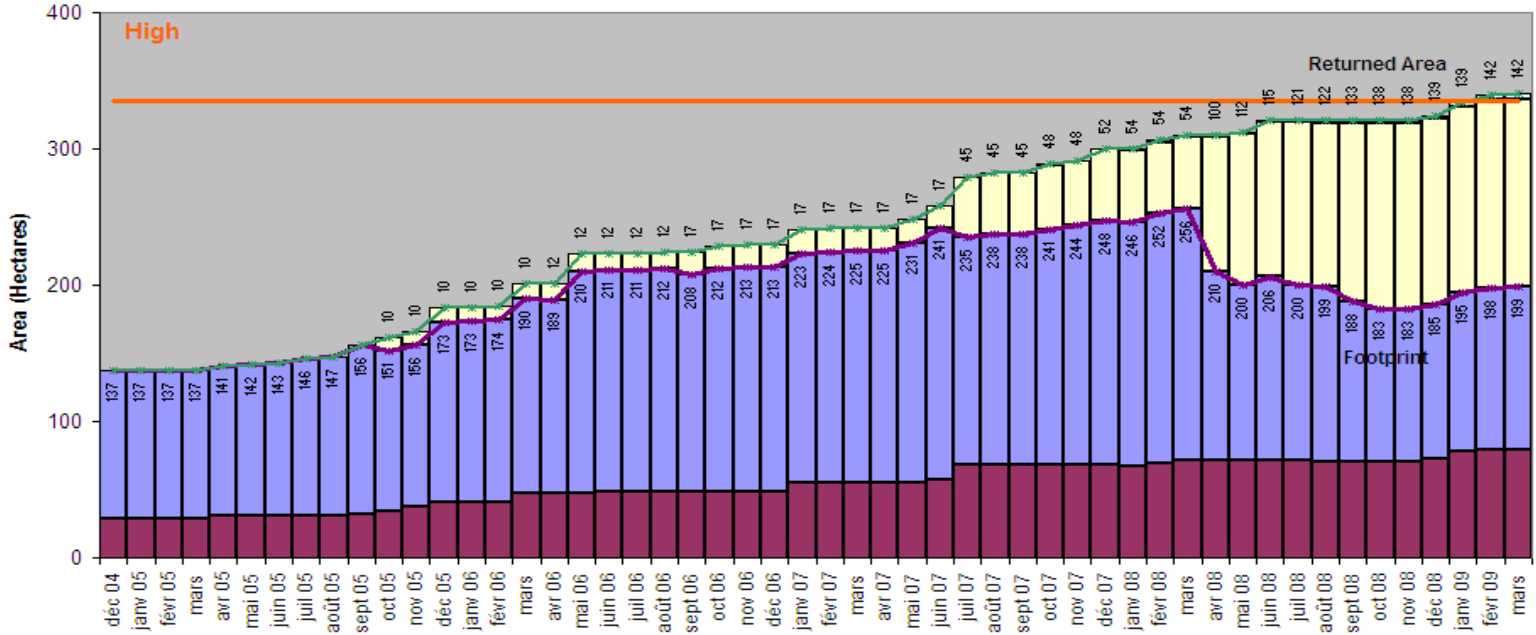


## Mouarom Village Land Acquired and Returned between January 2005 and 3Q 2009



(The following table shows land return as of the end of 1Q 2009)

**Mbanga Village Land Acquired and Returned between January 2005 and 1Q 2009**



### **Project In fill Drilling, Land Acquisition and Land Return**

The charts above show all the land acquisition and return from 2005, including – for the 6 In fill villages of Begada, Bela, Danmadja, Madjo Bero, Mbanga and Mouarom – land taken for in fill drilling, which started in June 2008. Land return has been keeping even with land acquisition in these villages.

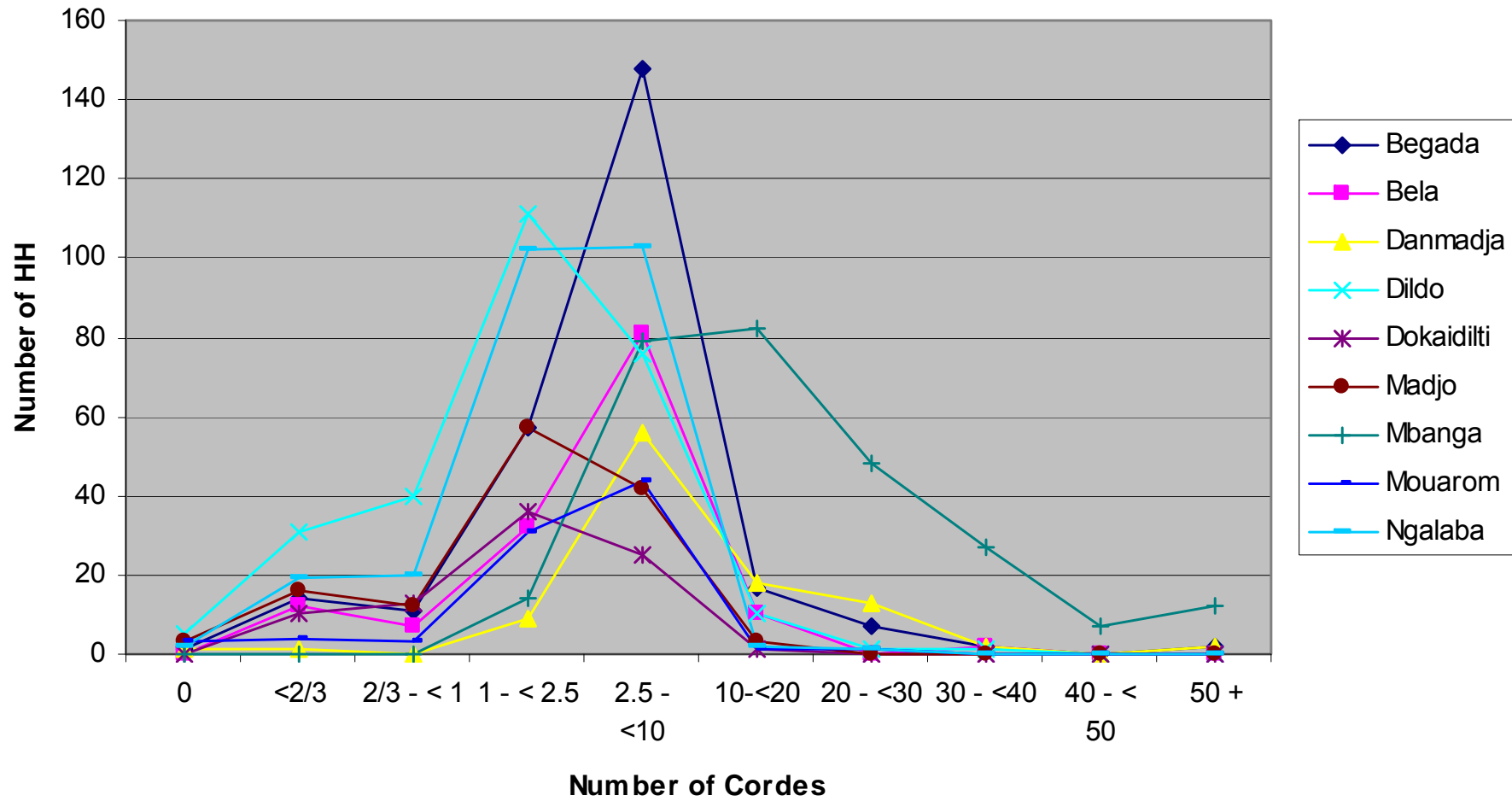
## **HOUSEHOLD ANALYSIS**

### **Viability of Households within Surveyed Villages**

Although “heavily impacted” villages have enough land, both field and fallow, for their populations, the village average hides a large discrepancy within the village. Landholdings in the surveyed villages are definitely skewed, with a few HH possessing extensive parcels of land as part of the family land pool and others with practically nothing. This disparity between “haves” and “have nots” is amplified when land-poor households have many dependents.

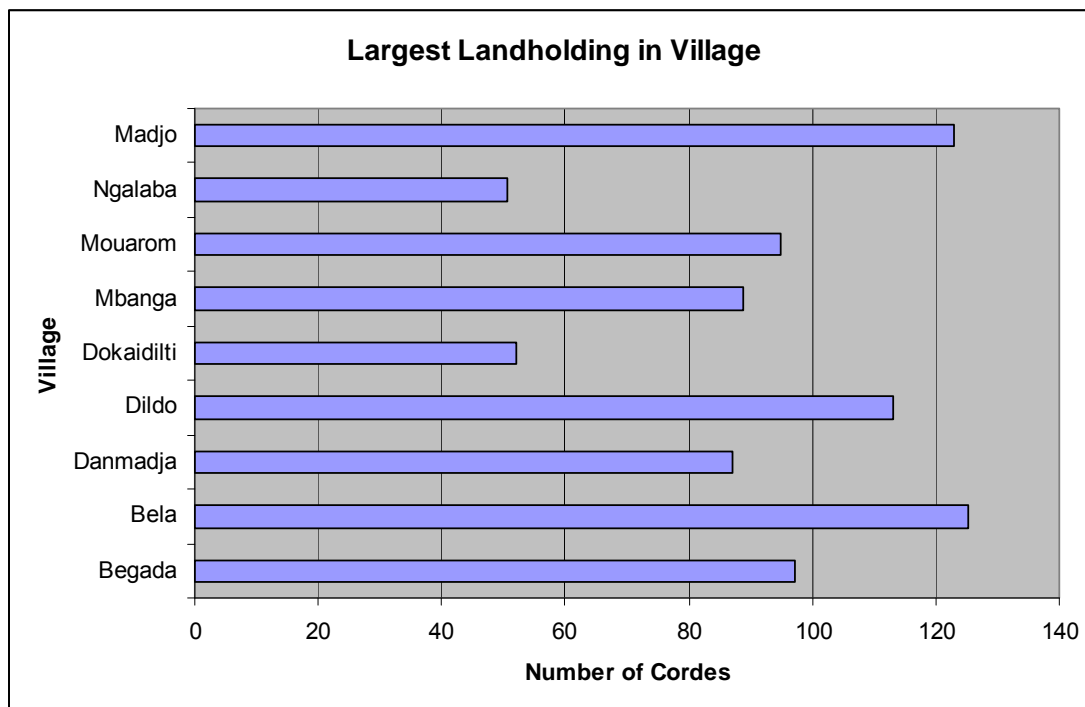
Skewed land distribution is illustrated by the graph showing the range and distribution of landholdings among HH in the 9 surveyed villages. This graph shows the inequality in distribution land among HH. Bear in mind that the survey fixes a moment in time; the same sort of distribution will continue over time but it will be different HH with more or less land as the HH evolve.

Distribution of Land in 9 Surveyed Villages



The modal land holding in these villages shows that most HH are cultivating small family farms somewhere around 2.5 cordes/capita while others cultivate large family farms of 10 cordes/HHM and sometimes more land.

This inequitable distribution occurs because some people maintain enormous land holdings as part of a family pool<sup>9</sup>, a “land trust” which members of this fortunate family can withdraw from fallow to use when the HH needs it. A young man with no dependents farms only what he needs but turns to the trust and “trustees” when he marries and has children.



There are, however, unfortunate families that do not have such a pool to call upon. These families are characterized by certain qualities which, if watched for, can serve as indicators of possible vulnerability.

### **Indicators of Vulnerability**

A HH may change its characteristics over time, as it evolves through what sociologists call “the domestic cycle”, but when land take occurs HH that may be negatively impacted can be identified by these factors.

#### **Indicators of Possible Vulnerability**

- **Age**
- **Gender**
- **HH Land Holding and Family Land Pool**
- **Residence**
- **Infirmity**

<sup>9</sup> The family pools all form part of a village pool, into which some HH may move in order to exploit underutilized land. Or the village can cede part to a group of incomers.

Analysis of data from the village surveys has identified and confirmed these indicators of possible vulnerability.

### **Age as a Factor in Vulnerability**

Very few HHH are under 20 years of age – the few below this age are usually orphans who have been left caring for their younger siblings.

The diagram showing HHHs by Age and Sex reveals how HH move through the domestic cycle. The age categories used to classify the HHH in the diagram are the ones by which local people differentiate the various statuses of HHH.

- Below 20 a person is not ready to become a HHH except because of harsh reality; and the HHH is pitied by all for the difficulties to be faced.
- Young men in their early twenties are of an age to be looking for wives and will soon set up housekeeping. Girls this age should already be married or in the process.
- 24 to 30 year olds are young householders, independent of their families, beginning to produce children.
- 31-44 year old HHH are mature heads of household, capable of taking on the full responsibilities of supporting a family (own children and the many other dependents that join a HH as a result of a short average life span).
- 45-59 year olds are mature HHH whose children are beginning to disperse into their own households.
- 60-69 are the retirement years, with fewer HH responsibilities. These HHH are merging into the characteristics of:
- 70+ years, in which the HHH jealously guard their independence as a HH but nevertheless depend on their children for some economic support, for grandchildren to come help out with HH chores, etc.

The diagrams below show that more males than females become HHH, since women are often dependent on their husbands. Women do, however, become HHH, especially at a later age, when they are separated, widowed or divorced. Women have access to their own family land pool and some elderly women have extensive holdings. Young men and early middle-aged men form the bulk of the HHH, before mortality sets in.

Age plays a strong role in determination of viability because individuals access the family land pool for two reasons:

- Being the head of a growing family
- Being left as an heir to other family members' land

and, in the case of women:

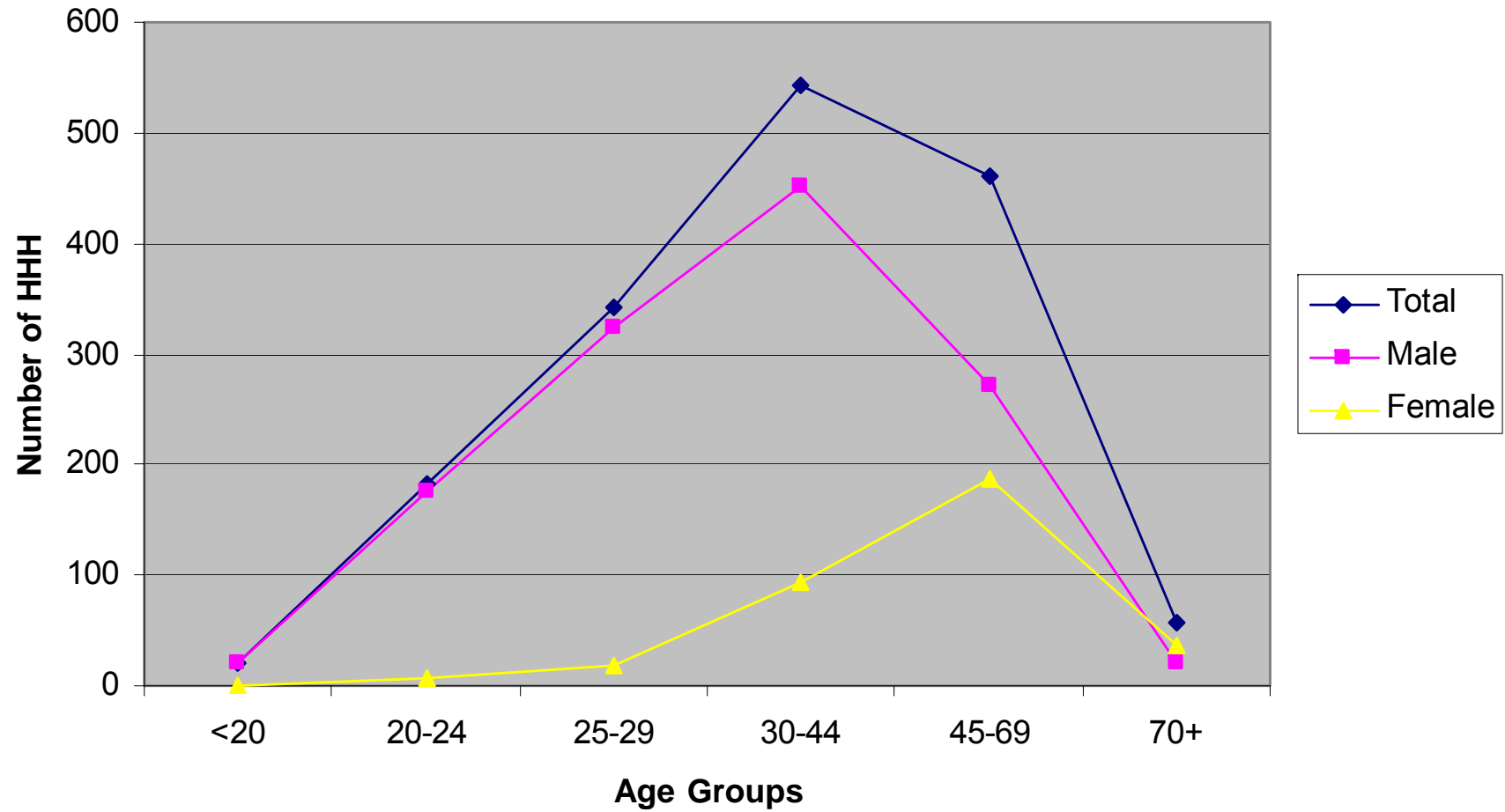
- Becoming independent of their husbands

The following graphs also make clear that land holdings tend to increase with age. The final graph shows how HHH at certain ages are more likely to be vulnerable because of the interplay of the “indicators of vulnerability”, which are really “risk factors” for vulnerability.

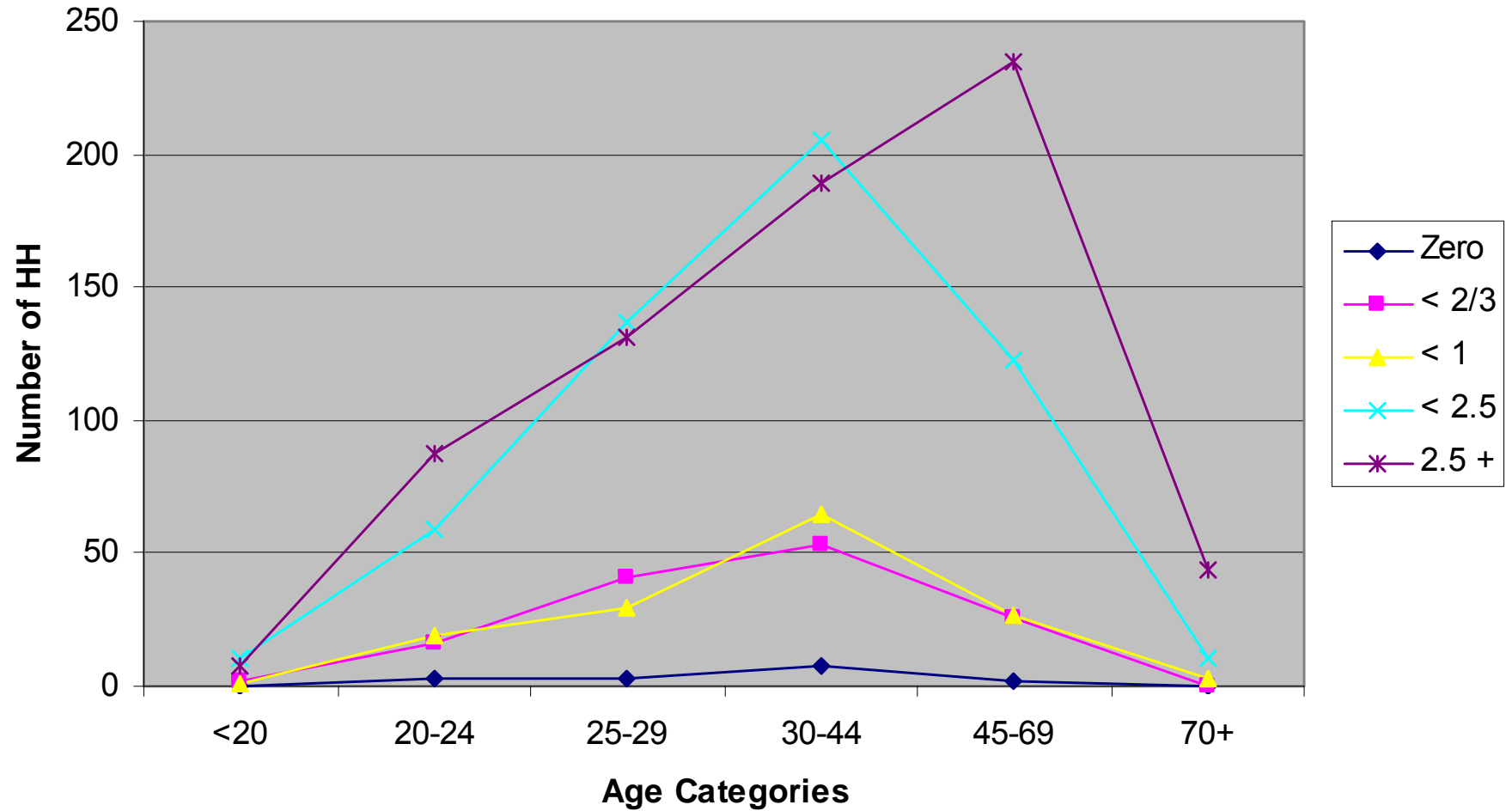
The graphs also demonstrate that most vulnerable MHHH are in their 20s. At this age they are only setting up their homesteads and adding fields for their growing family by accessing the family pool. Hence men at this age often appear to lack adequate farm land but their true vulnerability will be revealed only as they enter their late 20s and 30s, when their families continue to grow but insufficient family land has already been portioned out. Likewise by this age dysfunctional traits such as alcoholism begin to affect the HHH’s farming productivity.

