

APPENDIX L

INITIAL ENVIRONMENTAL EVALUATION

SPECIALIST REPORT ON:

THE DRY SEASON SOCIAL IMPACT ASSESSMENT
IN NAMIBIA

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for

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LIST OF ABBREVIATIONS

AIDS	Acquired Immuno Deficiency Syndrome
BCG	Bacille Bilié de Calmette et Guérin (vaccine)
CSIR	Council for Scientific and Industrial Research
CSO	Central Statistical Office
DERU	Desert Ecological Research Unit
DPT	Diphtheria - poliomyelitis - tetanus (vaccine)
DSSA	Dry Season Social Assessment
EEAN	Environmental Evaluation Associates of Namibia
HDI	Human Development Index
HIES	Household Incomes and Expenditures Survey
lcd	Litres Per Capita Per Day
MOHSS	Ministry of Health and Social Services
NBC	Namibian Broadcasting Corporation
SIA	Social Impact Assessment
SIAPAC	Social Impact Assessment and Policy Analysis Corporation
SIDA	Swedish International Development Authority
SPSS	Statistical Package for the Social Sciences
TOR	Terms of Reference
TRP	Town and Regional Planning Associates
UNDP	United Nations Development Programme

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1. INTRODUCTION

1.1 Introduction

In May, 1996 the Department of Water Affairs of the Ministry of Agriculture, Water and Rural Development issued Terms of Reference for A Feasibility Study on Measures to Augment and Secure the Water Supply to the Central Areas of Namibia by Completing the Okavango River - Grootfontein Link of the Eastern National Water Carrier. Attached as part of that document were Terms of Reference for the Environmental Impact Assessment.

SIAPAC-Namibia, AfriDev Consultants, and CSIR were asked by a consortium of companies, the Okavango Water Transfer Consultants (WTC) to undertake the social and natural environmental impact assessment of the pipeline and downstream effects on the riverine area of the Project. AfriDev was responsible for the assessment of the natural environment impacts of the pipeline, while CSIR was responsible for the downstream assessment from Rundu in Namibia to Maun in Botswana.

SIAPAC was responsible for the social assessment of the entire Project, covering the pipeline area and all downstream locations in both Namibia and Botswana. This process was overseen by two internal evaluators, Dr. Mary Seely, of Environmental Evaluation Associates of Namibia (EEAN), and Mr. Peter Tarr, of the Namibian Ministry of Environment and Tourism.

The aim of the project is to provide reliable water for the central area of Namibia, specifically Windhoek and environs. While originally expected to be fully investigated early in the 21st century, the continued drought affecting much of Namibia necessitated the advancement of a study into the technical and environmental (social and natural) aspects of the water transfer scheme.

The emergency nature of the scheme meant that a full assessment of project feasibility and impact could not be conducted prior to proceeding with the full technical assessment of project feasibility, as well as initial design activities. As a result, environmental investigations during 1996 were limited to an Interim Environmental Evaluation. Collectively, for the social component these investigations are referred to as the Initial Environmental Evaluation - Social Component (IEE-SC). The Department of Water Affairs intends to support the undertaking of a full wet season Environmental Impact Assessment, including a full Social Impact Assessment, in 1997.

1.2 Purpose and aim of the study

The purpose of the IEE-SC was to assess the positive and negative potential impacts of the proposed Okavango River link to the Eastern National Water Carrier near Grootfontein. As noted above, this involved an initial investigation into anticipated social impacts, positive and negative, arising from the proposed scheme, including a consideration of threats arising from the project and suggested remedial actions.

The aim of the project, therefore, was to recommend to the client how to maximise the positive impact of the pipeline scheme in Okavango Region, specifically along the pipeline route, and to minimise negative impacts in Okavango Region and western Caprivi Region, specifically along the river, emphasising the area up to the confluence of the Okavango and Cuito Rivers, where impacts were anticipated to be greatest.

The IEE-SC involved an investigation into the anticipated social impacts of the project along the river and down the pipeline route.

1.3 Summary of issues to be investigated by the IEE-SC

Issues to be investigated came from three principal sources: 1) the original Terms of Reference (TOR) and the original comments on the TOR by SIAPAC; 2) issues arising from the initial rapid appraisal and the natural environment field visit; and 3) scoping workshop issues arising. The IEE-SC therefore aimed at conducting an initial investigation into the following issues:

1. Cultural and traditional constraints and opportunities.
2. Age and gender issues, as well as social class, focusing on the potential differential impacts across these groups.
3. Degree and type of community organisation, both formal and informal, and the extent to which communities are able to organise as groups.
4. Authority structures, both 'traditional' and 'modern', and considerations of altered authority structure legitimacy in the case of temporary or long-term in-migration from outside the project area.
5. Growth rate of local populations, projected from general census figures for the region, coupled with projected in-migration growth propensities.
6. Current adequacy of local services, focusing on local perceptions as well as comparisons with regional and national standards.
7. Settlement patterns and migration, including seasonal as well as long-term migration patterns, and the extent to which settlement patterns link to authority structures and community organisation.

8. Relocation of people and livestock, arising from the pipeline and the pipeline offtake.
9. Land and resource tenure considerations, including utilisation of natural resources and rights of access, and consideration of local attitudes towards compensation, and also impacts of low flows on riverine areas.
10. Traditional land use patterns, including rights of access by outsiders, and focusing particular attention on land tenure patterns and land use systems in areas of likely in-migration.
11. Dependence and use of natural resources, and the potential changes in both downstream and in-migration areas.
12. Privatisation, referred specifically to the need to pay for bulk water supply.
13. Employment situation, including current unemployment and underemployment, chronic lack of jobs, propensity to seek temporary jobs, etc.
14. Income distribution, focusing on a review of the household incomes and expenditures survey data (which will be secured for Okavango and Caprivi Regions and Windhoek).
15. Public health and safety, including perceptions of public health and safety, and knowledge of waterborne diseases (riverine areas).
16. Altered access to schools, clinics and other services, focused on projected social service needs in expected in-migration areas.
17. Altered access for livestock to grazing and water, including an assessment of the effectiveness of local management systems for livestock access in the face of current settlement patterns and project in-migration.
18. Theft, poaching, vandalism, focusing on local attitudes about these issues and recommended actions.
19. Historical and cultural monuments and areas of historical or cultural importance, collecting information on locally-perceived areas of historical and cultural value.
20. Public participation at the local level.
21. Natural resource utilisation, non-utilisation, and attitudes about natural resources, as well as local management systems, based in large part on inputs from the EIA teams. This would include dry and wet season assessments.
22. Inventory of water users along the river¹.
23. Water usage in households.
24. Local knowledge of erosion and trends.
25. Use of river islands and use of the northern border by Namibians.
26. Backyard irrigation demands.
27. Water cost estimates based on cost recovery policy.

¹ The inventory was conducted by Parkman, assisted by two SIAPAC field officers, with input on the inventory instrument provided by SIAPAC.

Overall, the study principally focused on social issues in the affected pipeline route area running from Rundu to the southern border of Okavango Region, along the tar road (Figure 1.1). Particular attention was devoted to a consideration of in-migration potential into the pipeline area, and fears, concerns and expectations arising from the proposed project along the proposed pipeline route. Along the river, particular attention was paid to natural resource use, an assessment of attitudes towards the proposed scheme, and consequent fears arising.