<b>Landholding per capita</b>					
<b>9 Villages Ethnic Age</b>	<b>Zero</b>	<b>&lt; 2/3</b>	<b>&lt; 1</b>	<b>&lt; 2.5</b>	<b>2.5 +</b>
<20	0	2	1	8	10
20-24	3	12	17	47	84
25-29	4	47	34	158	170
30-44	8	47	55	171	229
45-69	1	25	35	110	249
70+	0	0	3	10	44

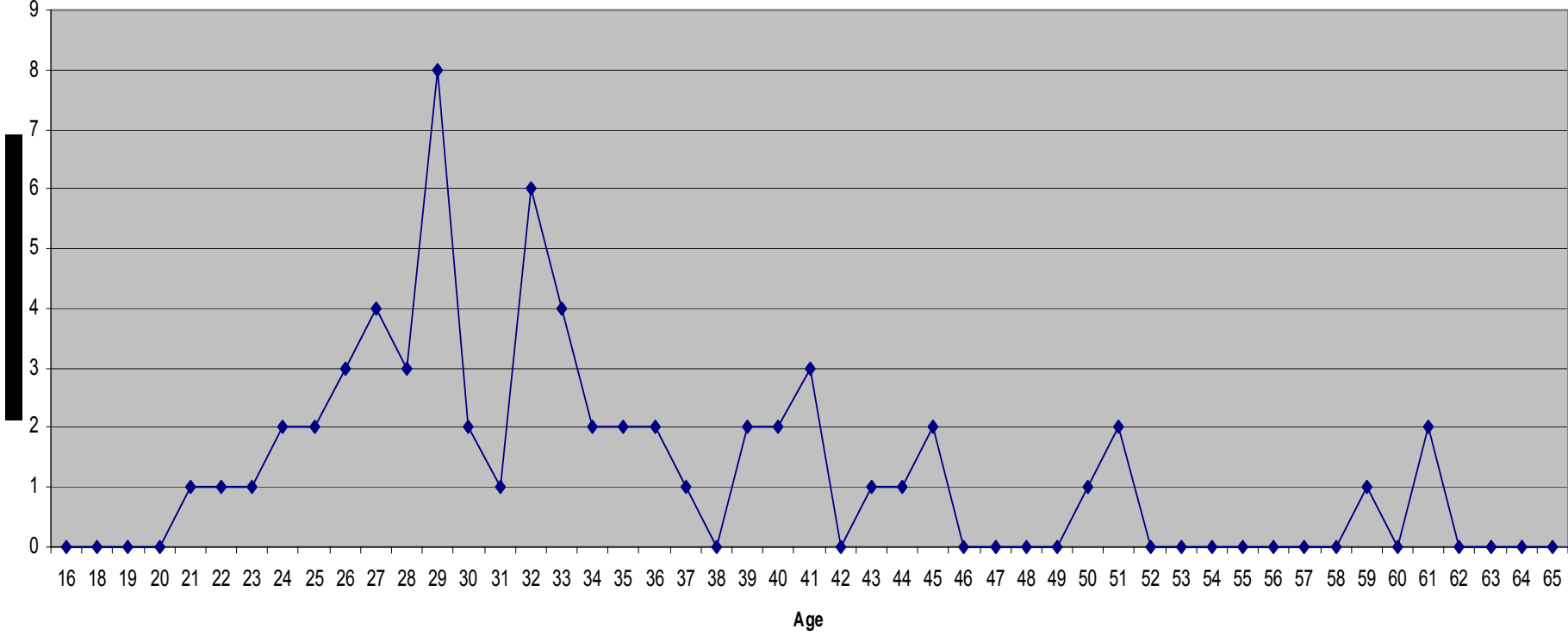
### 9 Survey Villages by Ethnic Age Groups & Gender



## Landholdings of HH by Ethnic Age Categories



**Peak Ages for Vulnerability**  
**Distribution of At-Risk HH by the Age of the Household Head**



**Age Distribution of Vulnerable Household Heads**

### **Gender as a Factor in Vulnerability**

The analysis of age above shows that gender also plays a role in HH independence.

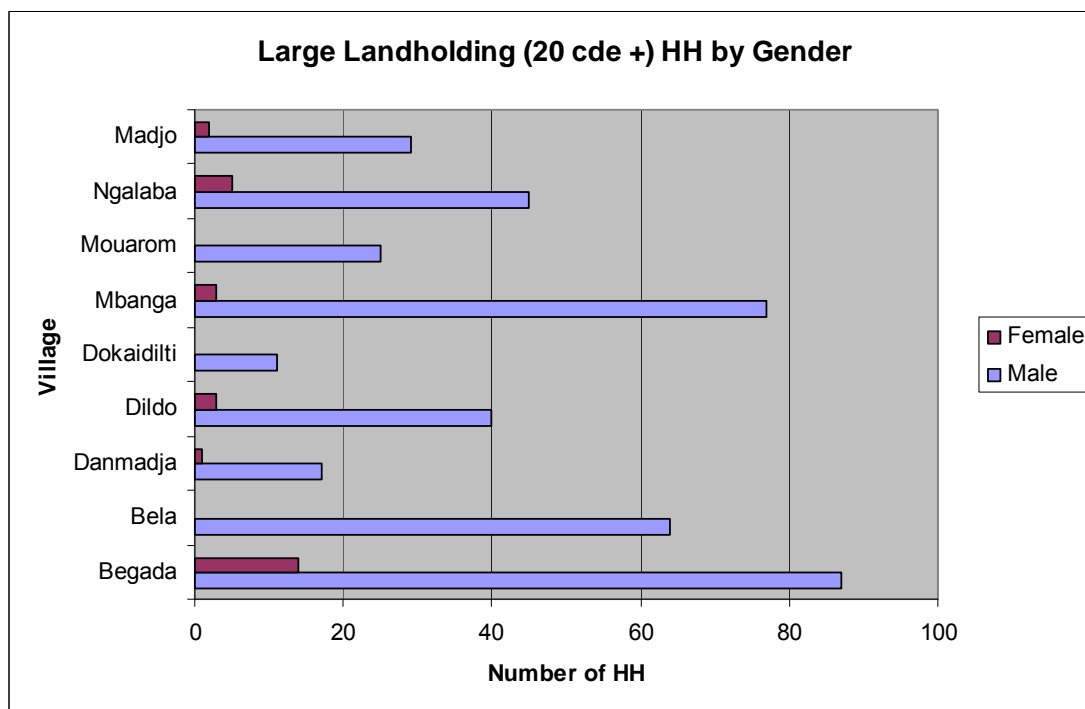
The graph above has shown how MHHH in their 20s make up the bulk of “vulnerable” HH, but this is only an appearance. As males they become HHH, take on wives, and start producing children. They dip into the family land pool bit by bit, as they need to acquire land. Truly vulnerable MHHH remain vulnerable over time, without the land to lift them out of their situation.

Older women are more likely to be HHH than younger ones for both demographic reasons (women live longer than men) and for social ones.

- First, an older woman who has charge of many children must count on herself as well as her husband to provide for her, an incentive to become independent.
- Second, a more mature woman may separate from her husband’s HH and set up on her own, either in her husband’s village or in her natal village.

Since women are responsible only for taking care of themselves, their children, and any dependents from their own side of the family, plus husband’s family dependents, whereas men have the charge not only of possibly several wives and their offspring and dependents, plus his own family dependents, women usually cultivate less land than men. When a woman marries into another village this is particularly true, since she must access land through her husband and his family. Thus she accesses only what she needs.

But women do not lack potential access to adequate family land, as the large land holdings of some women indicate. Land is not an attribute of gender; both men and women can hold and exploit land in the family pool. It is men, however, who need to put larger holdings into use as their charge grows.



Women are, however, less likely to be able to access their family land pool not for lack of rights but for logistical reasons. Although there is a high degree of in-marriage within the village and between neighboring villages, the rule upon initial marriage is that the woman moves to her husband's house. He and his family are obliged to provide her with part of their family pool of land for her to cultivate, either in the same field with her husband, or on her own. Most young wives cultivate with their husbands because they are tied down by small children and have little time to devote to farming. As the children get older a woman can increase her farm work.

A woman who is widowed and with small children will be looked after by the husband's family, "for the children's sake". But as they grow and are able to move from their mother's HH to become dependents in a paternal relative's HH, the husband's family has little reason to ensure that the widow has access to more land, their land. Hence women married into distant villages are at a disadvantage and more likely to become vulnerable.

The following table shows how age and gender play out in vulnerability of HHs.

## Comparison of Vulnerability by Age and Sex 9 Surveyed Villages

9 Villages	% HH <2/3 Out of All HH by Gender	
	M HHH <2/3	F HHH <2/3
<20	0%	0%
20-24	1%	1%
25-29	3%	2%
30-44	3%	7%
45-69	1%	5%
70+	0%	0%

- Young male household heads 20-29 appear “non-viable” but land may still be held in family pool
- 30 and above male HHH are probably vulnerable
- Older women become HHH and thus may become vulnerable

### **HH Land Holding and Family Land Pool as a Factor in Vulnerability**

Landholdings within the village are considerably skewed, with a few HH (usually less than 10%) that possess too little land for them to prosper agriculturally. The fertility of their land will remain low because they cannot leave it long enough in fallow. At the other end of the spectrum are the few elderly HHs who possess vast landholding because they have either not yet partitioned it all out to others in the family, or because there are too few in the family to divide it among. In between are the HH that, no matter where they are in the family’s domestic cycle, have enough or more than enough land to remain agriculturally viable.

If you belong to a family with a limited land pool and many members, then your HH’s likelihood of accessing sufficient land is low and your vulnerability risk is high. Within the village some families simply have small family pools. But there are several circumstances that may mean you have little land to access. The principle of these is:

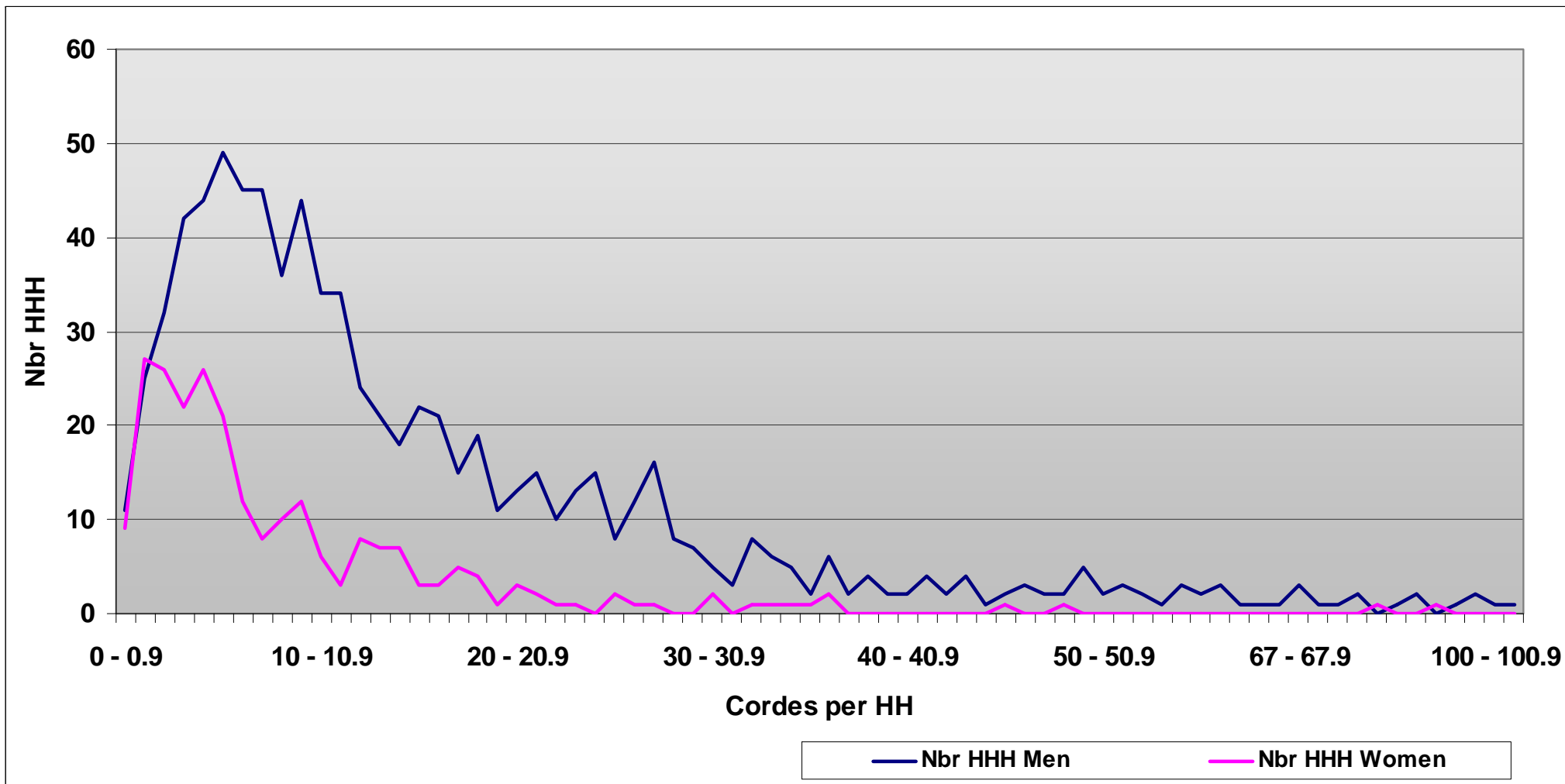
- **Residence**

If you or your father have come from another village/canton the amount of land in your pool is limited to what your kin within the village have granted to you. Hence people who are not residing in their natal village may have a small family pool.

The prime example of someone living outside the natal village is a woman who has married someone in another village. In this case she can access only the land that her husband and husband’s family offer her. But people leave their natal villages for many other reasons, after quarrels, to follow their mother to her natal village, to get away from sorcery or sorcery accusations, adventure. All these movements reduce access to land except within the home village.

### **Infirmity as a Factor in Vulnerability**

Infirmity as such can make a HH vulnerable because it can limit the amount of land the HH can exploit, even if the HH were land rich. An infirmity does not necessarily mean the HH is non-viable, because other HHM or relatives may cultivate or carry out other economic activities that cover the HH livelihood needs. Thus elderly parents appear nonviable, farming only a small piece of land (which helps them to keep their self-respect as active members of the HH) but are supported by their siblings or children and helped out at home by grandchildren who come to do the housekeeping. In a number of HH where one spouse is handicapped or unwilling to work, the HH is maintained at an adequate level either by other HHM farming or earning money. Each case of infirmity must be examined in order to decide what resettlement actions would indeed help the HH.



Range and Distribution of Land among Male and Female HHH

### **Becoming Vulnerable in the OFDA**

A household living in a vulnerable situation, a state in which the HH does not have enough land to cultivate and then leave it fallow long enough to fully recuperate its fertility, is not a phenomenon created by the Oil Export Project.

About 5% of HHH were vulnerable according to the criterion of land holding at the time the baseline study for the Project was carried out (1995-6). Not all of the households that appeared vulnerable were, in fact, at risk. Some HHH had small land holdings because they made most of their living from fishing. Others earned cash from commerce of different commodities.

But some of the households were indeed below the threshold for land holding with nothing to make up for the lack of land. They were poor and remained poor, either because they could not access any more land or because of their disabilities or from lack of willingness did not change their situation.

The Project, of course, recognizes that Project land acquisition aggravates the situation of already vulnerable HH and that land take may also push other HH into a vulnerable situation. All compensated HH below the risk threshold of 2/3 c per HHM are able to choose among resettlement options – whether or not they were nonviable before giving up land to the Project. But all non-viability is not due to the Project. 62% of the HH offered resettlement options in the villages in the table below were already below the threshold of vulnerability before the Project acquired any of their land. There are other HH in these villages that are also vulnerable but that have not surrendered any land to the Project. These HH can benefit, if they wish, by voluntarily attending the various lessons in Improved Agriculture techniques or Literacy and Business Management that the Project offers in the villages. All HH in the village benefit from Community Compensation.

The following table shows some of the Project impact in the surveyed villages.

- The first line shows the number of HH that have
  - 1) benefited from compensation i.e.
  - 2) Surrendered land to the Project. (As the graph below on Land Taken from At-Risk HH shows, most HH lose only a small portion of their land holdings.)
- The second shows the % of HH within the village that benefited from compensation.
- The third, how many Non Viable HH in the village surrendered land and received compensation. This line shows the value of the Land Use Mitigation Action Plan and Village Surveys in finding all Non Viable HH that have surrendered land and should receive resettlement benefits.
- The fourth, how many Non Viable HH were correctly identified as Non Viable during compensation i.e. the reliability of declarative data to reveal a HH's true landholding situation.
- The fifth, how many compensated Non-Viable HH were revealed as Non Viable and in need of a resettlement option at the time the Village Survey was completed. This equals the LUMAP obligation to offer resettlement benefits. This has/will be done by offering counseling and benefits in 2009-11.

<b>Village</b>	<b>Begada</b>	<b>Bela</b>	<b>Danmadja</b>	<b>Dildo</b>	<b>Dokaidilti</b>	<b>Madjo Bero</b>	<b>Mbanga</b>	<b>Mouarom</b>	<b>Ngalaba</b>
# compensated HH	190	179	88	103	73	111	211	74	209
% all HH compensated	73%	93%	86%	38%	86%	83%	78%	87%	84%
# NV HH compensated	11	5	13	11	9	12	15	9	19
# NV HH resettlement option	4	4	4	3	8	4	4	8	2
# NV HH to receive option	7	1	9	8	1	8	11	1	17

## HH Vulnerability Before or Because of Project Land Acquisition

Although there is a tendency to account for HH becoming vulnerable after Project start up, not all changes in HH landholdings have been due to Project land acquisition. Many other common social factors such as births and deaths, dependents joining the HH, etc. can account for a HH becoming vulnerable, whether or not it has surrendered land to the Project. With this caveat, the table below shows the landholding situation of HH that have surrendered land to the Project.

<b>9 Villages HH in Land Categories</b>		
	% All HH	% All HH Compensated
zero	1%	0.7%
<2/3	9%	6.5%
<1	10%	7.0%
<2.5	35%	27.8%
2.5 +	45%	37.4%

It is clear that a number of HH are nonviable or marginal even though they have surrendered none of their landholdings to the Project. Many HH were nonviable or marginal before Project inception.

<b># All Mbanga HH at Vulnerability Factor per Capita</b>					
HH viability factor	Total # current HH	Male HHH		Female HHH	
		203		63	
	269	before	now	before	now
zero	0	0	0	0	0
<2/3	17	5	8	8	9
<1	16	8	12	5	4
<2.5	82	59	65	15	17
2.5 +	154	134	121	35	33
<b># All Mbanga Compensated HH at Vulnerability Factor per Capita</b>					
HH viability factor	Total # current HH	Male HHH		Female HHH	
		174		37	
	211	before	now	before	now
zero	0	0	0	0	0
<2/3	10	1	4	5	6
<1	13	7	11	3	2
<2.5	63	50	56	5	7
2.5 +	125	115	103	24	22

<b># All Madjo HH at Vulnerability Factor per Capita</b>					
HH viability factor	Total # current HH	Male HHH		Female HHH	
		118		14	
	133	before	now	before	now
zero	3	1	3	0	0
<2/3	16	11	13	3	3
<1	12	11	11	0	1
<2.5	57	46	52	6	5
2.5 +	45	50	41	5	4

<b># All Madjo Compensated HH at Vulnerability Factor per Capita</b>					
HH viability factor	Total # current HH	Male HHH		Female HHH	
		118		14	
	133	before	now	before	now
zero	2	0	2	0	0
<2/3	10	6	9	1	1
<1	9	6	6	2	3
<2.5	51	41	46	6	5
2.5 +	39	43	33	6	6

<b># All Bela HH at Vulnerability Factor Per Capita</b>					
HH viability factor	Male HHH		Female HHH		
	127		17		
	before	now	before	now	
zero	0	0	0	0	
<2/3	6	9	3	3	
<1	8	6	1	1	
<2.5	27	28	3	4	
2.5 +	86	84	10	9	

<b># All Compensated Bela HH at Vulnerability Factor Per Capita</b>					
HH viability factor	Male HHH		Female HHH		
	79		5		
	before	now	before	now	
zero	0	0	0	0	
<2/3	2	5	0	0	
<1	3	1	0	0	
<2.5	13	15	1	2	
2.5 +	61	59	4	3	

<b># All Mouarom HH at Factor Per Capita</b>					
HH viability factor	Total # HH	Male HHH		Female HHH	
		75		12	
	87	before	now	before	now
zero	3	0	2	1	1
<2/3	4	5	4	0	0
<1	3	0	2	0	1
<2.5	31	22	25	7	6
2.5 +	46	48	42	4	4

<b># Compensated Mouarom HH at Factor Per Capita</b>					
HH viability factor	Total # HH	Male HHH		Female HHH	
		68		6	
	74	before	now	before	now
zero	2	0	2	0	0
<2/3	4	5	4	0	0
<1	3	0	2	0	1
<2.5	26	19	22	5	4
2.5 +	39	44	38	1	1

<b># All Danmadja HH at Factor Per Capita</b>					
HH viability factor	Total # HH	Male HHH		Female HHH	
		102			
	102	before	now	before	now
zero	1	0	0	0	1
<2/3	15	10	13	2	2
<1	21	7	16	2	5
<2.5	40	41	35	8	5
2.5 +	25	30	23	2	2

<b># Compensated Danmadja HH at Factor Per Capita</b>					
HH viability factor	Total # HH	Male HHH		Female HHH	
		88			
	88	before	now	before	now
zero	1	0	0	0	1
<2/3	12	8	11	2	1
<1	17	5	14	0	3
<2.5	37	38	32	8	5
2.5 +	21	27	20	1	1

All Begada HH at Factor per Capita					
HH viability factor	Total # current HH	Male HHH		Female HHH	
		189		72	
	259	before	now	before	now
zero	0	0	0	0	0
<2/3	17	5	8	8	9
<1	16	8	12	5	4
<2.5	82	59	65	15	17
2.5 +	154	134	121	35	33

# Compensated Begada HH at Factor per Capita					
HH viability factor	Total # current HH	Male HHH		Female HHH	
		151		39	
	259	before	now	before	now
zero	2	0	1	0	1
<2/3	9	2	5	4	3
<1	10	3	6	3	4
<2.5	40	27	33	8	7
2.5 +	129	119	106	24	23

All Dokaidilti HH at Factor Per Capita					
HH viability factor	Total # HH	Male HHH		Female HHH	
		75		10	
	85	before	now	before	now
zero	0	0	0	0	0
<2/3	10	4	7	3	3
<1	13	6	11	2	2
<2.5	36	41	31	2	2
2.5 +	26	24	23	3	3

# Compensated Dokaidilti HH at Factor Per Capita					
HH viability factor	Total # HH	Male HHH		Female HHH	
		68		5	
	85	before	now	before	now
zero	0	0	0	0	0
<2/3	9	4	7	2	2
<1	12	6	11	1	1
<2.5	31	38	31	0	0
2.5 +	21	20	19	2	2

<b># All Dildo HH at Factor Per Capita</b>					
<b>HH viability factor</b>	<b>Total # HH</b>	<b>Male HHH</b>		<b>Female HHH</b>	
		<b>before</b>	<b>now</b>	<b>before</b>	<b>now</b>
zero	5	4	4	0	1
<2/3	31	16	20	11	11
<1	40	27	32	8	7
<2.5	111	101	95	16	16
2.5 +	88	69	65	23	23
<b># Compensated Dildo HH at Factor Per Capita</b>					
<b>HH viability factor</b>	<b>Total # HH</b>	<b>Male HHH</b>		<b>Female HHH</b>	
		<b>before</b>	<b>now</b>	<b>before</b>	<b>now</b>
zero	1	0	0	0	1
<2/3	10	3	8	2	2
<1	16	10	15	2	2
<2.5	45	48	42	2	3
2.5 +	31	31	27	4	4

### **The Role of Project Land Acquisition in Making HH Vulnerable**

Two vital elements of Project impact in making HH vulnerable must be noted:

1. When the total land acquired from a HH is added up, the total in most cases amounts to less than 2.5 cordes. Usually total land lost to the Project has been even less, less than 1 corde per HH. In other words, from the beginning of the Project to today, HH are far more likely to have lost a small amount of land in total than a substantial portion.
2. The negative effect of land acquisition for the Project has primarily impacted HH that were already vulnerable, or close to vulnerability ("marginal"). Very few large land holders have surrendered enough land to become non-viable, or even marginal. Instead, HH with low land holdings undergo a major impact even though they are not losing much land.