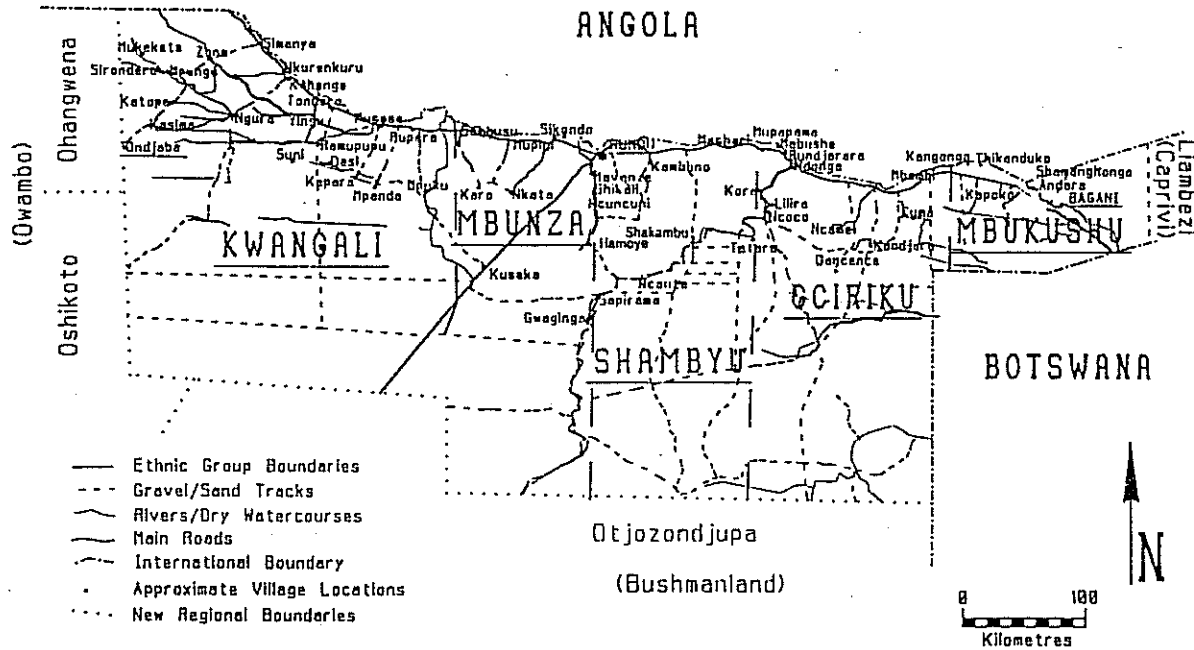


Figure 1.1: Map of study area in northern Namibia.

1.4 Summary

The Interim Environmental Evaluation - Social Component was conducted by SIAPAC, working closely with the natural environment teams of AfriDev and CSIR, reporting to Water Transfer Consultants, themselves reporting to the client, the Department of Water Affairs, Ministry of Agriculture, Water and Rural Development, Government of Namibia. The IEE-SC is the first step in what is expected to be a full Social Impact Assessment of the proposed scheme which is anticipated to take place in 1997. As such, the findings are provisional in the sense that a more detailed assessment of projected impacts could not be done during the Interim Environmental Evaluation - Social Component.

Within this context, the study is designed to initially investigate the issues listed above. Particular attention was devoted to potential effects along the pipeline route itself, as well as fears and expectations arising from the proposed scheme.

2. METHODOLOGY AND FIELD IMPLEMENTATION

2.1 Methodology

2.1.1 Introduction

Field data collection activities were comprised of three basic sets of activities: 1) an initial rapid assessment; 2) rapid quantitative questionnaire implementation; and 3) initial qualitative research activities. Further, feedback consultative workshops were also held in the riverine and proposed pipeline route areas.

Work during the first phase involved an initial Interim Environmental Evaluation as the first step in the Environmental Impact Assessment process. Initial social impact was reviewed and, as is standard for social assessments, attitudes about the proposed infrastructural project were solicited. Consultative workshops were also held to review findings.

2.1.2 Rapid assessment

One member of SIAPAC traveled into the field with the natural environment team. During this week in the field, SIAPAC undertook a rapid appraisal along the proposed pipeline route, in Rundu, and along the river.

2.1.3 Rapid quantitative questionnaire

As noted, issues to be investigated came from three principal sources: 1) the Terms of Reference; 2) issues arising from the initial rapid appraisal and the natural environment field visit; and 3) scoping workshop issues arising. Those variables derived from the TOR which needed to be measured numerically (e.g., frequency of occurrence) were included on a Rapid Quantitative Questionnaire. *Rapid Quantitative Questionnaire* approaches differ from standard Quantitative Questionnaires only in terms of scope, not in terms of process. Generally, Rapid Quantitative Questionnaires are less than 4 pages and 5-7 minutes in administrative length. The rules and procedures which apply to Quantitative Questionnaires apply to Rapid Quantitative Questionnaires, including sampling approaches, instrument design, and attention to validity and reliability in the design and implementation stages.

For this study, 1000 Rapid Quantitative Questionnaires were completed, divided across five strata: 1) the pipeline route; 2) River Strata 1 - the area along the river from Rundu to the Omatako Omuramba; 3) River Strata 2 - the area from the Omatako Omuramba to the confluence of the Okavango and Cuito Rivers; 4) River Strata 3 - the area from the

confluence towards the end of the Angolan border; and 5) River Strata 4 - the area from a point west of the end of the Angolan Border to the border with the Mahango Game Reserve².

The Rapid Quantitative Questionnaire comprised sixty-five questions and took an average (median figure) of 10 minutes to administer, longer than most Rapid Quantitative Instruments (5-7 minutes). Issues investigated included current knowledge of the scheme, basic demographic information, the current water supply situation in the proposed pipeline area, utilisation of the river by riverine households, attitudes towards the proposed pipeline, and a limited set of questions of interest to the natural environment team.

The Rapid Quantitative Questionnaire is included as Annexure A to this report.

2.1.4 *Qualitative instruments*

While the Rapid Quantitative Questionnaire used for this study provided information on the frequency of events of interest and the distribution of attitudes, a number of qualitative approaches were also employed to investigate key issues in more detail: 1) focus group discussions; 2) local-level key informant interviews; and 3) for selected locations in the proposed pipeline route area, mapping. In addition, based on the information needs of the natural environmentalists, data were collected on natural resources from general community members as well as traditional healers/doctors (who were expected to be key users of natural resources); findings from these instruments are not presented here, and are instead included in the natural environment team reports.

Focus group discussions are one of the principal tools used to gain insights about potentially sensitive topics. Groups are normally comprised of 5-7 homogeneous members of the same community. A limited set of issues are discussed in detail, with a trained and experienced facilitator (and a translator/note-taker) leading the effort. Focus groups take between 1.5 and 3 hours to implement. Six focus group discussions were held altogether, of which four were held in the riverine area, focusing on obtaining information and attitudes from a broad range of community members, including opinion leaders, female-headed households, livestock owners and poorer households. The focus group discussion instrument is appended to this report (**Annexure B**).

² In fact, the natural environment team divided the riverine area into 6 strata. However, strata 6 had no people in it, as it comprised the Mahango Game Reserve, while strata 5 was too small in terms of population to allow proper sampling (sampling with replacement) to take place. Therefore, strata 6 was excluded from the social assessment, while strata 4 and 5 were merged.

Local-level key informant interviews are one-on-one interviews conducted with people who, by their positions in society or by the activities, are influential members of a community. For this study, interviews were held with traditional authorities, church officials, school officials, community opinion leaders, and local officials. The local level key informant interview instrument is included as Annexure C. Ten local level key informant interviews were administered in the pipeline area, while twelve local level key informant interviews were held in the riverine area.

2.2 Start-up and field implementation

SIAPAC was appointed to carry out the IEE-SC on 24 October, 1996. Full planning activities began around this date. On 28 October, SIAPAC proceeded into the field to hold meetings with the natural environment team and begin its rapid appraisal. Instrument development began in early November, while enumerator training took place from 5-9 November. Samples were pulled on 8 and 9 November, and the team began fieldwork on 12 November. Data entry began on 19 November. Fieldwork was completed by mid-December, while data entry and validation ended on 23 December. Final literature review, data analysis and report write-up began on 26 December. Data analysis was undertaken using the Statistical Package for the Social Sciences (SPSS). Level of co-operation is indicated in the following figure:

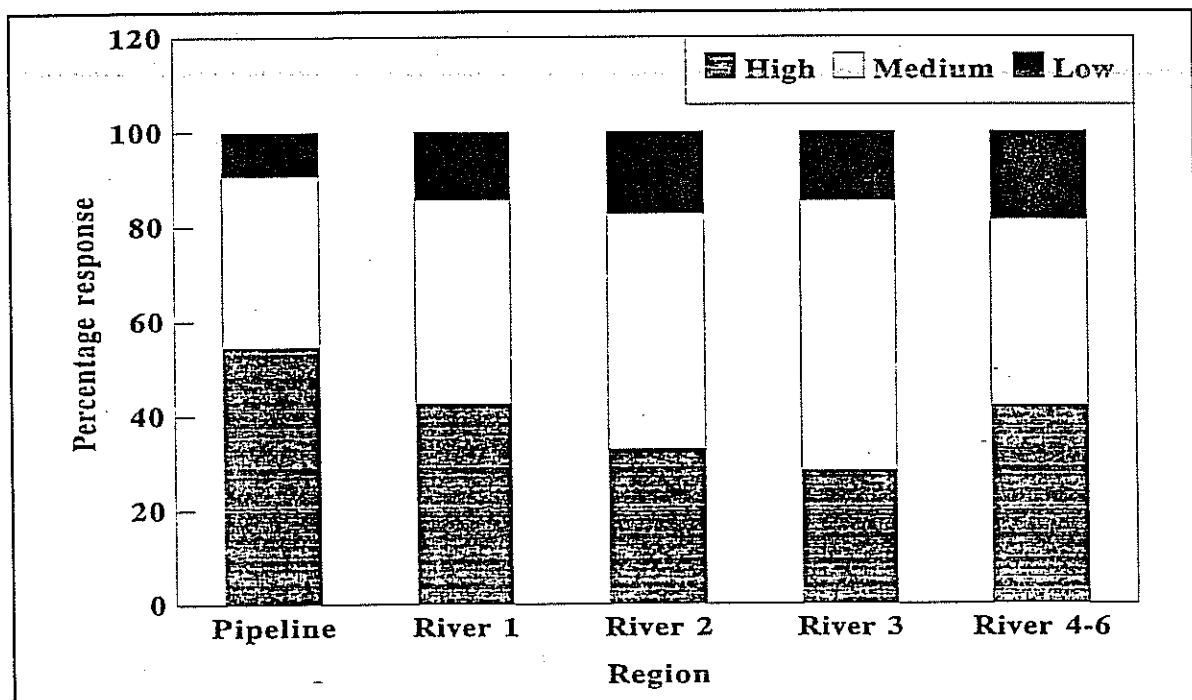


Figure 2.1: Level of co-operation shown to interviewers.