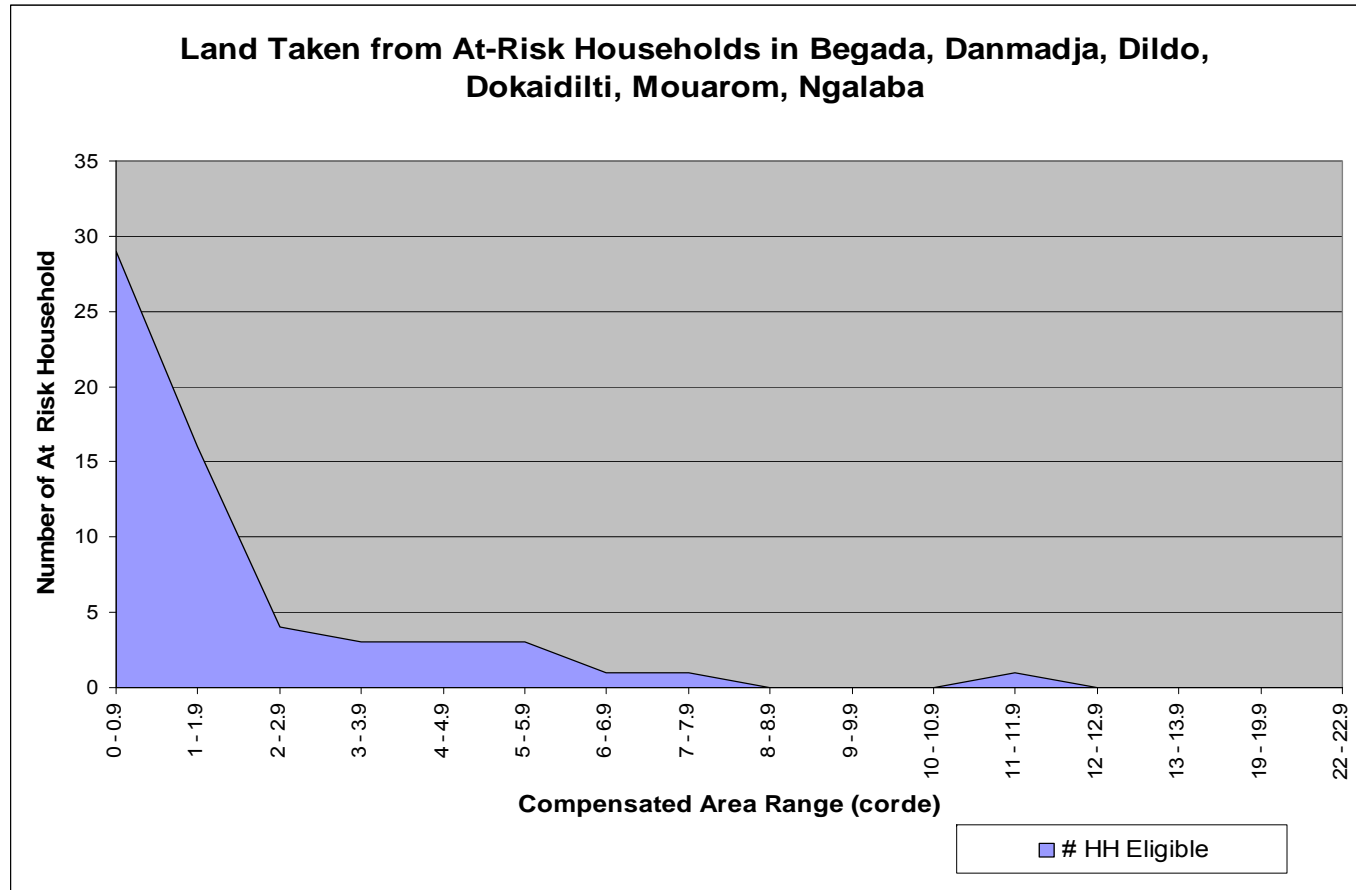
These facts account for the final indicator of HH vulnerability or risk in the OFDA.

- Small HH land holding/small family land pool

This is demonstrated by the graph below of land taken from vulnerable HH.

When someone has a small land holding coupled with problems accessing additional land because the family land pool is insufficient or far away, the individual and HH are very likely to lack enough land to farm.

# It's What You Have, Not What You Lose, That Counts



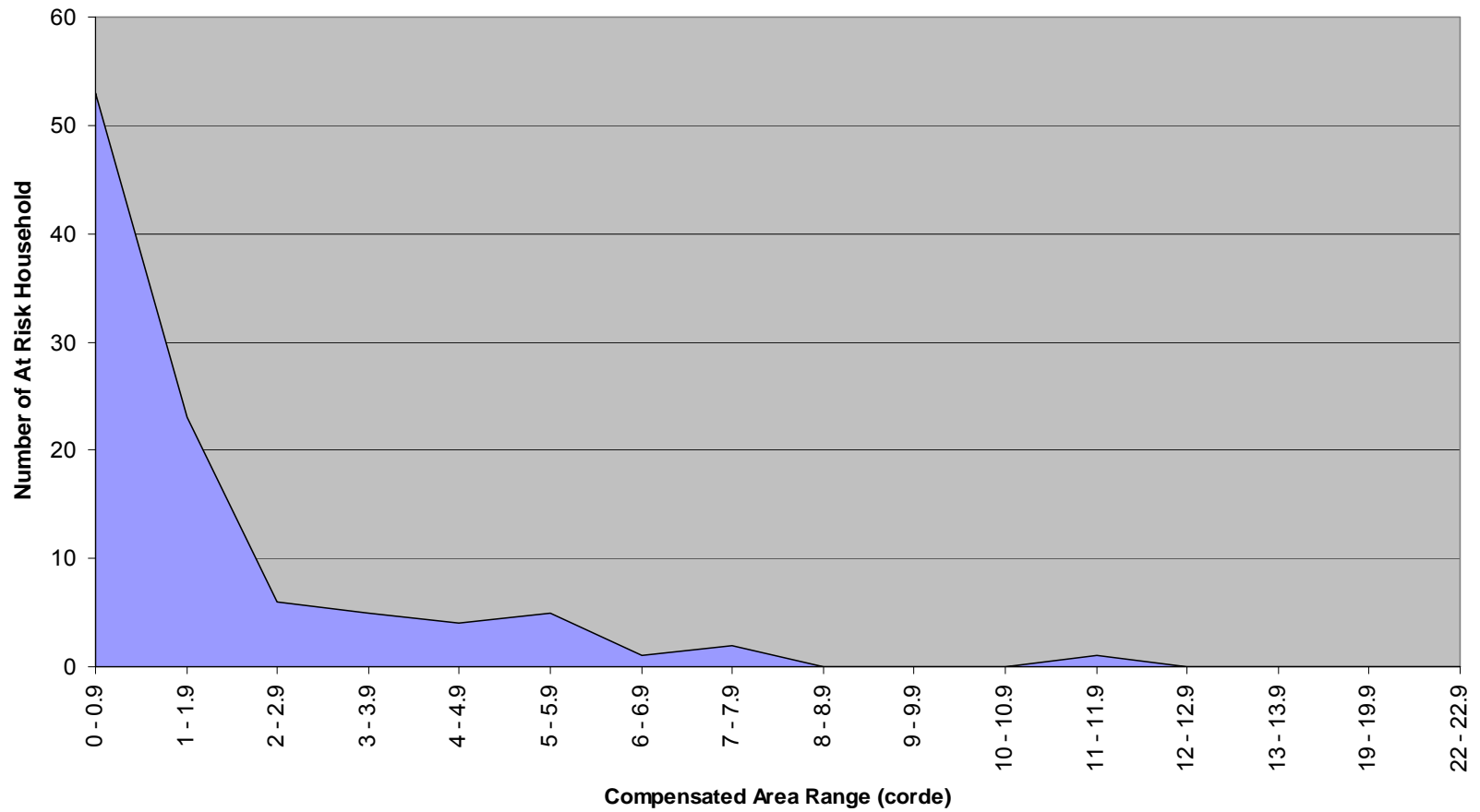
### **Using the Indicators of Vulnerability**

Once a Village Land Use Survey has been completed and the characteristics of the constituent HHs are known, the HHs showing signs of vulnerability can be monitored whenever land take occurs, to see if they are impacted.

In villages where no complete survey has been carried out, HH that are already vulnerable are already known because they have been identified in the past and through Land Use Mitigation Action Plan activities.

Individuals and HH that are impacted in the future for the first time will also undergo HH and Land Use Surveys, according to the revisions in the updated Land Management Manual, and their status will be uncovered. Vulnerable HH revealed through these surveys will become eligible for resettlement options.

### Land Taken from At-Risk Households in Bela, Mbanga, Madjo



### **Distribution of Vulnerability and Land in the OFDA**

Data analysis has shown that vulnerability is not determined at the village level. It is, instead, a consequence of unequal land distribution within the village coupled with social factors such as age and sex and with the logistical factor of distance from accessible land. These factors are clearly summed up by the following table:

<b>Skewed Land Holdings in 9 Survey Villages</b>				
Resettlement factor	0-0.67	0.68-0.99	1.00-2.49	2.5 +
% HH at factor	10%	10%	35%	45%

### **Project Impact on Landholding Status within OFDA Villages**

It is possible to evaluate the effects of Project land acquisition from 1998-2008 through the data collected in compensation records and Village Land Use Surveys. This information displays changes in compensated HH land holding status between the first compensation and mid-2008, changes that have occurred both because of land acquisition and population increase.

Different categories of land holding status as cordes per HH (sum of the land of all HHM) have been defined as follows:

<b>Land Holding Status</b>	
Zero	No landholding
Non-Viable	< 2/3 corde / HHM (0.67 corde)
Marginal	0.68-0.99 corde / HHM
Comfortable	1-2.49 corde / HHM
Wealthy	2/5 + cordes / HHM

These thresholds for land holding status have been set because they reflect the amounts of land per HHM which HH along the land distribution curve possess. HH tend to fall into distinct groups lying around the center of each of these ranges used to evaluate status.

When the pre-project situation of a HH is compared to its present land holding status it is possible to see that some households have undergone a change in status. When only compensated HH are considered, because they are HH on which Project land take may have had an effect as well as demographic changes, the social impact of the Project can be approximately assessed. Some compensated HH may have lost some land but they retain their land holding status without much change.

Understanding Project impact is easier if one thinks of the land holding categories as "social status". Some HH are wealthy and may have lost some of their wealth but they remain in the "upper class". On the other hand, some

HH may have slipped from their Comfortable position in the middle class to a marginal one in the “lower middle class” or even joined those already in the “lower class”. And a few are “destitute” – either they have another source of income which raises them out of their land-holding condition or else they really have problems, whether related to land access, alcohol, attitude, etc.

**Total Number HH That Changed in Status to Nov 2009**

<b>Change in Status</b>	<b>Begada</b>	<b>Bela</b>	<b>Danmadja</b>	<b>Dildo</b>	<b>Dokaidilti</b>	<b>Madjo Bero</b>	<b>Mbanga</b>	<b>Mouarom</b>	<b>Ngalaba</b>	<b>All 9</b>
nonviable to zero	2	0	1	1	0	2	0	2	0	8
marginal to zero	0	0	0	0	0	0	0	0	0	0
marginal to nonviable	2	2	3	4	2	3	3	0	4	23
comfortable to nonviable	3	1	1	1	1	1	1	1	1	11
wealthy to nonviable	0	0	0	1	0	0	0	0	0	1
comfortable to marginal	6	0	15	8	7	4	6	3	7	56
wealthy to marginal	0	0	0	0	0	0	0	0	0	0
wealthy to comfortable	14	3	7	3	1	10	15	6	19	78
<b>Overall Social Impact of Project</b>	<b>27</b>	<b>6</b>	<b>27</b>	<b>18</b>	<b>11</b>	<b>20</b>	<b>25</b>	<b>12</b>	<b>31</b>	<b>177</b>
Nov 09 nonviable HH	7	3	5	7	3	6	4	3	5	43
Nov 09 marginal HH	6	0	15	8	7	4	6	3	7	56
<b>Total At-Risk</b>	<b>13</b>	<b>3</b>	<b>20</b>	<b>15</b>	<b>10</b>	<b>10</b>	<b>10</b>	<b>6</b>	<b>12</b>	<b>99</b>

**Percent of HH That Changed in Status to Nov 2009**

<b>% HH Change in Status</b>	<b>Begada</b>	<b>Bela</b>	<b>Danmadja</b>	<b>Dildo</b>	<b>Dokaidilti</b>	<b>Madjo Bero</b>	<b>Mbanga</b>	<b>Mouarom</b>	<b>Ngalaba</b>	<b>All 9</b>
% nonviable to zero	1	0	1	0	0	2	0	2	0	1
% marginal to zero	0	0	0	0	0	0	0	0	0	0
% marginal to nonviable	1	1	3	1	2	2	1	0	2	2
% comfortable to nonviable	1	1	1	0	1	1	0	1	0	1
% wealthy to nonviable	0	0	0	0	0	0	0	0	0	0
% comfortable to marginal	2	0	15	3	8	3	2	4	3	5
% wealthy to marginal	0	0	70	0	0	0	0	0	0	8
% wealthy to comfortable	5	2	7	1	1	8	6	7	8	5
<b>% Overall Social Impact of Project</b>	<b>10</b>	<b>4</b>	<b>27</b>	<b>7</b>	<b>13</b>	<b>15</b>	<b>9</b>	<b>14</b>	<b>12</b>	<b>12</b>
% Nov 09 nonviable HH	3	2	5	3	4	5	1	4	2	3
% Nov 09 marginal HH	2	0	15	3	8	3	2	4	3	5
% Total At-Risk	5	2	20	6	12	8	3	8	5	8

During most of Project implementation, compensation's impact was determined by the impacted person's declarative data on how many HHM s/he had and how much land. Over-reporting of HHM or under-reporting of land, or both, could make a HH appear "vulnerable" even though its actual situation was fine. As a result, a number of people received a resettlement option – for the most part training in Improved Agriculture or Off Farm skills – from which they benefited although they were not in need of livelihood restoration. This training can be considered a positive benefit of the Project, leaving some people better off than before and contributing to the development of the OFDA.

The following three tables illustrate the social impact of the project. The first shows how many compensated OFDA HH in surveyed villages underwent a change in land holding status due either to Project land acquisition or to births/deaths, etc. This change can be considered as an indicator of social change. The second looks at these changes at the village level. The third looks at these villages to see how many HH benefited from training whether or not they were feeling negative Project Impact. Comparing the total of 103 HH undergoing social change with the number of HH in these villages which have benefited from training (110), the overall picture is even or slightly positive.

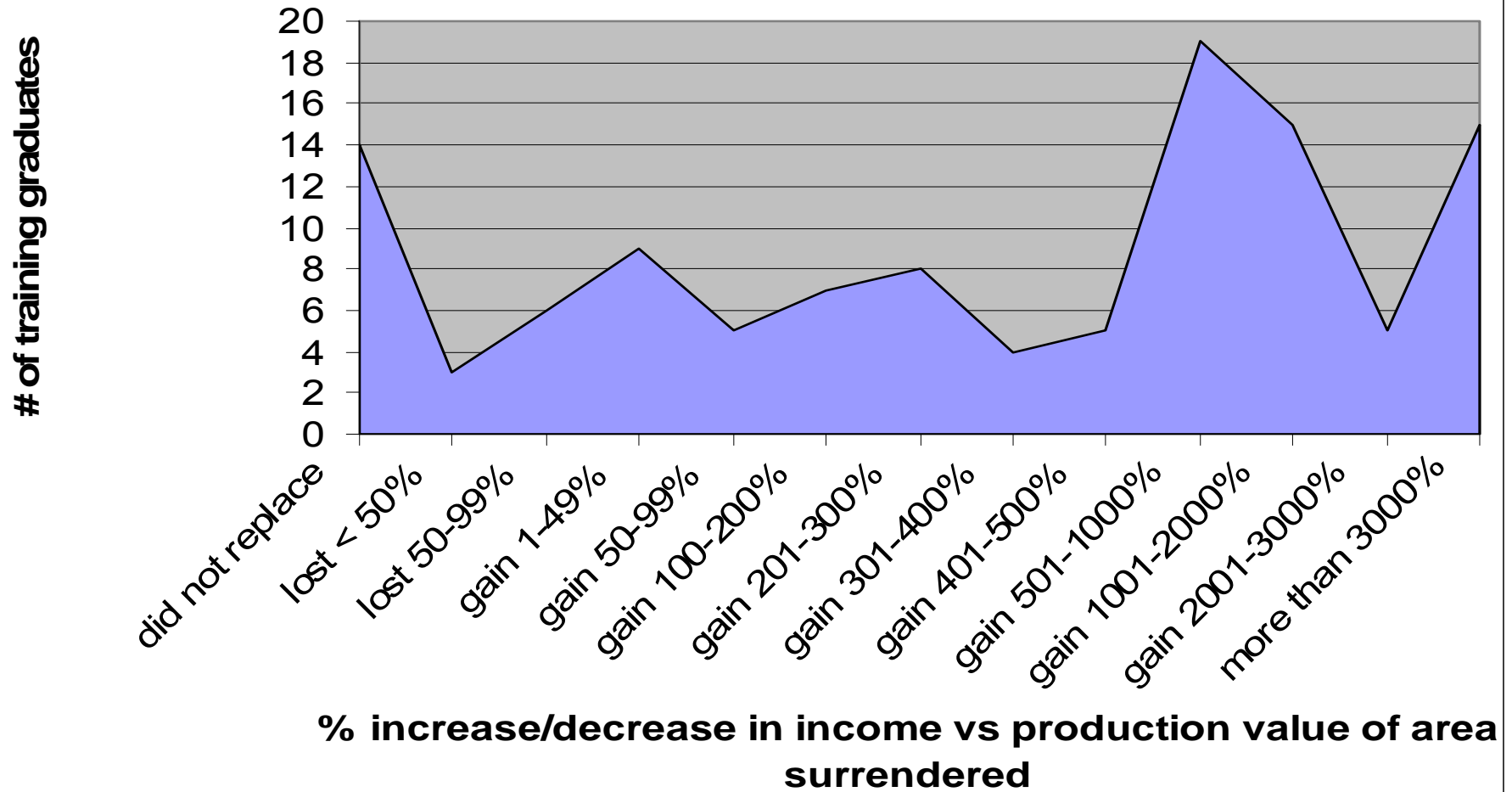
Training, however, does little good in maintaining or improving a HH's living unless it succeeds. Despite the widespread belief that most trainees do not apply their learning, or have sold off their equipment just for the money, monitoring of trainees/graduates does not bear this out. The general perception may in good part have sprung from the refusal of 11 members of the first graduating class to practice their training as blacksmiths and welders until they were given complex welding equipment and jobs with the Project, for which their training was insufficient.

The graph below compares the additional craft/agricultural earnings of each training graduate versus the production value in sorghum (the most common crop) of the area acquired by the Project from the graduate. The graph shows that annually most graduates do better financially from their training than what they could have earned by selling their lost production.

Since there is, as the data has shown, enough land for all HH in the village, the Project can always assist any graduate trainee who has failed to restore livelihood by paying a 3<sup>rd</sup> party compensation for ceding adequate land to the failed graduate.

HH Receiving Training by Land Holding Status 1998-2008 in Surveyed Villages						
Change in Status	Ngalaba	Dokaidilti	Dildo	Mouarom	Danmadja	Total HH
<b>Social Impact of Project (change status training or no training)</b>	33	12	18	12	28	103
Non-Viable HH	5	3	7	3	6	24
Marginal HH	5	8	8	3	15	39
<b>Offsetting Impact : Status change irrelevant</b>	2	10	9	0	11	27
Non-Viable Trained	0	3	3	0	3	9
Marginal Trained	2	7	6	0	8	18
<b>Positive Impact: Status change irrelevant</b>	31	20	12	7	13	83
Comfortable Trained	18	16	9	5	9	57
Wealthy Trained	13	4	3	2	4	26
<b>Total HH Trained</b>	33	30	21	7	24	110

## Craft + Agricultural Income after Training



### **Villages Targeted for In fill Drilling**

In fill drilling, as discussed in the section on Fault Blocks, will occur only within the area defined, subsurface, by the contours of the oil formations. Therefore only individuals with land holdings lying above the oil formations are at risk of being affected by the in fill drilling.

If the same characteristics analyzed above:

- Population distribution proportional to the village land area
- Viability at the village level
- Constant readjustment of the population density through traditional redistribution of the population
- Skewed land holdings
- Impact of land take being determined far more by the HH's size and land holdings than by the amount of land acquired by the Project

are also typical of In fill villages, then the same indicators of vulnerability can be used to predict and monitor in fill drilling's impact on farming HH. That is not to say that a farmer with extensive land holdings might not be made vulnerable by in fill land take, but rather that the probability of this happening is low.

Once reservoir has communicated to EEPIC the actual coordinates of an In fill well pad and associated construction, these coordinates can be overlaid on the map of village land holdings and the specific individuals and HH lying in the footprint can be identified. Knowing their dependents and their total landholdings already, the additional land they will surrender can be subtracted and their viability factor calculated ahead of land acquisition. These people can enter into the choice of resettlement options immediately.

By its very nature in fill drilling targets the places of highest production within a fault block, and so any additional land acquisition occurs in areas which have already been densely occupied by Project construction. In these spots there is not much additional land which could be acquired for the first time. HH cannot therefore be deprived of much more land in these areas.

At the village level In fill drilling will have little impact. For the six villages, the total area lying over the fault blocks is 1,130 Hectares, whereas the villages dispose of 12,569 Hectares of land. Even if the fault blocks were paved over in their entirety the six villages would lose only 9% of their land. Each village is well able to withstand even this catastrophic scenario.

The impact of land acquisition for In fill drilling would be on the HH who have land near existing facilities and well pads where in fill wells will be drilled to take advantage of sweet spots. An extrapolation from the number of HH made non-viable so far by the in fill construction built to date is 46 HH/1004 HH in the 6 villages.

To return to the Worst Case Scenario, where every bit of land within the fault blocks is acquired for Project use, the various villages would be affected as follows:

<b>Worst Case Scenario for Population of 6 In fill Villages (1004 HH)</b>				
<b>Village</b>	<b># Potential NV HH</b>	<b># Potential Marginal HH</b>	<b># Potential Comfortable HH</b>	<b># HH left Wealthy</b>
Begada	29	9	37	45
Bela	4	0	14	32
Danmadja	33	15	20	6
Madjo	25	11	26	24
Mbanga	13	5	26	23
Mouarom	12	2	18	26

From this table it appears that Danmadja is at the most risk if the Fault Blocks were completely occupied.

## **Conclusions**

- Most Project land acquisition has taken only small amounts of land from any given HH
- HH are made vulnerable or marginal by the amount of land the HH has available, not directly by the amount of land the Project takes in any area
- HH at risk are therefore most likely HH with small land holdings.
- Other indicators of vulnerability are:
  - Sex: females are vulnerable because they generally have smaller land holdings than men and because, if they marry into another village, they may have problems accessing family land holdings
  - Age: Young male HHH; thirty-something male HHH; forty-ish female HHH are the periods of vulnerability, either because they have not yet accessed the family land pool, are unable to access it, or the pool is too small, or because the HHH is impeded by character traits.
- These “indicators of vulnerability” can be used to predict the HH that are likely to be made vulnerable, more vulnerable or marginal by Project land take.
- Villages are not “vulnerable” at the village level. In fill drilling will not negatively impact the villages targeted. Instead the drilling will impact HH within the targeted village, and these HH can be predicted or identified, depending on how much survey and reservoir data is available
- The EMP/CRCP training provisions for helping vulnerable HH restore livelihood have been 75% effective. The failures have been due in large part to those character traits referred to above.

- This leaves around 25% of vulnerable HH impacted by the Project who must depend on other options than training.
- The EMP/CRCP and Land Management Manual provide for physical resettlement, either on land within the boundaries of the vulnerable HH's village or in another village.
- There is sufficient land for vulnerable HH at the village and regional level. EMP also proposes to improve lowlands so that lucrative rice and vegetable farming will be available to the vulnerable HH and others.
- The traditional land adjustment mechanisms are still strong and vital and support and underlie any actions undertaken by the EMP.

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## **Annex E: Performance Indicators**

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**Annex E: Performance Indicators**

**Annex E (i): Livelihood Indicators**

## **Livelihood Indicators**

### **(Options that will assist in developing indicators)**

#### **Population**

- Total population
- Age distribution
- Gender distribution
- Birth, death and migration rates

#### **Employment**

- Current local businesses, success rate of community owned businesses
- Training programs leading to employment

#### **Housing**

- Access to housing
- Quality of housing
- Allocation of housing

#### **Infrastructure**

- Environment (access to water)
- Condition of roads and buildings

#### **Education**

- Level of education as measured by completion of 2<sup>nd</sup> level
- Literacy as measured by completion of 1<sup>st</sup> level
- Completion of any education past 2<sup>nd</sup> level (courses, programs, “degrees”)

#### **Health**

- Main health concerns/issues
- Access to healthcare and frequency of visits to: clinics, doctors, nurse practitioners, traditional medicine practitioners
- Access to medicine (clinics, pharmacies, local vendors)
- Access to perinatal/maternal health care facilities within area (relative close proximity)
- Vulnerable care in the community and access to health care facilities for vulnerable population
- Traditional “starvation” (manioc) food consumption (frequency of use); use of other foods during these times & nutritional values of other foods used and variance of other foods used

#### **Traditional Culture, Community & Youth (Future of Community)**

- Ability to access land (relative close proximity to main homestead)
- Ability to access land and living conditions (land that is farther away and living conditions are not main homestead)
- Ceremonies, spirituality, traditional cultural practices

- Children and youth focused programs via educational services, community center programs<sup>1</sup>
- Community development programs (types, targeted @ which population base, short & long term goals)<sup>2</sup>

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<sup>1</sup> Via Government programs, Project and/or Company initiatives

<sup>2</sup> Via Government programs, Project and/or Company initiatives

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## **Annex E: Performance Indicators**

### **Annex E (ii): Chad Millennium Development Goals**

Millennium Development Goals				
	1990	1995	2000	2007
<b>Goal 1: Eradicate extreme poverty and hunger</b>				
Employment to population ratio, 15+, total (%)	..	66	66	65
Employment to population ratio, ages 15-24, total (%)	..	46	47	45
Income share held by lowest 20%	..	..	..	..
Malnutrition prevalence, weight for age (% of children under 5)	..	..	29	..
Poverty headcount ratio at national poverty line (% of population)	..	..	..	..
Prevalence of undernourishment (% of population)	..	..	..	..
Vulnerable employment, total (% of total employment)	..	94	..	..
<b>Goal 2: Achieve universal primary education</b>				
Literacy rate, youth female (% of females ages 15-24)	..	..	23	..
Literacy rate, youth male (% of males ages 15-24)	..	..	56	..
Persistence to last grade of primary, total (% of cohort)	..	..	46	..
Primary completion rate, total (% of relevant age group)	17	15	22	37
Total enrollment, primary (% net)	..	..	53	..
<b>Goal 3: Promote gender equality and empower women</b>				
Proportion of seats held by women in national parliament (%)	..	..	2	7
Ratio of female to male enrollments in tertiary education	..	..	18	14
Ratio of female to male primary enrollment	..	..	61	68
Ratio of female to male secondary enrollment	..	..	28	33
Ratio of young literate females to males (% ages 15-24)	..	..	42	..
Share of women employed in the nonagricultural sector (% of total nonagricultural employment)	3.8	..	..	..
<b>Goal 4: Reduce child mortality</b>				
Immunization, measles (% of children ages 12-23 months)	32	26	28	23
Mortality rate, infant (per 1,000 live births)	120	121	122	124
Mortality rate, under-5 (per 1,000)	201	202	205	209
<b>Goal 5: Improve maternal health</b>				
Adolescent fertility rate (births per 1,000 women ages 15-19)	..	..	191	169
Births attended by skilled health staff (% of total)	..	..	16	..
Contraceptive prevalence (% of women ages 15-49)	..	..	8	..
Maternal mortality ratio (modeled estimate, per 100,000 live births)	..	..	..	1500
Pregnant women receiving prenatal care (%)	..	..	42	..
Unmet need for contraception (% of married women ages 15-49)	..	..	..	..
<b>Goal 6: Combat HIV/AIDS, malaria, and other diseases</b>				
Children with fever receiving antimalarial drugs (% of children under age 5 with fever)	..	..	32	..
Condom use, population ages 15-24, female (% of females ages 15-24)	..	..	..	..
Condom use, population ages 15-24, male (% of males ages 15-24)	..	..	..	..
Incidence of tuberculosis (per 100,000 people)	119	179	259	299
Prevalence of HIV, female (% ages 15-24)	..	..	..	2.8
Prevalence of HIV, total (% of population ages 15-49)	..	..	..	4
Tuberculosis cases detected under DOTS (%)	..	35	34	19

Millennium Development Goals				
	1990	1995	2000	2007
<b>Goal 7: Ensure environmental sustainability</b>				
Annual freshwater withdrawals, total (% of internal resources)	..	..	..	..
CO2 emissions (kg per PPP \$ of GDP)	0	0	0	..
CO2 emissions (metric tons per capita)	0	0	0	..
Forest area (% of land area)	10	..	10	9
Improved sanitation facilities (% of population with access)	5	6	7	9
Improved water source (% of population with access)	..	24	34	48
Marine protected areas, (% of surface area)	..	..	..	..
Nationally protected areas (% of total land area)	..	..	..	..
<b>Goal 8: Develop a global partnership for development</b>				
Aid per capita (current US\$)	51	33	15	27
Debt service (PPG and IMF only, % of exports of G&S, excl. workers' remittances)	4	9	14	2
Internet users (per 100 people)	0	..	0	1
Mobile phone subscribers (per 100 people)	0	0	0	9
Telephone mainlines (per 100 people)	0	0	0	0
<b>Other</b>				
Fertility rate, total (births per woman)	6.7	6.6	6.6	6.3
GNI per capita, Atlas method (current US\$)	260	200	180	540
GNI, Atlas method (current US\$) (billions)	1.6	1.5	1.5	5.8
Gross capital formation (% of GDP)	6.8	13.2	23.3	19.1
Life expectancy at birth, total (years)	51	52	51	51
Literacy rate, adult total (% of people ages 15 and above)	..	12	26	..
Population, total (millions)	6.1	7.2	8.5	10.8
Trade (% of GDP)	41.4	55.7	51.6	82.9
<b>Source: World Development Indicators database</b>				

Figures in italics refer to periods other than those specified.

**Page:** Country: Chad **Row:** Series **Column:** Time

## Millennium Development Goals

1990

1995

2000

2007

Note: In some cases the data are for earlier or later years than those stated.

Goal 1 targets: Halve, between 1990 and 2015, the proportion of people whose income is less than one dollar a day. Halve, between 1990 and 2015, the proportion of people who suffer from hunger.

Goal 2 target: Ensure that, by 2015, children everywhere, boys and girls alike, will be able to complete a full course of primary schooling.

Goal 3 target: Eliminate gender disparity in primary and secondary education preferably by 2005 and to all levels of education no later than 2015.

Goal 4 target: Reduce by two-thirds, between 1990 and 2015, the under-five mortality rate.

Goal 5 target: Reduce by three-quarters, between 1990 and 2015, the maternal mortality ratio.

Goal 6 targets: Have halted by 2015, and begun to reverse, the spread of HIV/AIDS. Have halted by 2015, and begun to reverse, the incidence of malaria and other major diseases.

Goal 7 targets: Integrate the principles of sustainable development into country policies and programs and reverse the loss of environmental resources. Halve, by 2015, the proportion of people without sustainable access to safe drinking water. By 2020, to

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## **Annex E: Performance Indicators**

### **Annex E (iii): Potential EEPCI's KPIs aligned with Chad Millennium Development Goals**

## Millenium Challenge Indicators

### 1.1 population below Logone Orientale poverty line

absolute # Off Farm above and below; same cross-referenced with resettlement factor as above /below 2/3

can give village survey total with sample as problem/not problem plus distinguished by comp/not comp

Average Expenditure /year/person in Logone Oriental

XAF/year/person per day      US\$/year/person per day

### 1.2 poverty gap

earnings of Off Farm vs WB poverty figures

	CFA	US\$
poorest of poor	53 703	128
medium poor	90 919	216
median	134 751	321
middle rich	184 970	440
richest	345 444	822

soudure can manage vs can't manage vs no problem

(rich/mid) # no problem + with children's help

(med/MP) # problem + commerce + wife's help + rent equipment/beef

(PP) # problem + metayage/travail champs autre + cuillette + sell animals/equipment

# began rainy season with stock # yes/no

# HH meet health needs vs not Pouvez-vous subvenir à vos besoins en santé

# HH meet HH needs vs not Aux besoins de vos dépendants

# save (rich) Participez-vous à une caisse d'épargne

# tontine vs not tontine (med/ med poor) Participez-vous à une tontine

# pari-vente (median/rich) Organisez-vous des pari-ventes

# none of above (PP)

### Employment

Employment figures of nationals/ all employees This does not indicate LOCAL employment or # NOT employed

LBO figures National, not local

# salaried Avez-vous actuellement un travail remuneré #; # say non; # not answered

# previously employed Avez-vous ou un autre de adulte travaille pour Esso # yes

# personnes ayant travaille pour ESSO total # people

### Youth unemployment

# boys between ages 15-24 declared independent but in parent's HH

# boys between ages 15-25 declared dependent but in parent's HH Enfants biologiques dependants et autres dependants

# male HHH between age 15-24 give distribution by age and by HHM 1) only wives/children 2) only dependants 3) dependants/wives/children

### 2.1 Net enrolment in primary education both sexes

# HH with dependent children

# HH with dependent children enrolled (inscrit à l'école) in primary school (niveau scolaire)

### Gender parity index

# HH with dependent boys enrolled (inscrit à l'école) in primary school (niveau scolaire)

# HH with dependent girls enroled (inscrit à l'école) in primary school (niveau scolaire)

Primary completion rate both sexes

- incomplete # HH with dependent children NOT enrolled (caissier inscrit à l'école vide) avec (niveau scolaire) primary school
- complete # HH with dependent children NOT enrolled (caissier inscrit à l'école vide) avec (niveau scolaire) secondary or above
- # HH with dependent children ARE enrolled (caissier inscrit à l'école vide) avec (niveau scolaire) secondary or above

2.2 Proportion starting grade 1 who reach last grade of primary

- # HH with dependent children ARE enrolled (inscrit à l'école) avec (niveau scolaire) CM2
- # HH with dependent children NOT enrolled (caissier inscrit à l'école vide) avec (niveau scolaire) CM2
- # HH with dependent children NOT enrolled (caissier inscrit à l'école vide) avec (niveau scolaire) secondary or above
- # HH with dependent children ARE enrolled (caissier inscrit à l'école vide) avec (niveau scolaire) secondary or above

# children completed secondary

# children above secondary inscribed/completed

1.9 Proportion of pop below minimum dietary energy consumption

- use meat/fish indicator of all HH & at-risk HH as sign of good nourishment?
- insert meat/fish indicator in next questionnaire
- # in village survey say cannot make it through soudure
- # in On Farm who give month of soudure + HHM + # sacks bought
- none of above would indicate below minimum but give an idea of # well nourished

6.7 Proportion of children under 5 sleeping under bednets

- Assume if HH has bednets then children are sleeping under them since young children sleep with Mo
- # HH with bednets            Utilisez-vous des moustiquaires?            Yes/No
- # indicating from Esso vs # No Answer to Combien reçu d'Esso

7.8 Proportion of population using an improved drinking water source

Can give pop of villages with drilled well (but does not mean all are using, just that have access) vs population of other project affected villages without

Infrastructure Km roads

- # bridges/crossings
- # community compensation by type
- # clinics built/improved            (Public Affairs)
- # schools improved Esso Foundation            (Public Affairs)
- # schools built donations            (Public Affairs)
- # wells donation            (Public Affairs)

Housing

- # Imp Ag use \$ to build
- # Off Farm tin
- Add to next questionnaires

Health

- # HH meet health needs vs not            Pouvez-vous subvenir à vos besoins en santé
- # clinics built/improved            (Public Affairs)

Traditional Culture & Future Development

- Ability to access land            # 3rd party not rainy season or resettle
- # rainy season resettle
- # resettle

Youth programs

# schools helped by UNICEF/Esso contribution

# football teams supported

# villages distribute      calendars  
                                         notebooks  
                                         dictionaries

# villages proposing a development project /all villages with comm comp

# villages chose a devel project/all villages with comm comp

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**Annex F: EMP Information System –  
example tracking data for Vulnerable  
Households**

**Ok to Marginal (Bolded households interviewed)**

**Infill Facilities**

Village	HH #	Area Before	Area After	HH Members	Factor Befor Infill	Factor After Infill	Factor Difference	Comp File nbre	Amputed Area	# of Training
Begada I	1131	5.609597723	4.268567037	5	1.121919545	0.853713407	-0.268206138	6	0.776	NULL
Begada II	1728	<b>7.186729361</b>	<b>5.956922001</b>	7	<b>1.026675623</b>	<b>0.850988857</b>	<b>-0.175686766</b>	3	0	NULL
Danmadja	423	<b>11.1203728</b>	<b>10.54555536</b>	11	<b>1.010942982</b>	<b>0.958686851</b>	<b>-0.052256131</b>	15	<b>1.942</b>	1
Danmadja	1185	<b>7.528294661</b>	<b>5.671012574</b>	6	<b>1.254715777</b>	<b>0.945168762</b>	<b>-0.309547015</b>	26	<b>4.789</b>	1
Maouarom	1282	<b>4.127106592</b>	<b>3.907631244</b>	4	<b>1.031776648</b>	<b>0.976907811</b>	<b>-0.054868837</b>	10	<b>2.628</b>	NULL
Ngalaba II	520	12.03353029	11.72746585	12	1.002794191	0.977288821	-0.02550537	18	4.616	2
Ngalaba II	1053	9.118393149	8.572679478	9	1.013154794	0.952519942	-0.060634852	7	1.264	NULL

**Infill Facilities + 5m buffer**

Village	HH #	Area Before	Area After	HH Members	Factor Befor Infill	Factor After Infill	Factor Difference	Comp File nbre	Amputed Area	# of Training
Bayande	758	5.941567423	2.931074595	3	1.980522474	0.977024865	-1.003497609	0	0	NULL
Begada I	1131	<b>5.609597723</b>	<b>3.457066011</b>	5	<b>1.121919545</b>	<b>0.691413202</b>	<b>-0.430506343</b>	6	<b>0.776</b>	NULL
Begada II	1304	<b>6.956256438</b>	<b>4.90316613</b>	5	<b>1.391251288</b>	<b>0.980633226</b>	<b>-0.410618062</b>	26	<b>5.768</b>	1
Danmadja	288	9.027484026	8.922858204	9	1.003053781	0.991428689	-0.011625092	4	2.017	NULL
Danmadja	423	<b>11.1203728</b>	<b>10.4076717</b>	11	<b>1.010942982</b>	<b>0.946151972</b>	<b>-0.06479101</b>	15	<b>1.942</b>	1
Danmadja	1181	5.744428185	3.90875083	5	1.148885637	0.794175017	-0.35471062	4	1.412	NULL
Danmadja	1185	7.528294661	4.146926109	6	1.254715777	0.691154352	-0.563561425	26	4.789	1
Danmadja	1197	<b>15.4982277</b>	<b>9.925679584</b>	10	<b>1.54982277</b>	<b>0.992567958</b>	<b>-0.557254812</b>	20	<b>8.011</b>	2
Danmadja	1312	4.203903722	3.930304288	4	1.05097593	0.982576072	-0.068399858	11	3.579	NULL
Danmadja	1491	<b>4.612488237</b>	<b>2.883544134</b>	4	<b>1.153122059</b>	<b>0.720886034</b>	<b>-0.432236025</b>	3	<b>0.293</b>	NULL
Dildo	578	1.07701472	0.964497701	1	1.07701472	0.964497701	-0.112517019	1	0.094	NULL
Dokaidilti	36	17.03301377	11.35769164	13	1.310231829	0.873668588	-0.436563241	12	2.21	1
Dokaidilti	53	5.254780015	4.894191293	5	1.050956003	0.972238259	-0.078717744	10	2.991	1
Mbanga I	1366	1.611780933	0.848039825	1	1.611780933	0.848039825	-0.763741108	2	0.593	NULL
Mbanga I	1702	<b>8.539989633</b>	<b>7.754875999</b>	8	<b>1.067498704</b>	<b>0.969352</b>	<b>-0.098146704</b>	2	0	NULL
Mbanga II	1325	<b>1.043062307</b>	<b>0.702104066</b>	1	<b>1.043062307</b>	<b>0.702104066</b>	<b>-0.340958241</b>	2	<b>0.673</b>	NULL
Mouarom	1282	<b>4.127106592</b>	<b>3.831177649</b>	4	<b>1.031776648</b>	<b>0.957794412</b>	<b>-0.073982236</b>	10	<b>2.628</b>	NULL
Ngalaba II	520	12.03353029	10.57804949	12	1.002794191	0.881504124	-0.121290067	18	4.616	2
Ngalaba II	527	21.18974934	11.48196828	12	1.765812445	0.95683069	-0.808981755	6	1.94	1
Ngalaba II	1053	9.118393149	8.365972443	9	1.013154794	0.929552494	-0.0836023	7	1.264	NULL

### Ok to Non-Viable (bolded households interviewed)

#### Infill Facilities

None

#### Infill Facilities + 5m buffer

Village	HH #	Area Before	Area After	HH Members	Factor Befor Infill	Factor After Infill	Factor Difference	Comp File nbre	Amputed Area	# of Training
Begada II	1728	7.186729361	4.190627034	7	1.026675623	0.598661005	-0.428014618	3	0	NULL
Bela II	1811	6.031929587	2.432338823	6	1.005321598	0.405389804	-0.599931794	14	6.253	1
Danmadja	<b>1381</b>	<b>22.0178345</b>	<b>10.59567481</b>	<b>16</b>	<b>1.376114657</b>	<b>0.662229676</b>	<b>-0.713884981</b>	<b>6</b>	<b>5.835</b>	<b>1</b>
Mbanga I	1679	8.280388162	4.151187842	8	1.03504852	0.51889848	-0.51615004	4	1.066	NULL
Mbanga II	514	10.45397622	3.200949953	9	1.161552914	0.355661106	-0.805891808	18	8.106	1

### Marginal to Non-Viable

#### Infill Facilities

Village	HH #	Area Before	Area After	HH Members	Factor Befor Infill	Factor After Infill	Factor Difference	Comp File nbre	Amputed Area	# of Training
Begada II	314	6.252867986	5.138795617	9	0.69476311	0.570977291	-0.123785819	31	5.98	NULL
Ngalaba II	528	6.352887611	5.897970953	9	0.705876401	0.655330106	-0.050546295	10	1.926	1

#### Infill Facilities + 5m Buffer

Village	HH #	Area Before	Area After	HH Members	Factor Befor Infill	Factor After Infill	Factor Difference	Comp File nbre	Amputed Area	# of Training
Begada II	2071	3.456970059	3.33267462	5	0.691394012	0.666534924	-0.024859088	15	2.254	1
Bela II	2081	2.006141361	2.00614106	3	0.668713787	0.668713687	-1E-07	0	0	NULL
Danmadja	405	7.734189834	5.639804057	10	0.773418983	0.563980406	-0.209438577	14	2.094	1
Danmadja	1041	2.932278664	2.61621675	4	0.733069666	0.654054188	-0.079015478	12	2.312	NULL
Dildo	363	6.013520521	6.013520582	9	0.668168947	0.668168954	7E-09	0	0	NULL
Madjo	2000	7.833132545	7.350885728	11	0.712102959	0.668262339	-0.04384062	10	1.585	1
Mbanga	513	6.427712806	0.933188505	8	0.803464101	0.116648563	-0.686815538	9	0.131	1
Mbanga I	546	5.154133425	3.421889395	7	0.736304775	0.488841342	-0.247463433	7	5.67	2
Mbanga II	1446	7.621172036	5.69252976	10	0.762117204	0.569252976	-0.192864228	21	5.851	1
Ngalaba	179	5.164689953	3.686540908	7	0.73781285	0.526648701	-0.211164149	7	1.197	NULL
Ngalaba	724	4.05859726	3.323950516	5	0.811719452	0.664790103	-0.146929349	2	1.244	NULL
Ngalaba II	528	6.352887611	5.566126382	9	0.705876401	0.618458487	-0.087417914	10	1.926	1
Ngalaba II	907	5.678732096	5.286227851	8	0.709841512	0.660778481	-0.049063031	4	2.039	NULL
Ngalaba II	925	5.730979996	3.791316729	7	0.818711428	0.541616676	-0.277094752	0	0	NULL
Ngalaba II	927	3.425560124	2.716563797	5	0.685112025	0.543312759	-0.141799266	5	1.178	NULL

### Marginal to Non-Viable

#### Infill Facilities

Village	HH #	Area Before	Area After	HH Members	Factor Befor Infill	Factor After Infill	Factor Difference	Comp File nbre	Amputed Area	# of Training
Begada II	314	6.252867086	5.138795617	9	0.69476311	0.570977291	-0.123785819	31	5.98	NULL
Ngalaba II	528	6.352887611	5.897970953	9	0.705876401	0.655330106	-0.050546295	10	1.926	1

#### Infill facilities + 5m buffer

Village	HH #	Area Before	Area After	HH Members	Factor Befor Infill	Factor After Infill	Factor Difference	Comp File nbre	Amputed Area	# of Training
Begada II	314	6.252867986	4.034072892	9	0.69476311	0.448230321	-0.246532789	31	5.98	NULL
Begada II	2071	3.456970059	3.33267462	5	0.691394012	0.666534924	-0.024859088	15	2.254	1
Bela II	2081	2.006141361	2.00614106	3	0.668713787	0.668713687	-1E-07	0	0	NULL
Danmadja	405	7.734189834	5.639804057	10	0.773418983	0.563980406	-0.209438577	14	2.094	1
Danmadja	1041	2.932278664	2.61621675	4	0.733069666	0.654054188	-0.079015478	12	2.312	NULL
Dildo	363	6.013520521	6.013520582	9	0.668168947	0.668168954	7E-09	0	0	NULL
Madjo	2000	7.833132545	7.350885728	11	0.712102959	0.668262339	-0.04384062	10	1.585	1
Mbanga	513	6.427712806	0.933188505	8	0.803464101	0.116648563	-0.686815538	9	0.131	1
Mbanga I	546	5.154133425	3.421889395	7	0.736304775	0.488841342	-0.247463433	7	5.67	2
Mbanga II	1446	7.621172036	5.69252976	10	0.762117204	0.569252976	-0.192864228	21	5.851	1
Ngalaba	179	5.164689953	3.686540908	7	0.73781285	0.526648701	-0.211164149	7	1.197	NULL
Ngalaba	724	4.05859726	3.323950516	5	0.811719452	0.664790103	-0.146929349	2	1.244	NULL
Ngalaba II	528	6.352887611	5.566126382	9	0.705876401	0.618458487	-0.087417914	10	1.926	1
Ngalaba II	907	5.678732096	5.286227851	8	0.709841512	0.660778481	-0.049063031	4	2.039	NULL
Ngalaba II	925	5.730979996	3.791316729	7	0.818711428	0.541616676	-0.277094752	0	0	NULL
Ngalaba II	927	3.425560124	2.716563797	5	0.685112025	0.543312759	-0.141799266	5	1.178	NULL

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## **Annex G: EEPCI KPIs for the Chad Compensation and Resettlement Plan**

## Annex G

### Key Performance Indicators

The objective of the Operations Integrity Management System (OIMS) is to ensure that procedures critical to attaining a desired safety, health and environmental result are indeed implemented and have the desired impact. To this purpose each Management System of the production unit OIMS is comprised of five distinct features:

1. Scope of Work: purpose for the Management System – answers the question of why.
2. Procedures: describes the tasks to be performed within the Management System – answers the questions what, when, where and how.
3. Roles and Responsibilities, the staff positions that are in charge of carrying out the specified tasks and the quality, timeliness, and standards to be respected by the person in that position – answers the question of who.
4. Verification and Measurement – also known as Key Performance Indicators.
  - a. Process: measures the execution of the Management System.
  - b. Performance: measures the bottom line effectiveness of the Management System. In other words, did the system deliver the expected results?
5. Continuous Improvement: The above metrics along with: field verification on an annual (internal review) and triennial (other ExxonMobil experts providing peer review) basis and review of incidents wherein it was determined that the incident root cause was attributed to the execution of this management system provide the basis for continuous improvement.

In the Chad Compensation and Resettlement Plan the expected result of the resettlement program deliver livelihood restoration to vulnerable people affected by the Project's land take. Livelihood could be restored by a number of options offered in the Resettlement Plan:

- Physical displacement to another place where sufficient resources are available for the Project Affected People (PAP):
  - Physical resettlement in a new homestead in another village;
  - Seasonal resettlement in a farm hamlet on fields too distant from the PAP's homestead to be easily worked from home.
- Acquisition of a skill that will increase the PAP's ability to replace the product of lost resources given to the Project:
  - Improved Agricultural Training teaches the PAP techniques to increase the yield on his remaining rainfed land and dry season agricultural activities that can earn revenue for purchase of replacement produce;
  - Off Farm training in an alternative livelihood skill that allows the PAP to earn revenue throughout the year and to purchase replacement produce.
- Reinforcement of PAP's ability to restore livelihood by means of:
  - Training in Basic Business Skills Training;
  - Reinforcement training to strengthen weaknesses in skills learned for Improved Agriculture or Off Farm skills.
- Community Compensation, infrastructure or development projects that will improve the level of livelihood of everyone in an affected village.

To judge whether these objectives have been met, EMP will monitor the OIMS Key Performance Indices (KPI) most likely to reveal the effectiveness of the actions EMP is implementing. The KPIs established for monitoring livelihood restoration and improvement are:

## Annex G

### Key Performance Indicators

1. Food Indicator: Out of all households in the survey that gave up land for the Project, how many have entered the rainy season i.e. hungry season with sufficient stock to last until the first harvesting begins.
2. Education Indicator: Out of all households in the survey with school-age children, the number of households sending their children to school.
3. Health Indicator: Out of all households affected by the project, how many are able to cover their household's health needs without recourse to other relatives or sale of assets.
4. Tontine<sup>1</sup> Investment Indicator: How many households that gave up land for the Project have a regular enough cash income and enough surplus income to contribute regularly to a group savings account that yields periodically substantial returns to each investor?

The Food Indicator shows the level of livelihood – that a household has been able to grow (with new techniques) or to stock (with income-earning skills) to provide enough food ahead of time to face the hungry season. This indicator is more than a measure of livelihood restoration because a number of the households surveyed were, even before the Project began acquiring land, already unable to meet their needs (i.e. were already non-viable). If they are now able to start the rainy season with food they have more than restored their livelihood.

Education Indicator: One of the major requests in Community Compensation has been for schools (solid buildings that can be opened at the beginning of the school year, rather than waiting for several months before parents can harvest the straw to build temporary classrooms). In addition the value of education has become more evident to the local population over the period the Project has been in progress. Enrollment is a good indicator of positive changes in values in Project-affected villages. In villages where a school has been built for Community Compensation it is also a direct measure of the value of the school/Community Compensation.

Health Indicator: One of the major challenges households often face is paying for health care when someone falls sick. Households with adequate livelihoods can cover the initial expenses without turning to relatives for assistance or selling assets for cash.

Investment Indicator: Everyone in the village knows the advantages of belonging to a tontine. Regular contributions by each member of the tontine are grouped together and paid out in turn to one of the members who then has a substantial amount of cash. However not everyone can belong to a tontine; if they do not have a regular enough source of surplus income to make recurring contributions they are not welcomed as members. How many Project-affected households are financially capable of belong to a tontine?

Given the objectives of the Chad Compensation and Resettlement Plan to restore non-viable households affect by the Project to their previous level of livelihood or more, the above four indicators show whether affected households have restored and attained a level that can ensure their basic needs.

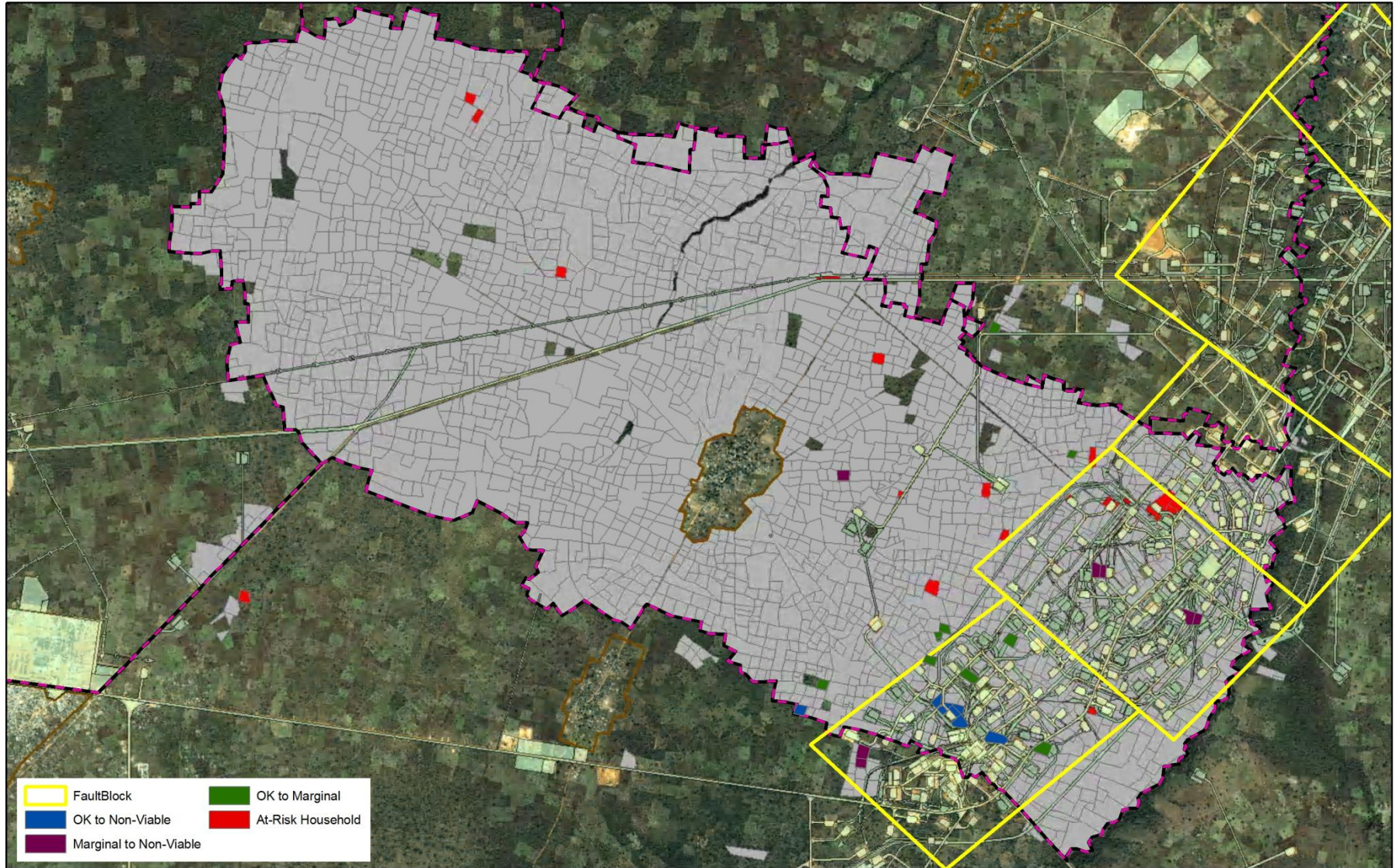
---

<sup>1</sup> A rotating savings group; each person regularly pays in a set amount and each member in turn receives the sum total.

---

## **Annex H: EMP Information System mapping for Infill Villages**

# Begada



FaultBlock	OK to Marginal
OK to Non-Viable	At-Risk Household
Marginal to Non-Viable	

### Resettlement Eligibility Factor

<= 0.67 Corde/Dependant	Protected Site
0.68 - 1.00 Corde/Dependant	Permanent/Not Returned Facilities
1.01 - 2.50 Corde/Dependant	Bush
>2.50 Corde/Dependant	Land Cultivated (Field) or Owned (Fallow) by Outsiders

House	Settlement
Village Boundaries	Fallow Land
Fault Blocks	

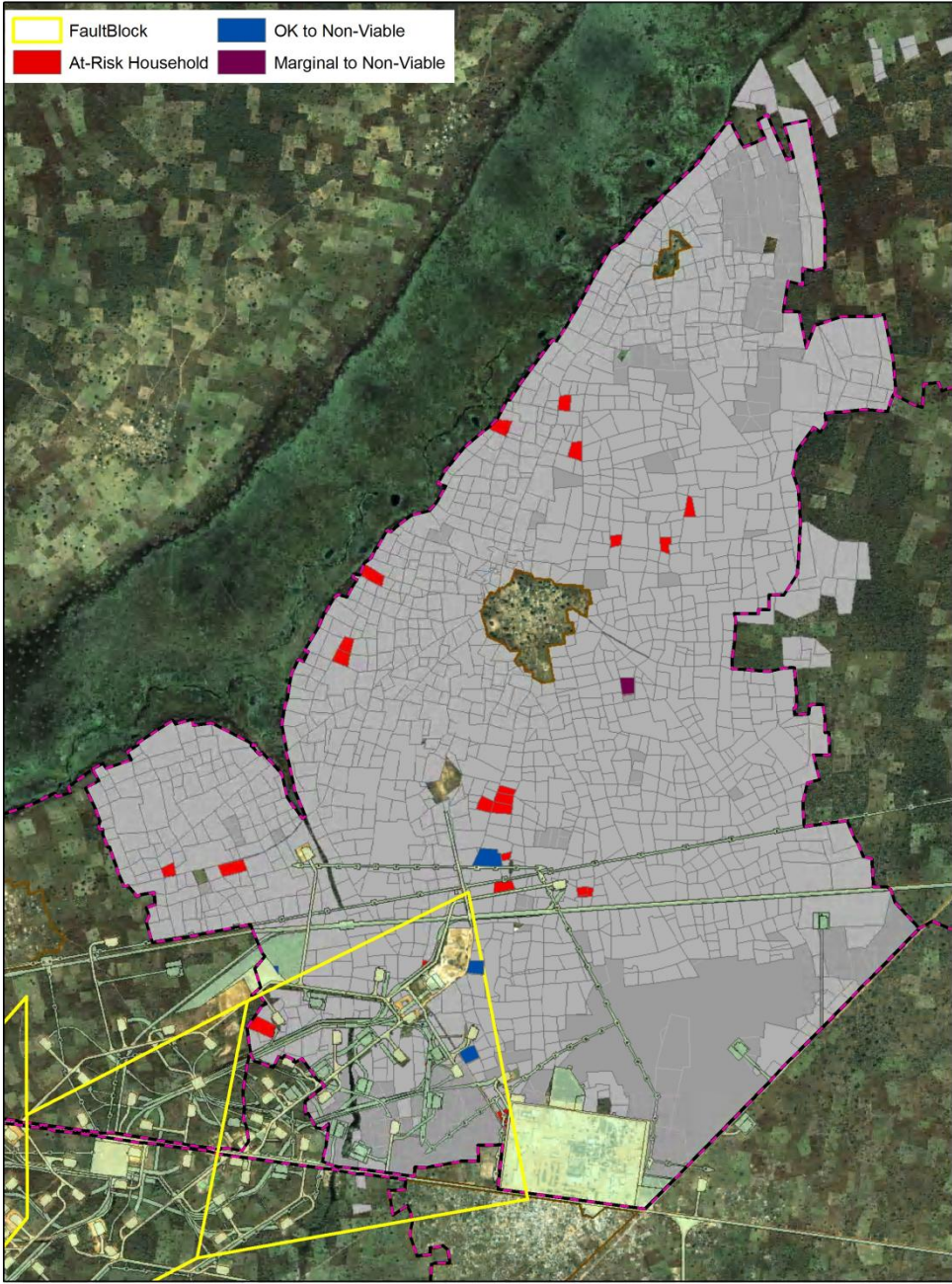
15 Red flagged households from which  
11 are project's affected households



Map drawn on May 15, 2009  
Satellite Image: IKONOS November 2008



# Bela



Resettlement Eligibility Factor	
0 - 0.50 Corridor/Dependent	Fallow Land
0.51 - 1.00 Corridor/Dependent	Land Cultivated (Field) or
1.01 - 2.50 Corridor/Dependent	Owned (if allowed) by Outsiders
> 2.50 Corridor/Dependent	Protected Site
	Permanent/Not Returned Facilities

House	Settlement
Village Boundaries	Fault Blocks

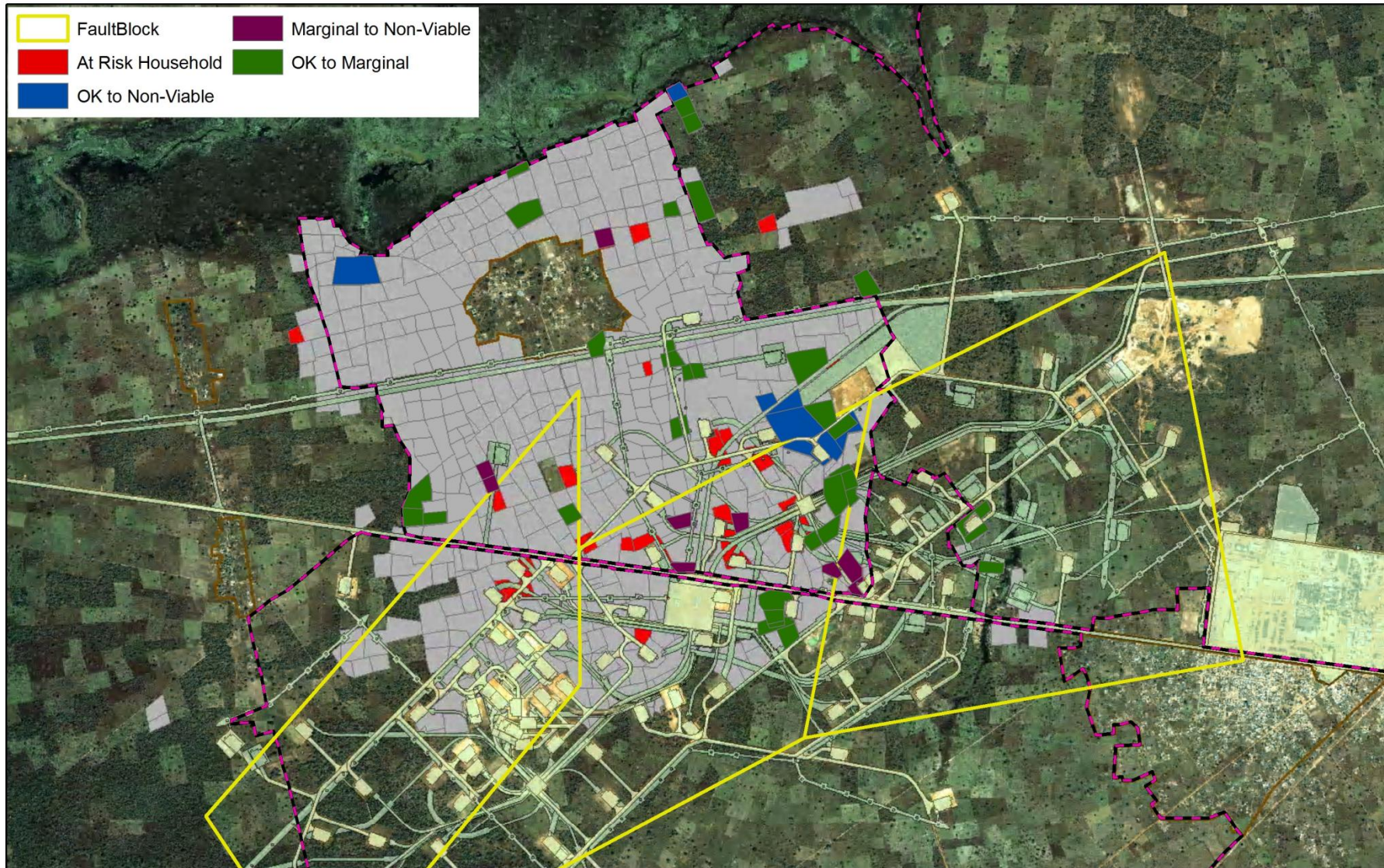
11 Red flagged households from which  
5 are project's affected households



Map drawn on May 18, 2009  
Satellite Image: IKONOS November 2008



# Danmadjia



## Resettlement Eligibility Factor

- ≤ 0.67 Corde/Dependant
- 0.68 - 1.00 Corde/Dependant
- 1.01 - 2.50 Corde/Dependant
- >2.50 Corde/Dependant

- Fallow Land
- Land Cultivated (Field) or Owned (Fallow) by Outsiders
- Protected Site
- Permanent/Not Returned Facilities

- House
- Settlement
- Village Boundaries
- Fault Blocks

13 Red flagged households from which  
11 are project's affected households

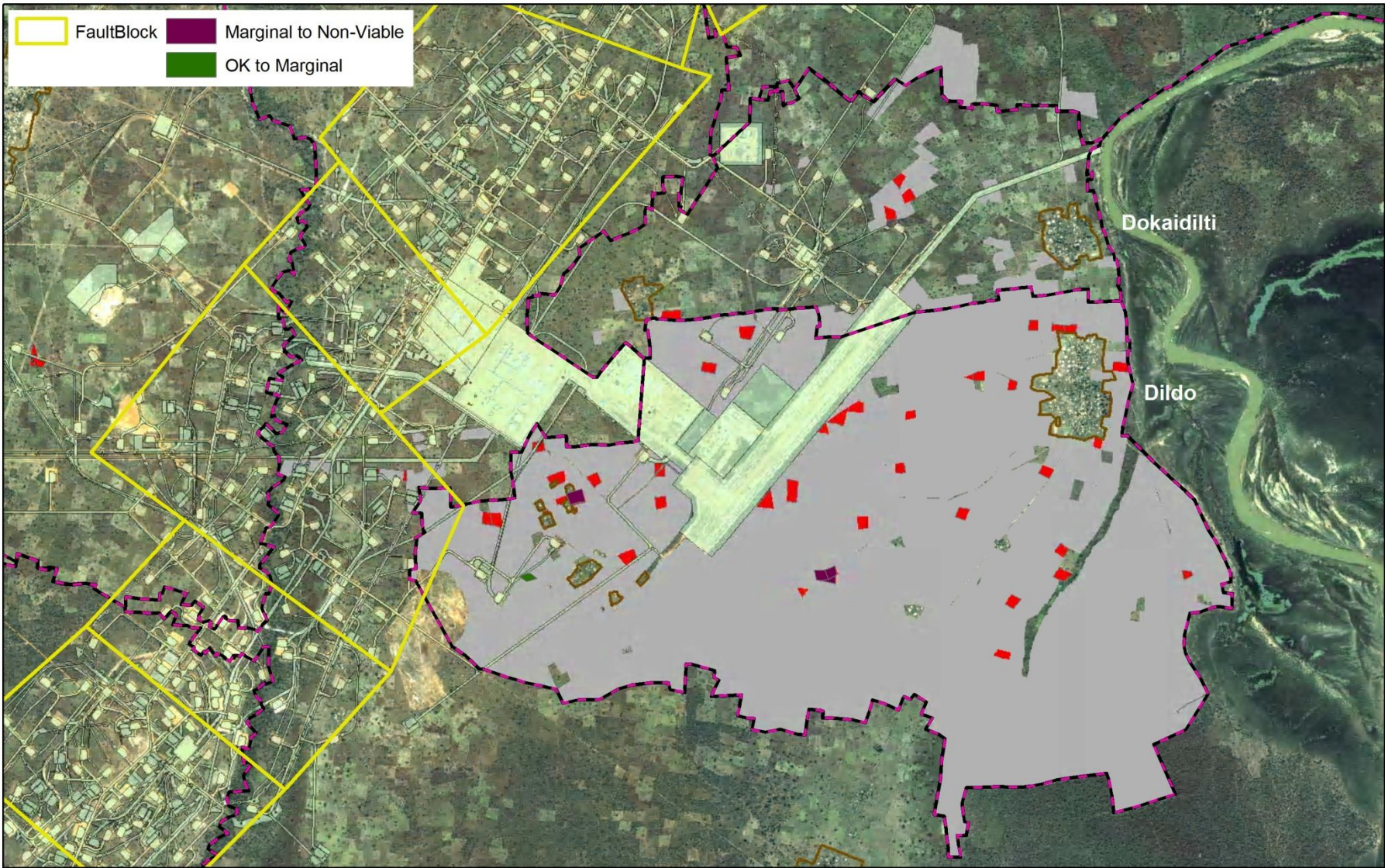


Map drawn on April 30, 2009  
Satellite Image: IKONOS November 2008



**EMP**  
Department

# Dildo

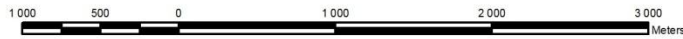


FaultBlock
  Marginal to Non-Viable  
 OK to Marginal

**Resettlement Eligibility Factor**

<ul style="list-style-type: none"> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: red; margin-right: 5px;"></span> <math>\leq 0.67</math> Corde/Dependant</li> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: orange; margin-right: 5px;"></span> 0.68 - 1.00 Corde/Dependant</li> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: yellow; margin-right: 5px;"></span> 1.01 - 2.50 Corde/Dependant</li> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: green; margin-right: 5px;"></span> <math>&gt;2.50</math> Corde/Dependant</li> </ul>	<ul style="list-style-type: none"> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: lightcoral; border: 1px solid red; margin-right: 5px;"></span> Protected Site</li> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: lightgreen; border: 1px solid green; margin-right: 5px;"></span> Permanent/Not Returned Facilities</li> <li><span style="display: inline-block; width: 15px; height: 10px; border: 1px dashed black; margin-right: 5px;"></span> Fallow Land</li> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: lightorange; border: 1px solid orange; margin-right: 5px;"></span> Land Cultivated (Field) or Owned (Fallow) by Outsiders</li> </ul>	<ul style="list-style-type: none"> <li><span style="display: inline-block; width: 10px; height: 10px; background-color: brown; border-radius: 50%; margin-right: 5px;"></span> House</li> <li><span style="display: inline-block; width: 15px; height: 10px; border: 1px solid brown; margin-right: 5px;"></span> Settlement</li> <li><span style="display: inline-block; width: 15px; height: 10px; border: 2px dashed purple; margin-right: 5px;"></span> Village Boundaries</li> </ul>
---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

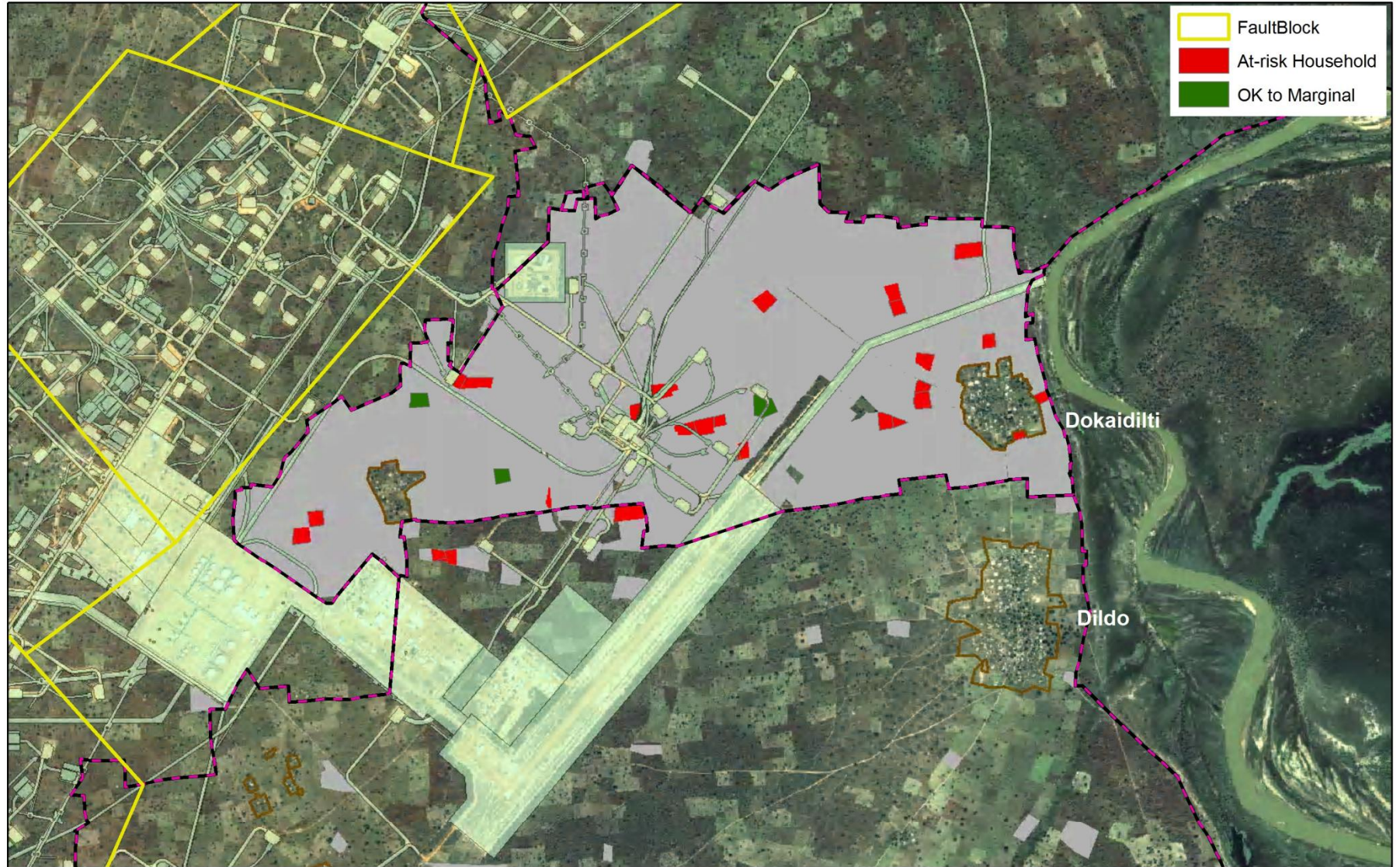
36 Red flagged households from which 11 are project's affected households



Map drawn on April 30, 2009  
Satellite Image: IKONOS November 2008



# Dokaidilti



- FaultBlock
- At-risk Household
- OK to Marginal

## Resettlement Eligibility Factor

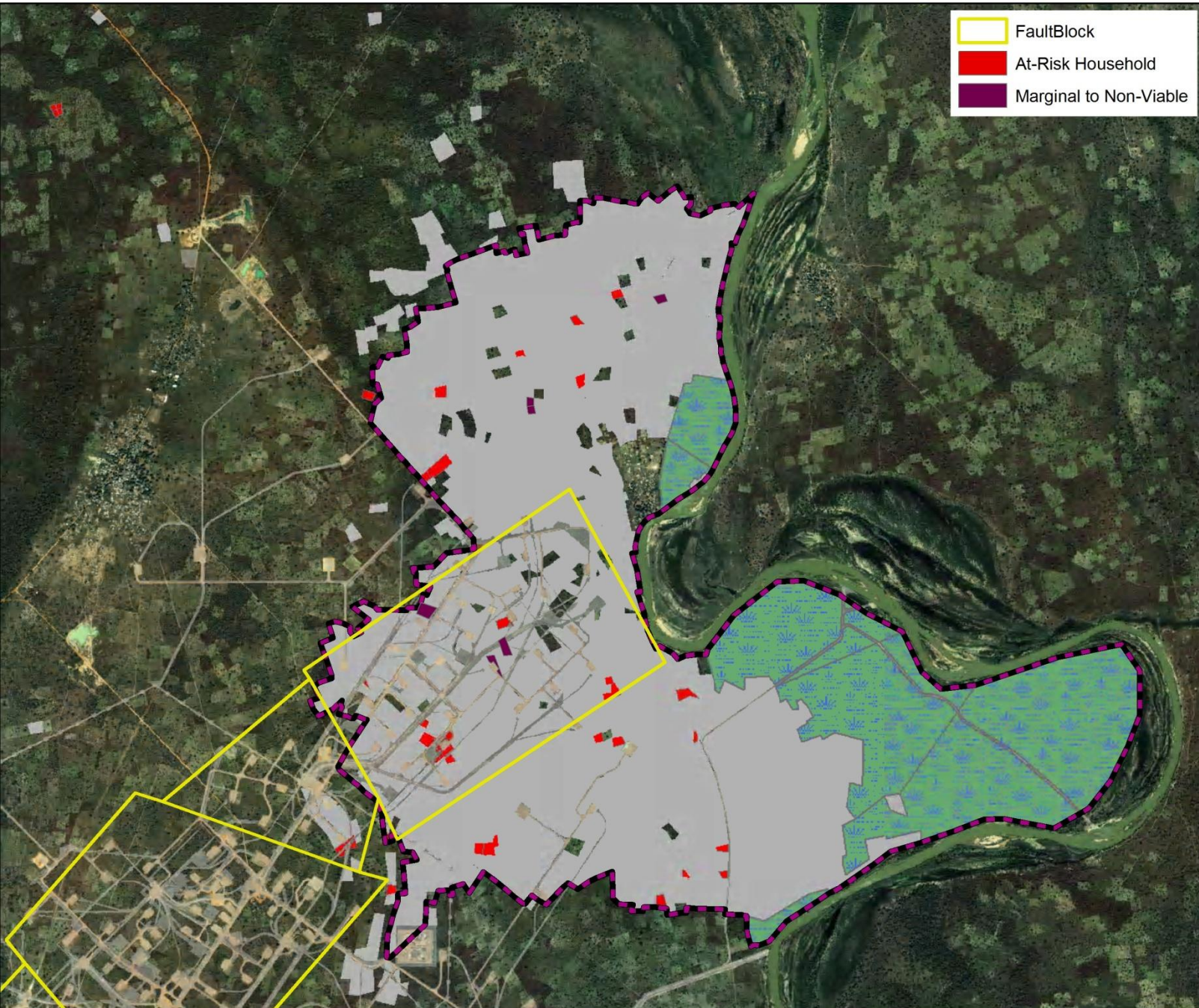
- |                                                                                                                                                                           |                                                                                                                                                                                                           |                                                                                                                                               |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|
| <span style="display: inline-block; width: 15px; height: 10px; background-color: red; border: 1px solid black; margin-right: 5px;"></span> ≤ 0.67 Corde/Dependant         | <span style="display: inline-block; width: 15px; height: 10px; background-color: lightcoral; border: 1px solid black; margin-right: 5px;"></span> Protected Site                                          | <span style="display: inline-block; width: 10px; height: 10px; border: 1px solid brown; border-radius: 50%; margin-right: 5px;"></span> House |
| <span style="display: inline-block; width: 15px; height: 10px; background-color: orange; border: 1px solid black; margin-right: 5px;"></span> 0.68 - 1.00 Corde/Dependant | <span style="display: inline-block; width: 15px; height: 10px; background-color: lightgreen; border: 1px solid black; margin-right: 5px;"></span> Permanent/Not Returned Facilities                       | <span style="display: inline-block; width: 15px; height: 10px; border: 1px solid brown; margin-right: 5px;"></span> Settlement                |
| <span style="display: inline-block; width: 15px; height: 10px; background-color: yellow; border: 1px solid black; margin-right: 5px;"></span> 1.01 - 2.50 Corde/Dependant | <span style="display: inline-block; width: 15px; height: 10px; border: 1px dashed black; margin-right: 5px;"></span> Fallow Land                                                                          | <span style="display: inline-block; width: 15px; height: 10px; border: 2px dashed purple; margin-right: 5px;"></span> Village Boundaries      |
| <span style="display: inline-block; width: 15px; height: 10px; background-color: green; border: 1px solid black; margin-right: 5px;"></span> >2.50 Corde/Dependant        | <span style="display: inline-block; width: 15px; height: 10px; background-color: lightorange; border: 1px solid black; margin-right: 5px;"></span> Land Cultivated (Field) or Owned (Fallow) by Outsiders |                                                                                                                                               |

10 Red flagged households from which  
9 are project's affected households



Map drawn on April 30, 2009  
Satellite Image: IKONOS November 2008





FaultBlock  
 At-Risk Household  
 Marginal to Non-Viable

# At Risk Households in Madjo

N

0 250 500 1 000  
Meters

Source : IKONOS 2008, EEPCI EMP and Construction Survey Department

## Legend

Resettlement eligibility factor (corde/dependant)

<= 0.670000  
 0.68 - 1.00  
 1.01 - 2.50  
 > 2.50

Land cultivated or owned by outsiders  
 Flooded zone  
 Settlement and protected area  
 Permanent and not returned facilities  
 VillageLimit



**ExxonMobil**

# At Risk Households in Mbanga



0 250 500 1 000  
Meters

Source : IKONOS 2008, EEP/CI EMP and Construction Survey Department

## Legend

Resettlement eligibility factor (corde/dependant)

- <= 0.670000
- 0.68 - 1.00
- 1.01 - 2.50
- > 2.50

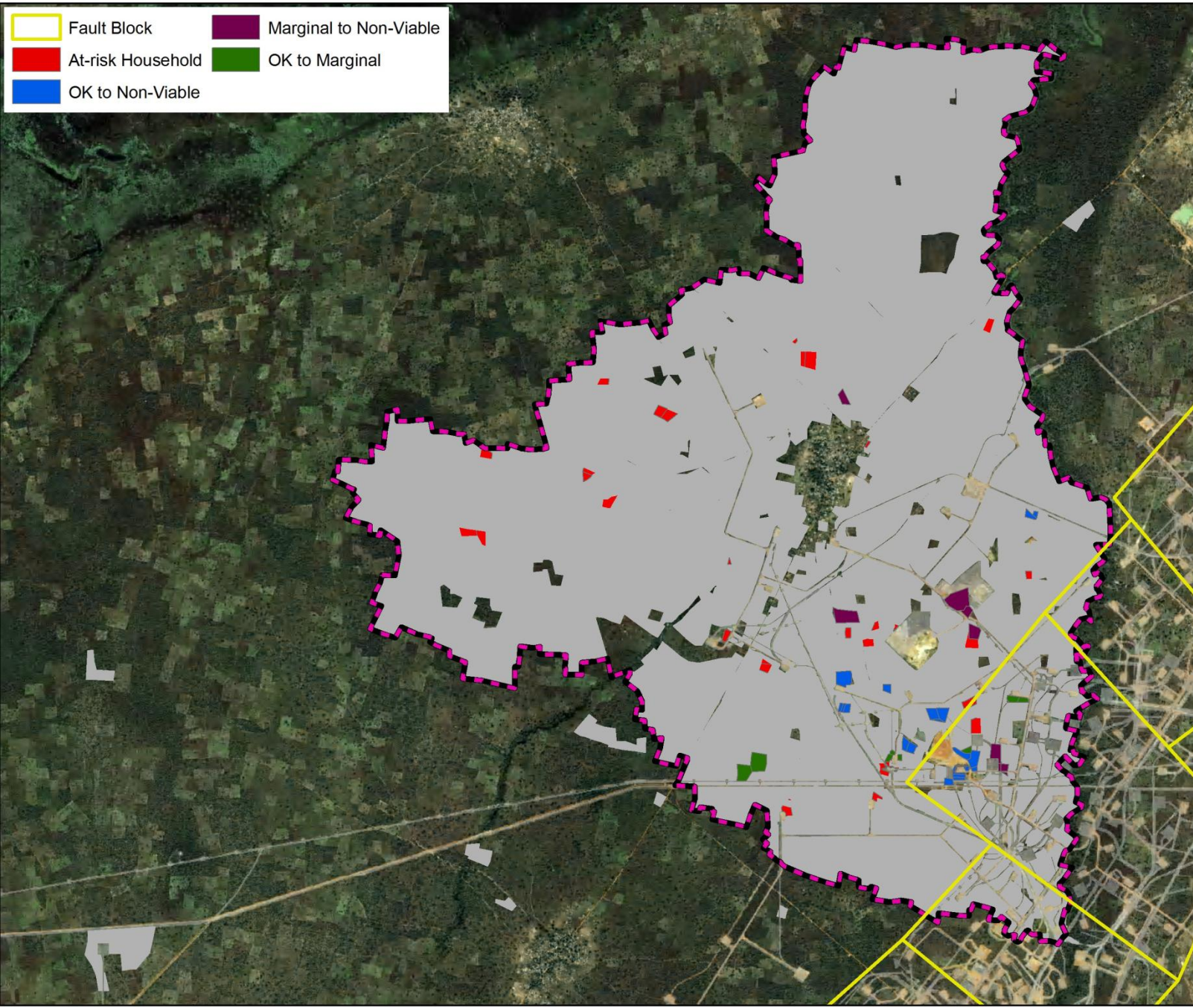
- Land cultivated or owned by outsiders
- Flooded zone
- Settlement and protected area
- Permanent and not returned facilities
- VillageLimit



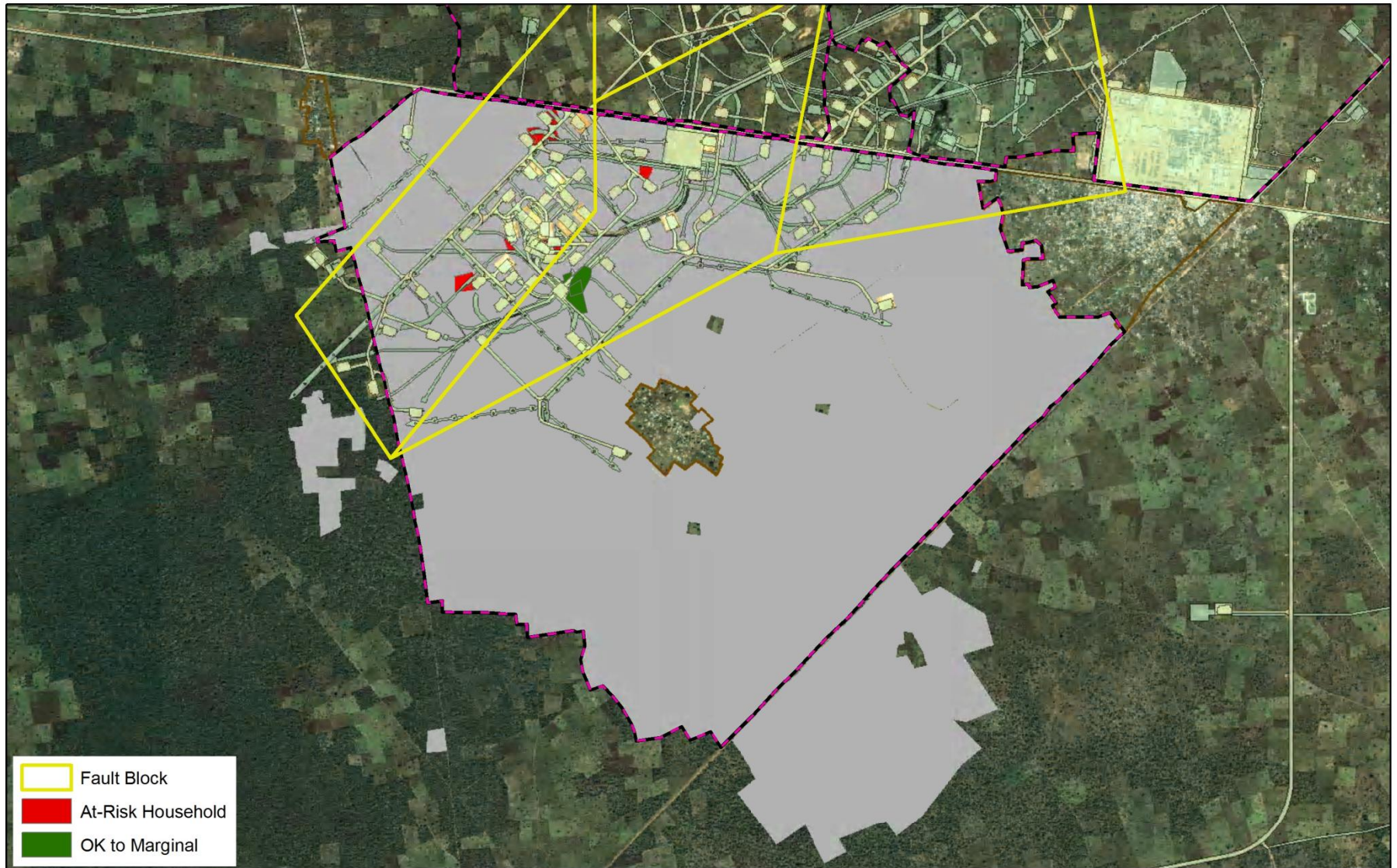
**ExxonMobil**

EEP/CI - Esso Exploration & Production Chad Inc.  
EMP, Environmental Management Plan

<span style="display: inline-block; width: 15px; height: 15px; border: 2px solid yellow; margin-right: 5px;"></span> Fault Block	<span style="display: inline-block; width: 15px; height: 15px; background-color: purple; margin-right: 5px;"></span> Marginal to Non-Viable
<span style="display: inline-block; width: 15px; height: 15px; background-color: red; margin-right: 5px;"></span> At-risk Household	<span style="display: inline-block; width: 15px; height: 15px; background-color: green; margin-right: 5px;"></span> OK to Marginal
<span style="display: inline-block; width: 15px; height: 15px; background-color: blue; margin-right: 5px;"></span> OK to Non-Viable	



# Mouarom



- Fault Block
- At-Risk Household
- OK to Marginal

### Resettlement Eligibility Factor

<span style="display: inline-block; width: 15px; height: 10px; background-color: red; border: 1px solid black; margin-right: 5px;"></span> <= 0.67 Corde/Dependant	<span style="display: inline-block; width: 15px; height: 10px; border: 1px dashed black; margin-right: 5px;"></span> Fallow Land
<span style="display: inline-block; width: 15px; height: 10px; background-color: orange; border: 1px solid black; margin-right: 5px;"></span> 0.68 - 1.00 Corde/Dependant	<span style="display: inline-block; width: 15px; height: 10px; background-color: lightgrey; border: 1px solid black; margin-right: 5px;"></span> Land Cultivated (Field) or Owned (Fallow) by Outsiders
<span style="display: inline-block; width: 15px; height: 10px; background-color: yellow; border: 1px solid black; margin-right: 5px;"></span> 1.01 - 2.50 Corde/Dependant	<span style="display: inline-block; width: 15px; height: 10px; background-color: lightcoral; border: 1px solid black; margin-right: 5px;"></span> Protected Site
<span style="display: inline-block; width: 15px; height: 10px; background-color: green; border: 1px solid black; margin-right: 5px;"></span> >2.50 Corde/Dependant	<span style="display: inline-block; width: 15px; height: 10px; background-color: lightgreen; border: 1px solid black; margin-right: 5px;"></span> Permanent/Not Returned Facilities

<span style="display: inline-block; width: 5px; height: 5px; background-color: black; border-radius: 50%; margin-right: 5px;"></span> House
<span style="display: inline-block; width: 15px; height: 10px; border: 2px solid orange; margin-right: 5px;"></span> Settlement
<span style="display: inline-block; width: 15px; height: 10px; border: 2px dashed purple; margin-right: 5px;"></span> Village Boundaries
<span style="display: inline-block; width: 15px; height: 10px; border: 2px solid purple; margin-right: 5px;"></span> Fault Blocks

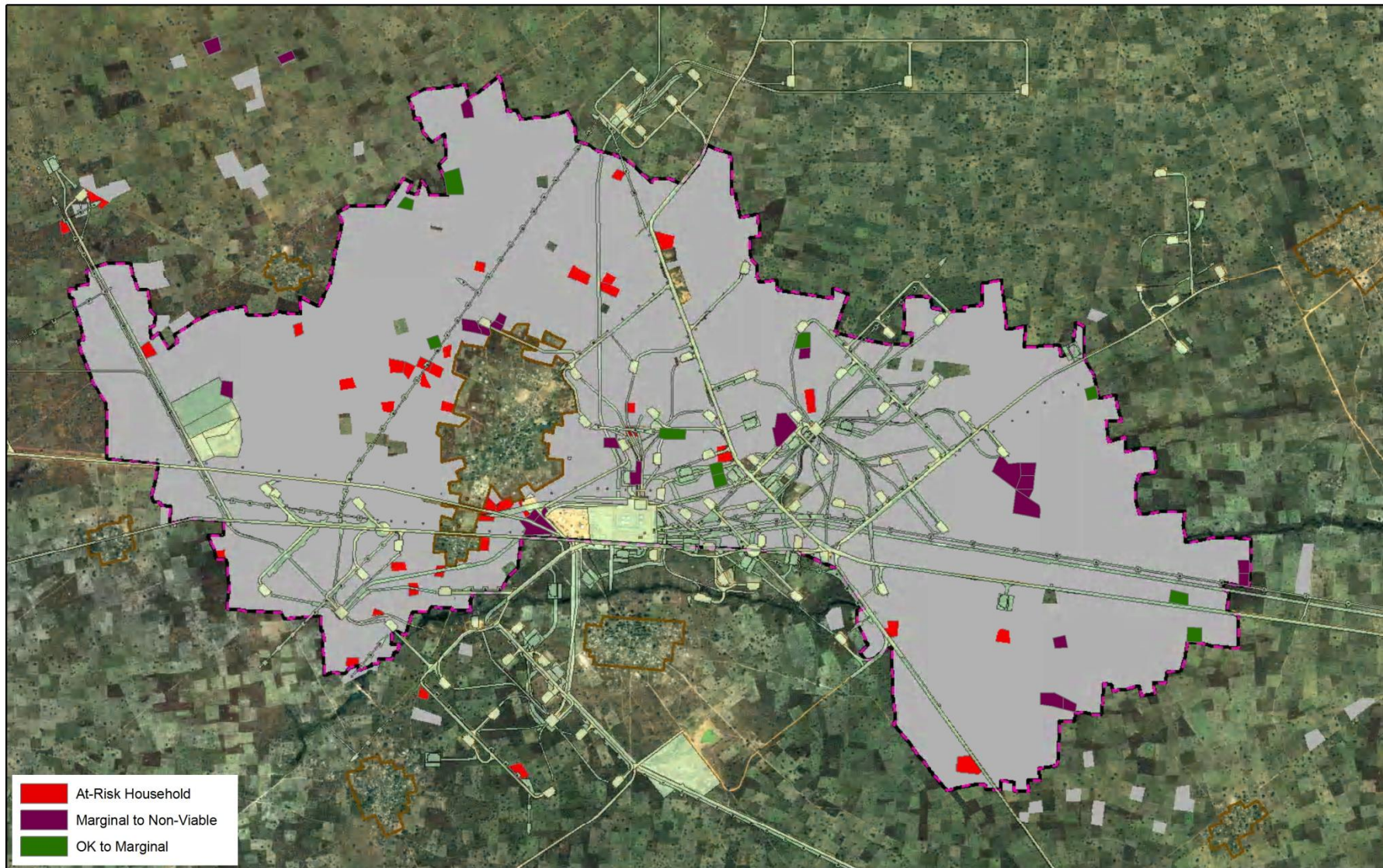
3 Red flagged households from which  
2 are project's affected households



Map drawn on April 30, 2009  
Satellite Image: IKONOS November 2008



# Ngalaba



- At-Risk Household
- Marginal to Non-Viable
- OK to Marginal

## Resettlement Eligibility Factor

- |                                                                   |                                                                                                   |                                                                                                                     |
|-------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|
| <span style="color: red;">■</span> <= 0.67 Corde/Dependant        | <span style="color: lightcoral;">■</span> Protected Site                                          | <span style="color: black;">●</span> House                                                                          |
| <span style="color: orange;">■</span> 0.67 - 1.00 Corde/Dependant | <span style="color: lightgreen;">■</span> Permanent/Not Returned Facilities                       | <span style="border: 1px solid black; display: inline-block; width: 10px; height: 10px;"></span> Settlement         |
| <span style="color: yellow;">■</span> 1.00 - 2.50 Corde/Dependant | <span style="color: lightblue;">■</span> Bush                                                     | <span style="border: 1px solid black; display: inline-block; width: 10px; height: 10px;"></span> Village Boundaries |
| <span style="color: green;">■</span> > 2.50 Corde/Dependant       | <span style="color: lightorange;">■</span> Land Cultivated (Field) or Owned (Fallow) by Outsiders | <span style="border: 1px dashed black; display: inline-block; width: 10px; height: 10px;"></span> Fallow Land       |

21 Red flagged households from which  
16 are project's affected households

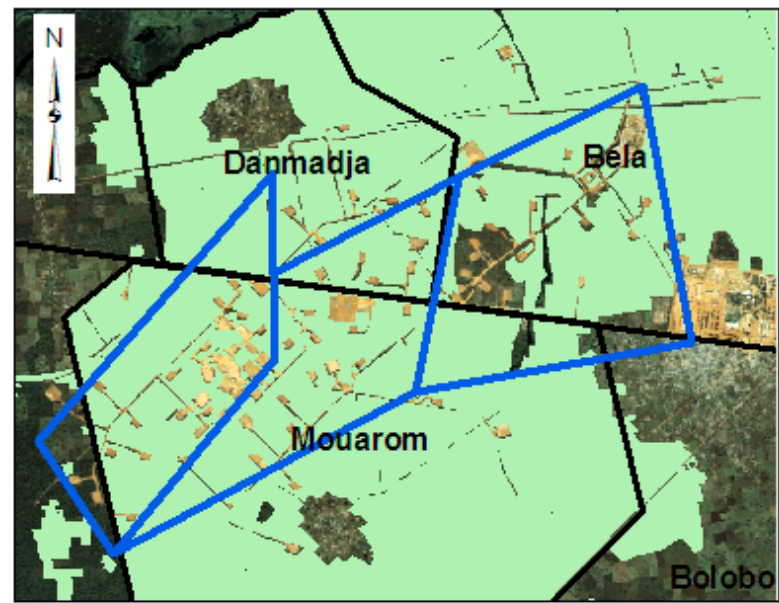


Map drawn on April 30, 2009  
Satellite Image: IKONOS November 2008

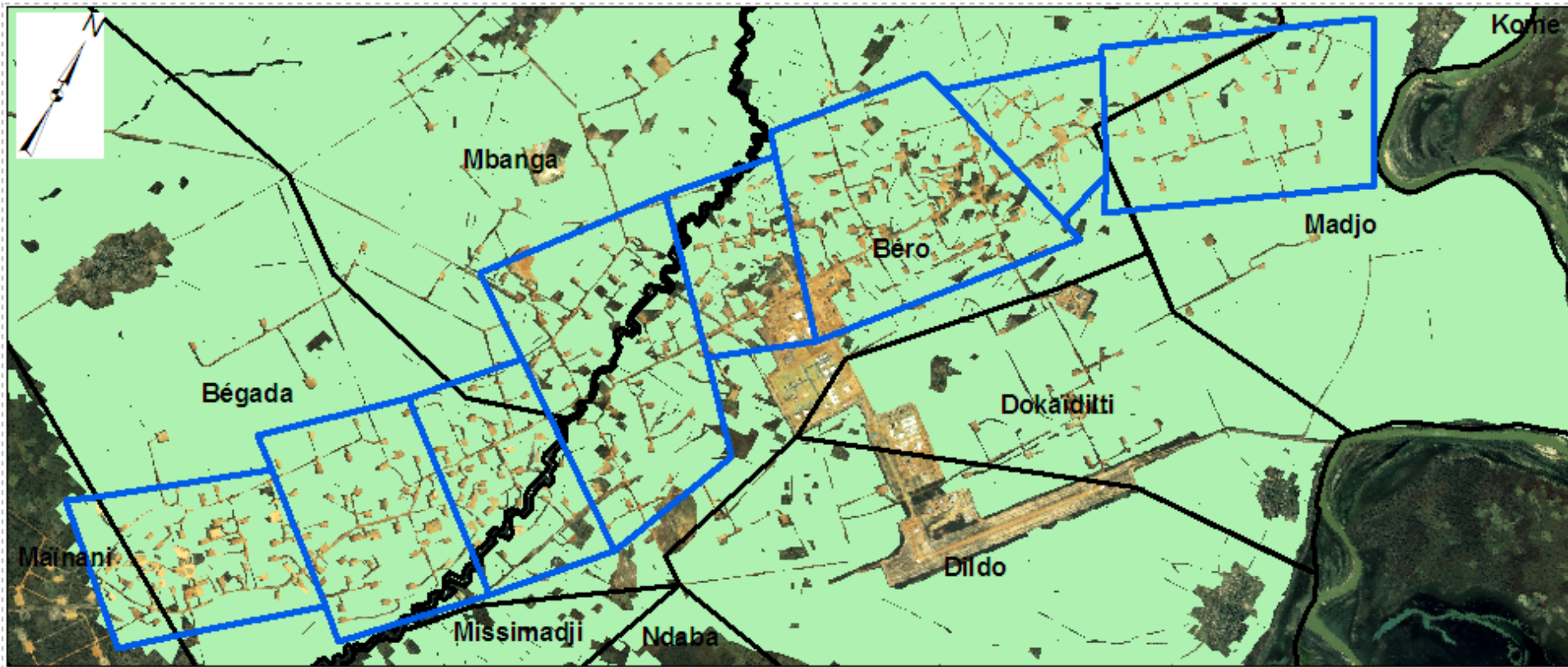


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**Annex I: EMP Information System mapping  
of the evolution of infill drilling**

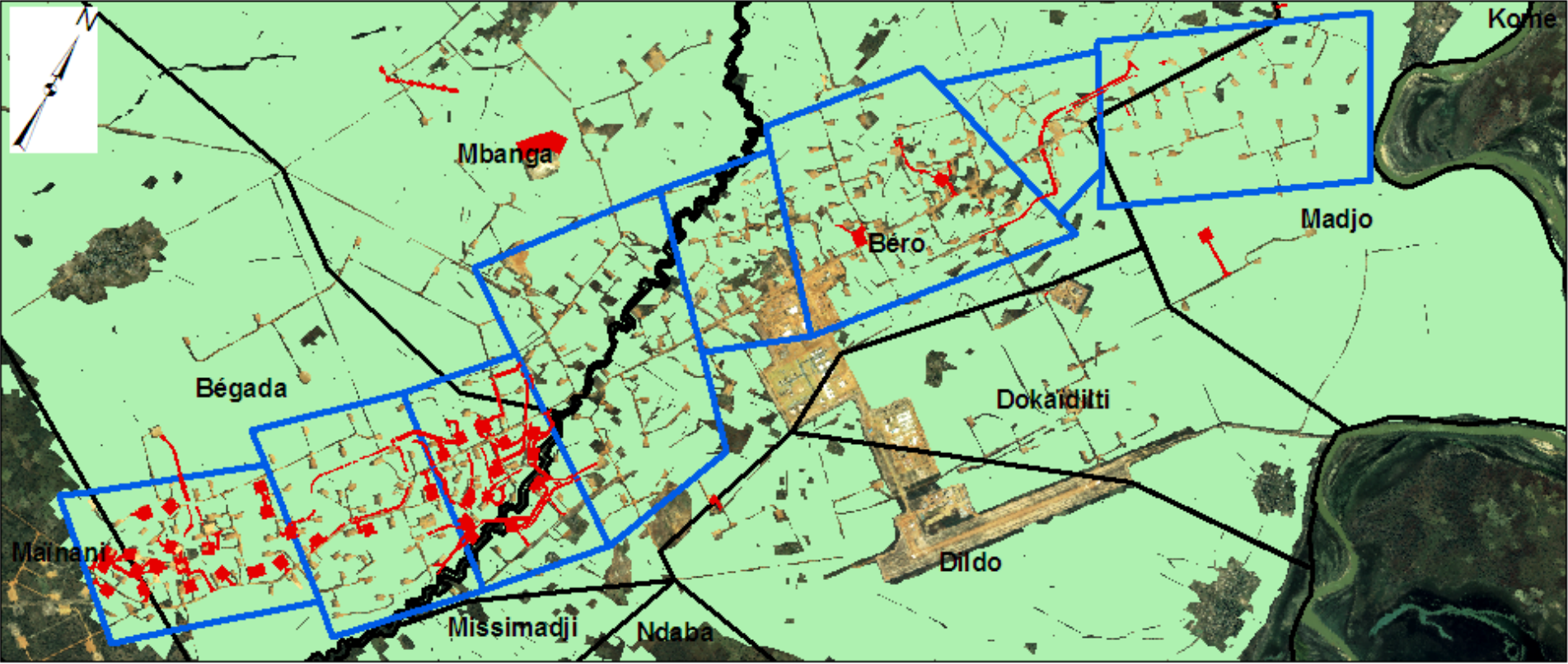
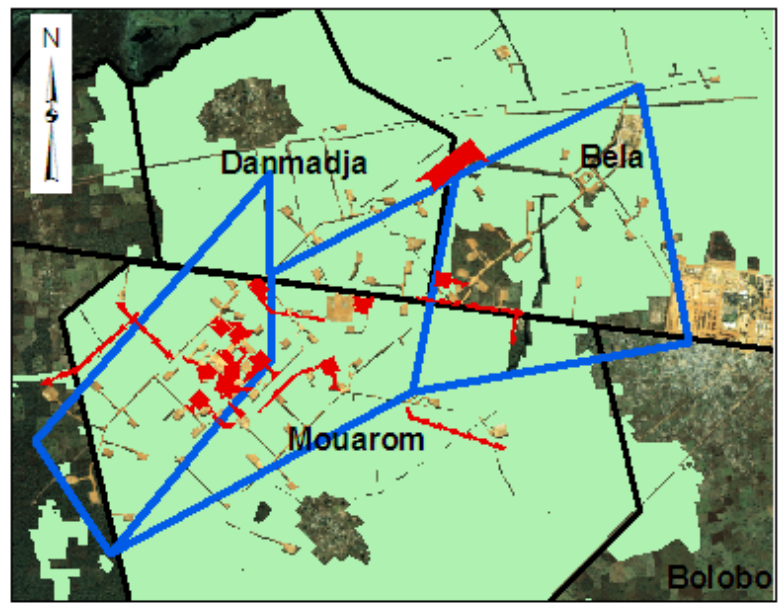


Measured Fields    FaultBlock    Village Limit



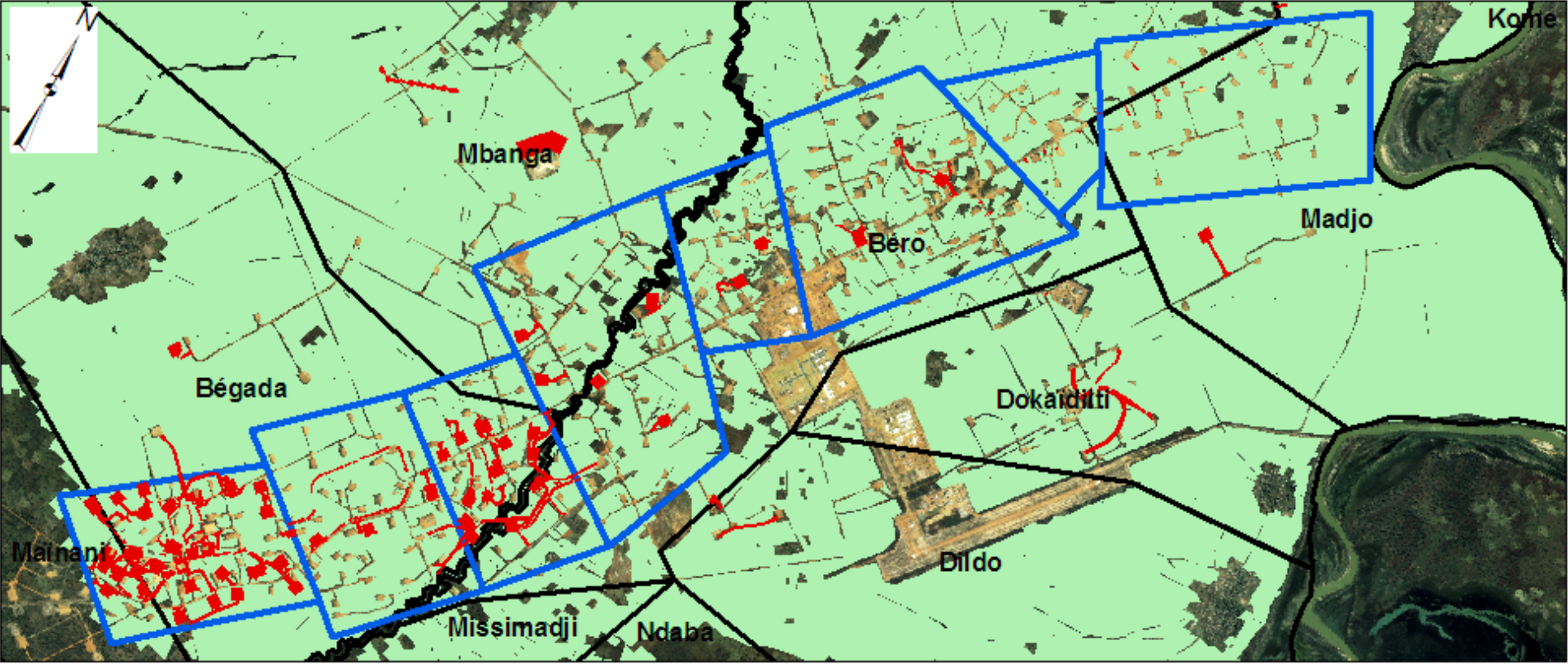
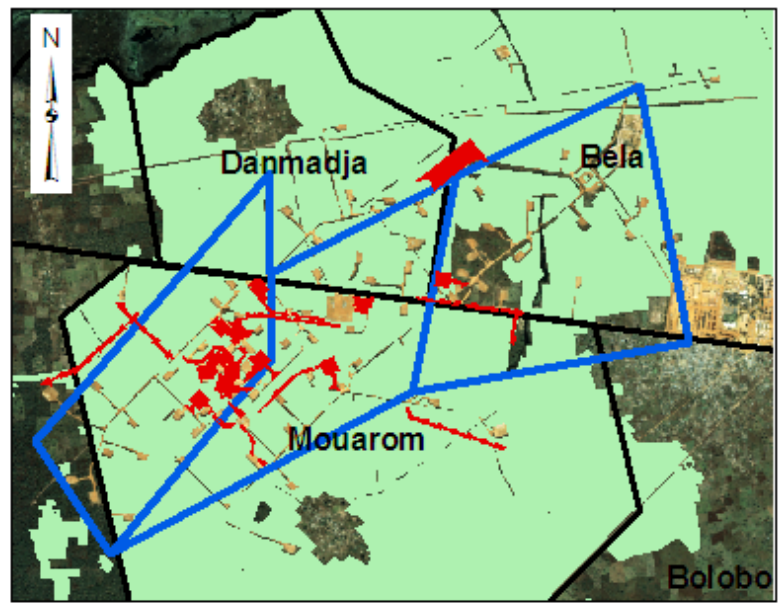
3Q08

Measured Fields    FaultBlock    Village Limit



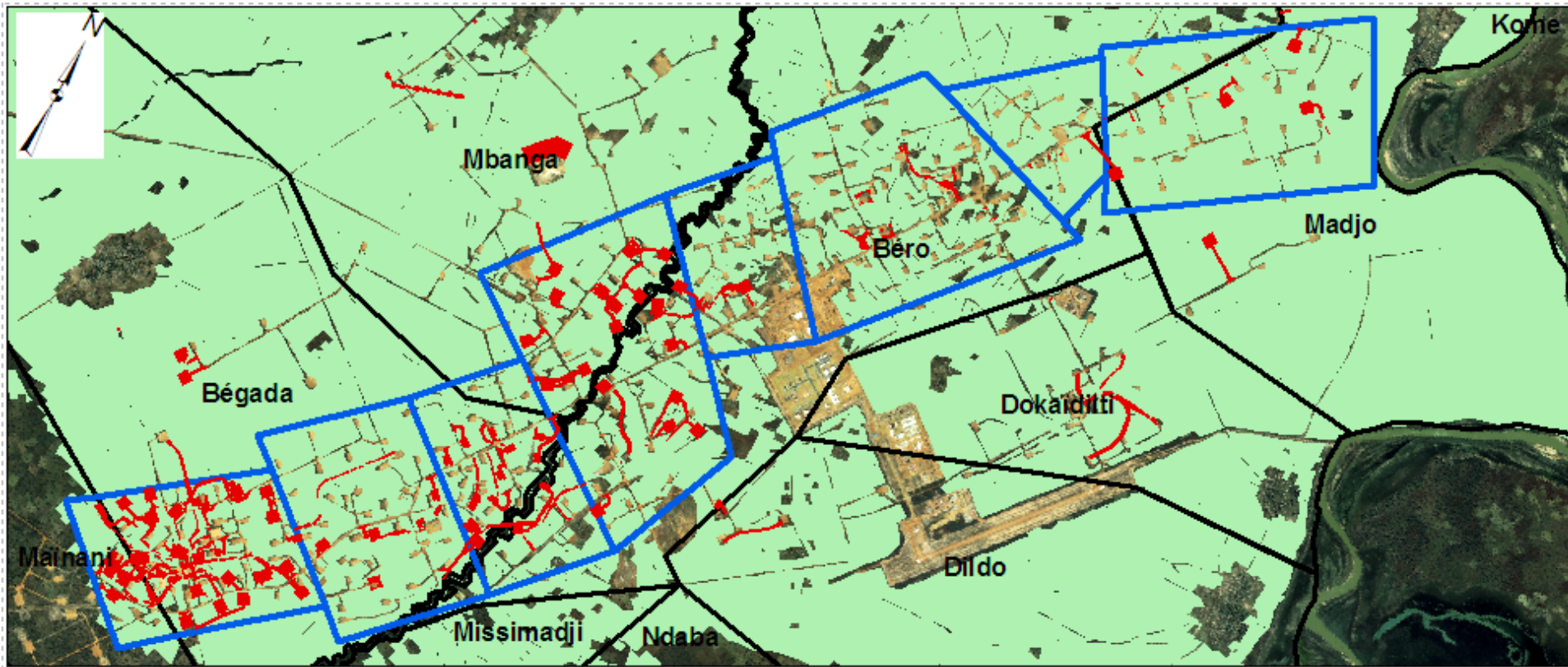
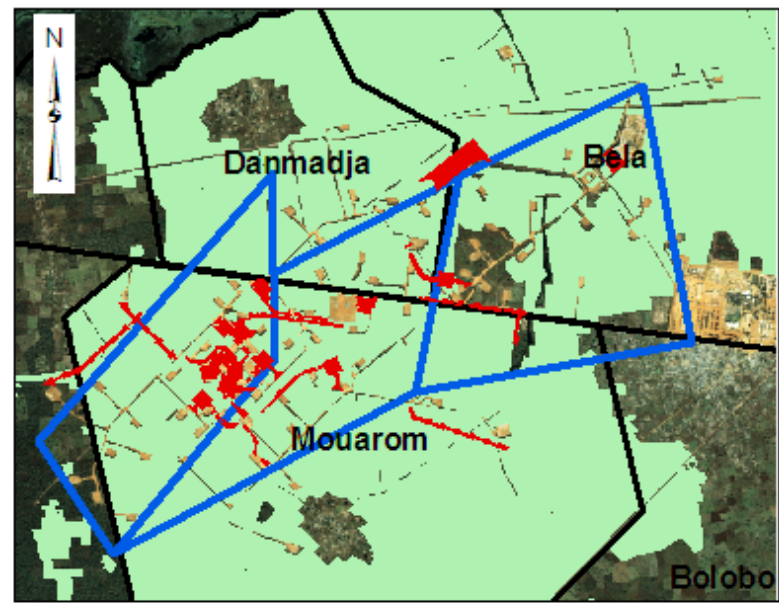
4Q08

Measured Fields    FaultBlock    Village Limit



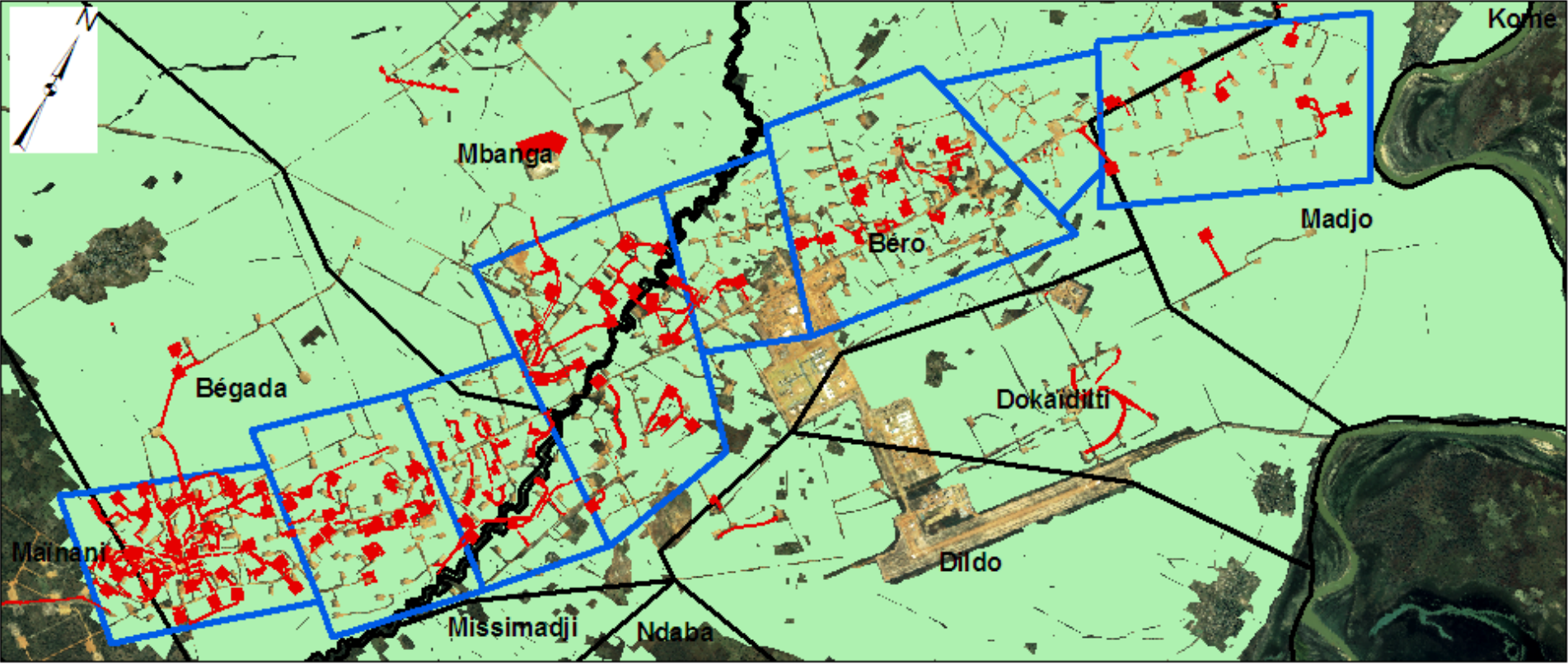
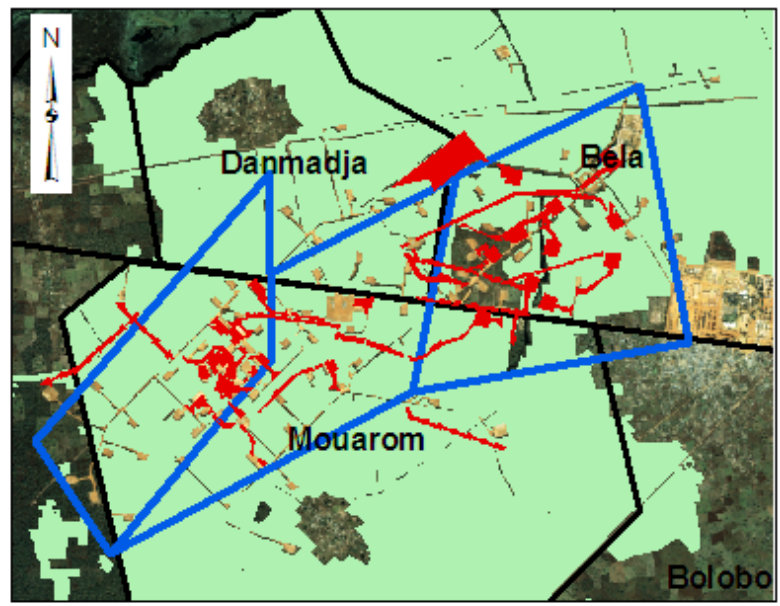
1Q09

Measured Fields    FaultBlock    Village Limit



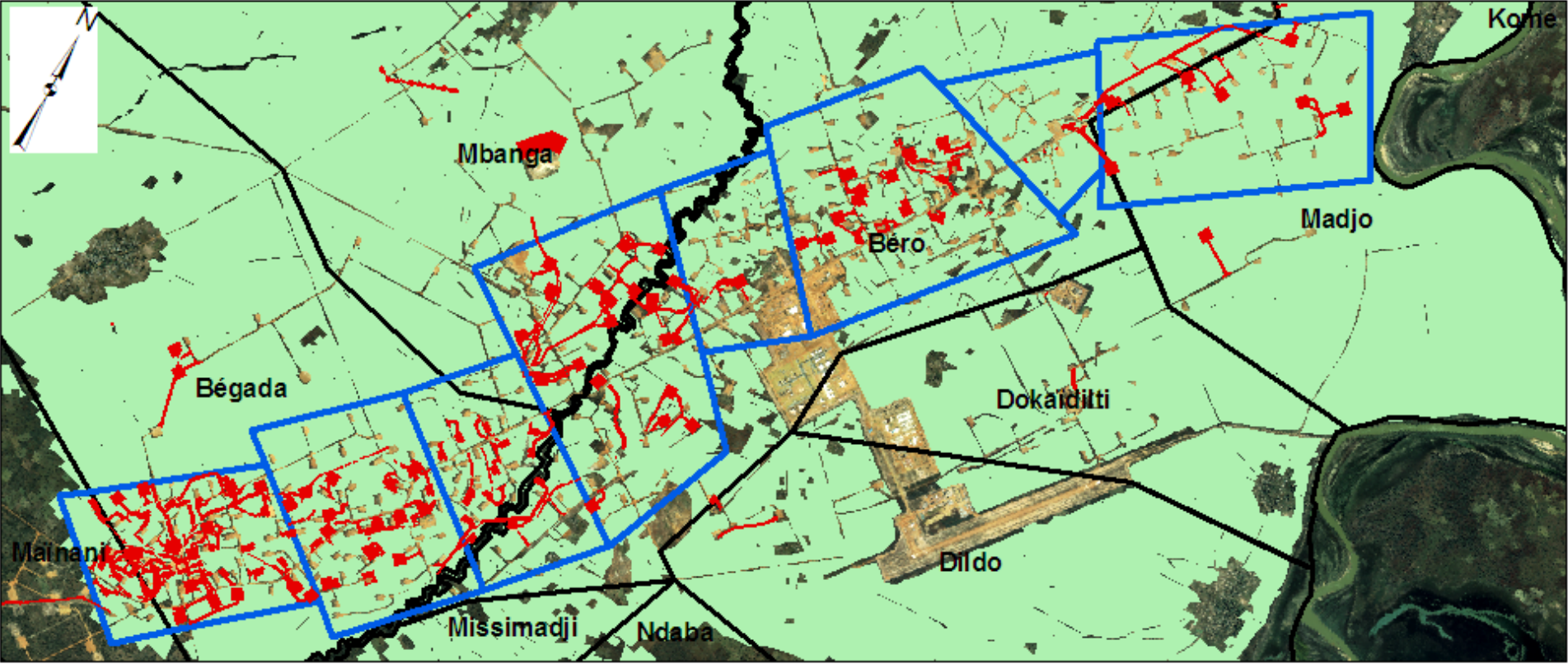
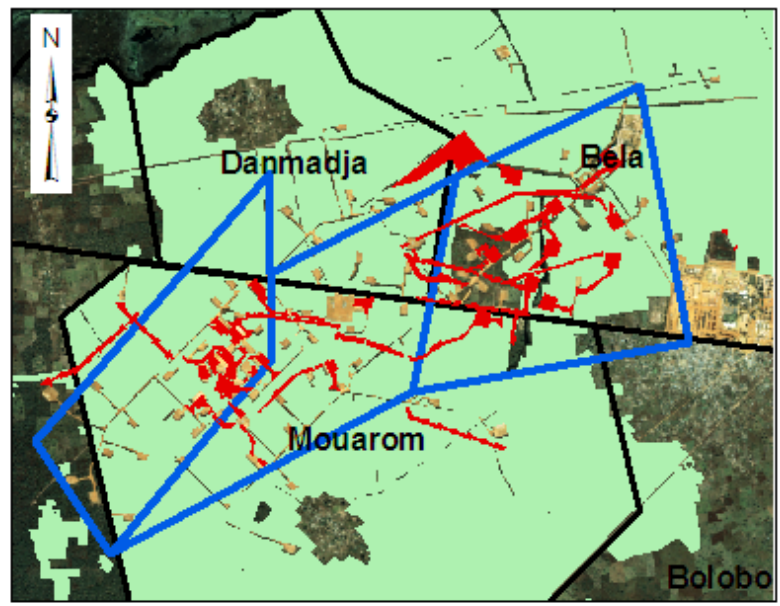
2Q09

Measured Fields    FaultBlock    Village Limit



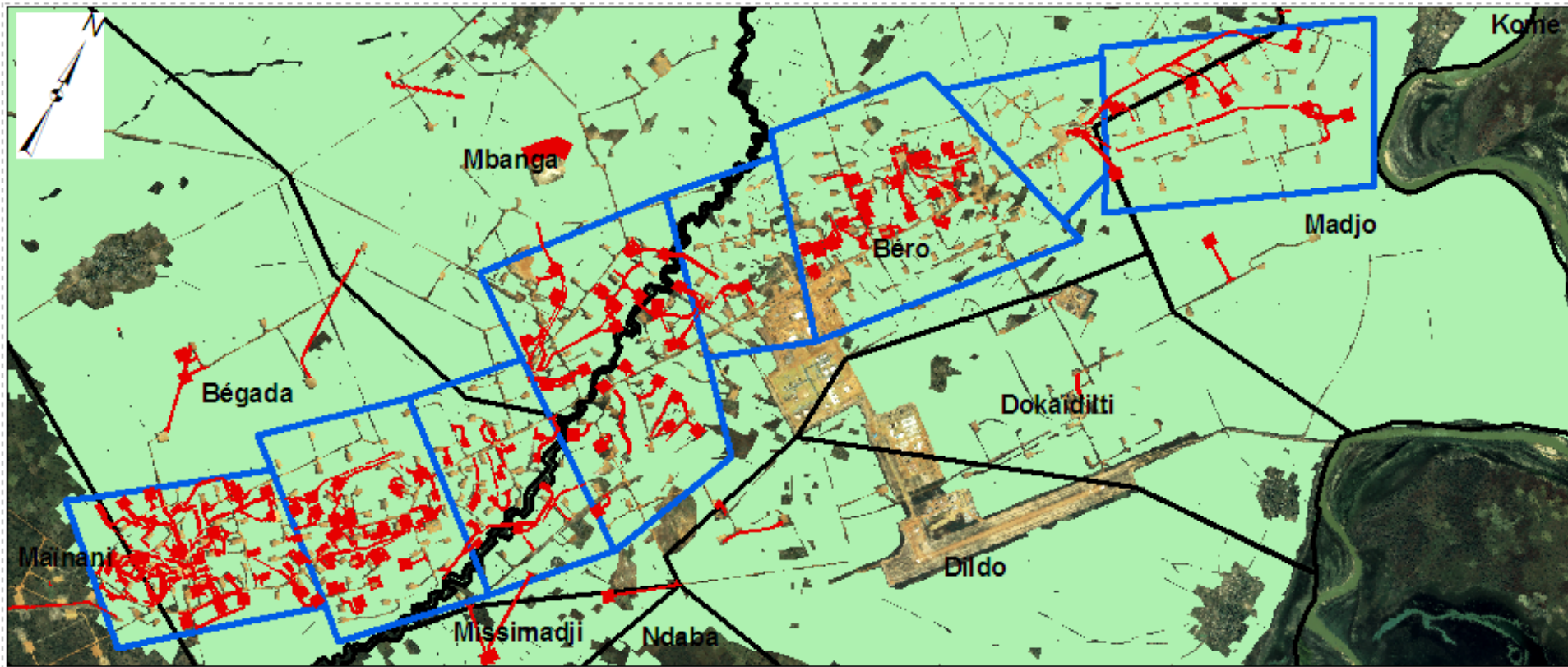
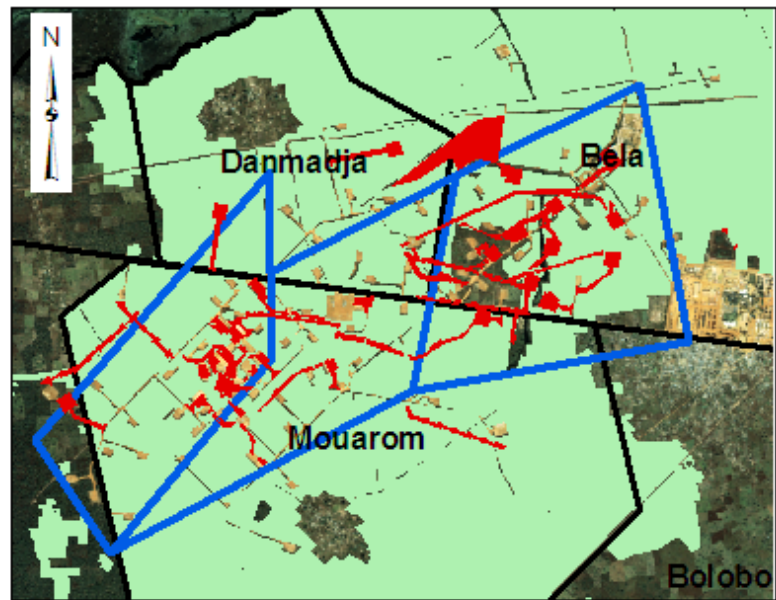
3Q09

Measured Fields    FaultBlock    Village Limit



Today

Measured Fields FaultBlock Village Limit



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**Annex J: Biophysical data for the OFDA  
riverine lowlands**

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## Annex J: Biophysical data for the OFDA riverine lowlands

### Chad EA:

*In the rainy season, the Nya and Pende rivers readily overflow their banks and spread out into shallow but extensive floodplains. There is, therefore, land that makes good pasture but is flooded during the cultivation season and is not used. This land does, however, have excellent potential for recession agriculture and irrigation (section 6.2.3)*

*The perennial and annual grasslands in the alluvial floodplains of the Pende, Loule, and Nya rivers is under continuous pressure from livestock and cultivation. (section 6.3.1.3)*

*The Logone floodplain is a wetland area of approximately 100,000ha that is listed in the Directory of African Wetlands (Hughes and Hughes, 1992). It contains valuable gallery forest and marsh habitat that supports relatively diverse bird and mammal populations and provides important grazing habitat for resident and transhumant livestock. (section 6.3.4)*

*Overexploitation, drought, elimination of crocodiles and hippopotami, and conversion of floodplains to grazing and agriculture have reduced the catches of what had been a major fishing industry in Chad. A principal prey of crocodiles is catfish; when crocodiles are removed, catfish proliferate and consume the eggs and fry of tilapia and other fish. Formerly, hippopotami fertilized the water with their dung and stirred up sediments, improving nutrient distribution in the water column. The elimination of this activity combined with the proliferation of catfish have been major contributors to reduced catches. (section 6.3.5)*

*Based on current estimates, approximately 1 00,000 head of cattle, owned by sedentary farmers and resident and transhumant herders, move through the study area annually along fairly well defined routes (see section 6.2). (section 6.3.7)*

### Chad Export Project Environmental Documentation Volume 6 – Chad Biological Studies

*Nya River – The Nya River appears to be unique. Although small in size, it reportedly flows throughout the dry season; however hydrology data were not collected as part of this survey. The Nya River has a poorly defined channel, and in many areas, the water seeps through emergent wetlands. This hydrology suggests that the river and catchment are perched on a large impervious iron pan. It is important that the pipeline construction does not alter this hydrology. (section 5.1.3.2)*

*The Nya River has a relatively wide floodplain and appears to support a productive*

*and important local fishery. As in other areas, fishing is particularly important during the dry season. At the time of the survey, large numbers of people were harvesting a stretch of the river, just upstream from its confluence with the Loulé River, that had been fenced off (“barrage” or “soo”) as the flood waters receded in December. Following the placement of the fish fence, this section of the river was closed to fishing for a few weeks, before then being opened for communal fishing. Harvesting had been underway for over a week when the survey team visited the area, but people (estimated at over 60 fishermen, mainly women*

---

and youths) were still catching several kilograms of fish after an hour or two of fishing. A variety of gear was being used (in particular, baskets, small conical traps [“nasse” or “korr”], fish enclosures [“chambres de captures” or “enceintes circular”], and, while many of the fish being collected were small, all would have been utilized for food. Further upstream, fishermen were observed fishing with seines near the village of Bedia.

The marketing system for the Nya River fishery is essentially similar to that of the Lim River. Fish are primarily for home consumption, but when there are excess captures, some are either sold locally or preserved for later use. While the Nya fishery appears to be currently important in the local food economy, it is likely that in previous years, when conditions were wetter and greater extensions of the floodplains remained inundated for longer periods, this fishery was even more productive (as seems to have been the situation in general for the Logone-Chari Basin). Under these more productive conditions, dry season fish harvests were such that substantial amounts of fish could be preserved for subsequent consumption during the otherwise food-scarce months of the early wet season (i.e., before the new crop harvests became available) (Brown, 1998). Thus, fish formerly represented a low-cost, readily available protein supply to tide people over until agricultural produce became more abundant.

Loulé River – At the time of the survey, the Loulé River had ceased to flow, and water was restricted to a few stagnant pools. Most of these were covered with aquatic plants and no fish sampling was possible. Interviews with residents of neighboring villages (Komé Village, Banga, and Kaba), however, made it clear that the Loulé River is used for fishing during certain periods, particularly on the rising flood and in the first part of the dry season. Collective fishing occurs with several villages being invited by the local “owners” of the water (Nje Mann) to participate in the harvests. Most of the captured fish are destined for home consumption. (section 5.2.3)

- Substantial tracts of gallery forest and marshland occur along the Nya River, which traverses the OFDA in a southwest to northeast direction, that are likely to have high value as wildlife habitat in the Project area.
- A unique grassland savanna is located in the vicinity of an oxbow lake on the west side of the Pendé River, east of Mogrom and near the eastern extremity of the OFDA.
- Marshlands and wetland savannas along the Nya River that appear to be potentially valuable to wildlife are impacted by cattle grazing, particularly in the vicinity of Kagroue.
- Gallery forests along both sides of the Loulé River are quite restricted by the expansion of cultivated agriculture.
- In general, habitats in the OFDA have been substantially modified by fire, livestock grazing, and cultivated agriculture. The potential of the area for wildlife, especially large mammal species that are sensitive to habitat modification and disturbance by humans and livestock, appears to be largely limited under existing land use practices with the exception of the Nya River floodplain and a few other wetland and riparian habitats (gallery forests). (section 5.4.1.1)

---

Conclusions from the Supplemental Data Collection Program for Biological Resources in Chad are described below. Information gathered resulted in conclusions regarding adequacy of survey effort, occurrence of biological resources, and recommendations for the pipeline route and oilfield facilities.

1. Surveys conducted for botanical resources, fish, birds, and large mammals were generally completed as planned, all yielding valuable information.
2. Despite some drawbacks (inability to sample two rivers for fish, a lack of nocturnal bird surveys), the objectives of the surveys were met. Common and sensitive species of trees, fish, birds, and large mammals were characterized.
3. Vegetation types previously mapped were groundtruthed.
4. Savanna woodland vegetation types were dominated by two tree species, *Isobberlinia doka* and *Burkea africana*.
5. Gallery forests were very narrow in extent and dominated by *Irvingia smithii*.
6. Additional botanical transect surveys are not considered to be necessary.
7. No IUCN-listed fish species were collected during the fish surveys.
8. At least 48 species of fish were collected from the Nya, Lim, Mbéré, Logone Occidental, and Pende rivers.
9. Of the rivers to be traversed by the pipeline, the Nya and Lim have important fisheries to local fishermen.
10. Construction during the dry season will have minimal negative effects on fish species, but some short-term negative effects on fishing.
11. Fisheries survey results provided a good picture of fish occurrence and levels of fishing activity during the dry season. Additional fisheries surveys may be needed if construction is to occur across the Nya River or Lim River during the wet season. The additional surveys could be conducted as part of an overall pre-construction survey/construction monitoring process for pipeline construction.
12. There is greater potential for operation impacts to rivers (Loule, Nya) in the OFDA than to rivers crossed by the pipeline. Oil spill contingency planning will be especially important for the OFDA.
13. No IUCN-listed birds were observed during the bird surveys, however a list was developed that included 15 species observed during the survey that are considered to be regionally vulnerable.
14. River habitats and swamps (which include habitats mapped as gallery forest and marshes) represent high-quality avian habitat. These habitats occur in association with the Mbéré, Lim, Nya, and Loule rivers.
15. Bird surveys provided a good overview of the regional avifauna. Based on survey results, it appears that pipeline construction and operation will not result in substantial impacts on birds in Chad.
16. The large mammal surveys, including village interviews and limited ground surveys, resulted in a good characterization of species along the pipeline route and in the OFDA.

- 
17. *The western third of the pipeline route in Chad traverses higher quality habitat for large mammals relative to the remainder of the pipeline route and the OFDA in Chad.*
  18. *Observations of individuals and sign, as well as results from interviews indicated that 17 IUCN-listed species of mammals are known or have the potential to occur along the pipeline route or in the OFDA. Of that total, six were considered to be very rare.*
  19. *The most commonly reported IUCN-listed mammals were African elephant, hippopotamus, bushbuck, kob, waterbuck, reedbuck, red-flanked duiker, and oribi.*
  20. *The Lim (for elephants) and Mbéré (for elephants and hippopotamus) rivers were identified as important habitat and movement corridors for IUCN-listed mammal species. Recommendations were made and implemented regarding pipeline route adjustments at the two river crossings. Both route adjustments reduced the potential effects to the habitat associated with the two rivers.*
  21. *The combination of interviews and ground surveys provided a broad overview of the occurrence of large mammals along the pipeline route. Based on factors such as the disturbed nature of habitat traversed, pipeline construction and operation are not likely to result in substantial impacts on large mammals in Chad. (section 6.0)*

#### **Environmental Document Maikeri (Poutouguem) Project**

*Sensitive wildlife species were not identified in the Maikeri (Poutouguem) Project area. Villagers indicated that the diversity of wildlife species in the area is low and has been in decline for several decades. Many wildlife populations, particularly the mega fauna species, such as Giraffe, African Buffalo, Black Rhinoceros and African Elephant were eliminated by uncontrolled hunting during and after the civil war 25-30 years ago. The continuing decline in wildlife resources has been exacerbated by overgrazing, deforestation and drought. These larger species are unlikely to reappear because their natural habitats have been mostly eliminated or extensively modified for agricultural use.*

*The Maikeri (Poutouguem) Project area does not include sensitive environmental habitats. The borders of the closest reserve, the Larmanaye Reserve (431,000 ha), are about 40 km from the closest development site in the Maikeri (Poutouguem) Project area.*

*The Maikeri (Poutouguem) Project area is adjacent to, but does not include, the sensitive floodplain of the Nya River. The Nya River and its floodplain fluctuates from between 400m wide, close to Poutouguem village, up to 650m wide. It has a meandering minor bed and the floodplain contains a large number of ponds which are used as watering holes and for fishing. The river does not run dry. In places the Nya river valley and floodplain contain valuable gallery forest and marsh habitat that support relatively diverse bird and mammal populations and provide important grazing habitat for resident and transhumant livestock. The Nya River is rich in fish, 18 species of fish were reported by villagers and this corresponds with prior studies of the area.*

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**Annex K: Photographs**



Photo 1: Rice Project near village of Mboh-Nya



Photo 2: Rice Project near village of Mboh-Nya

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	<b>Project No.:</b>	61C14017
	<b>Date:</b>	December 2008 to 2009



Photo 3: Rice growing in Nya floodplain between Bolobo and Miandoum oilfields



Photo 4: Rice growing near village of Madjo – Area F

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Photo 5: Rice growing in Loule tributary north of Begada – Area C



Photo 6: Rice growing near Danmadjia – Area A

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Photo 7: Rice harvesting near village of Mboh - Nya



Photo 8: Rice harvesting near village of Danmadjia

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Photo 9: Field work during Assessment site visits



Photo 10: Field work during Assessment site visits

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Photo 11: Field work during Assessment site visits



Photo 12: Field work during Assessment site visits

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Photo 13: Field work during Assessment site visits



Photo 14: Field work during Assessment site visits

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Photo 15: Field work during Assessment site visits



Photo 16: Field work during Assessment site visits

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Photo 17: Field work during Assessment site visits



Photo 18: Field work during Assessment site visits

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Photo 19: Field work during Assessment site visits



Photo 20: Field work during Assessment site visits

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Photo 21: Field work during Assessment site visits



Photo 22: Field work during Assessment site visits

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Photo 23: Field work during Assessment site visits



Photo 24: Field work during Assessment site visits

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Photo 25: Field work during Assessment site visits



Photo 26: Field work during Assessment site visits

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