Level of co-operation was very low in comparison to all other surveys undertaken by SIAPAC in Namibia, likely reflecting concern about the proposed project. The low level of cooperation does not mean that the information obtained is not useful or reliable, rather it reflects that people adopted a fairly aggressive tone when answering questions.

2.3 Feedback consultative workshops

Three workshops were held in early 1997 to feedback IEE-SC findings and to solicit the opinions of participants. In addition, the *hompos* in the affected area were also consulted and asked for their opinions.

2.4 Summary

Field data collection comprised implementation of three activities: 1) rapid appraisal; 2) rapid quantitative questionnaire; and 3) qualitative instruments, followed by three feedback workshops. Field activities were carried out from late October until mid-December, while entry and validation took place from November to December. Analysis and report write-up took place from late December until early January, with final inputs into the natural environment reports in March.

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3. BACKGROUND INFORMATION ON OKAVANGO REGION AND WESTERN CAPRIVI REGION

3.1 Introduction

This chapter provides basic background information on Okavango Region, including the part of western Caprivi Region potentially affected by the proposed pipeline scheme. The aim is to provide information on the following issues: age and gender distribution; growth rate of local populations; existing services; employment and unemployment; and income distribution.

3.2 Basic demographic statistics

3.2.1 Population

According to the 1991 census (Central Statistical Office, 1993), the population of Okavango Region was 136,219, or 9.7% of the total Namibian population. This figure includes the potentially-affected area which is now part of Caprivi Region, extending north from the western border of Botswana to the western side of the Okavango River. Disaggregation of enumeration area data shows that, in 1991, of the Okavango Region population of 136,219 people, 110,802 lived in what is now Okavango Region (excluding western Caprivi). This would imply that 25,417 people lived in the affected area of western Caprivi (1991 figures)³.

Applying the national population growth rate of 3.1% per annum, the 1997 Okavango Region population (including western Caprivi) is projected to be over 150,000, of which approximately 30,000 live in the potentially affected areas of western Caprivi. The bulk of the population lives in the riverine area, with approximately 27.5% of the population living in the area east of Rundu to the Caprivi Region border (33,000+ people), including people living up to 10 kilometres away from the river⁴.

Including the expected 11,000 people in the pipeline route area, the projected directly affected population totals 74,000 people.

³ All census-related findings presented in this chapter include the potentially affected areas of western Caprivi.

⁴ Unfortunately, more precise estimates are impossible, as no maps have been prepared for the 1991 census data showing the distribution of population *within* each enumeration area.

3.2.2 *Population characteristics*

52.4% of the population are females, while 47.6% are males. 47.2% of the population is under the age of 15, while an additional 7.6% are 55 or older. The so-called economically active age group of the population therefore comprises 45.2% of the region's population.

Large family sizes and high dependency rates suggest that affordability, discussed earlier, is likely to be a greater problem in the pipeline area than the regional incomes and expenditures findings suggest (see section 3.3 below).

Female-headed households comprise 31.8% of the total number of households of Okavango Region. While high, it is nevertheless well below the national average of 39.9%, reflecting a lower male propensity for out-migration in Okavango Region than in the four Owambo regions. Female-headed households tended to have higher dependency ratios (that is, more undersixteens per adult).

37.8% of the population of those aged 10 and over in Okavango Region are classified as illiterate, with the figure lower for males (32%) compared to females (42.7%). 29.5% of the population has never attended school, reflecting the fact that younger people are more likely to be in school than their parents and grandparents at the time they were young.

3.2.3 *Economic status*

Of the population of economically active people in Okavango Region, which comprises 46.5% of the total population of the region, 85.8% are engaged in some economic activity (including own production farming), while 14.2% are unemployed and *actively* seeking work. However, of those engaged in economic activities, 76% of all females and 48% of all males are underemployed⁵.

3.2.4 *Health*

Regarding health characteristics, unfortunately detailed regional data are not available for Okavango Region. However, in 1992 the Ministry of Health and Social Services (MOHSS), in collaboration with the Central Statistical Office, carried out a Demographic and Health Survey which broke down survey data into four 'regions': northwest, northeast, central, and

⁵ Underemployment was defined by the Central Statistics Office (1996: 53) as follows: "A person is underemployed if he/she has some employment (at least one hour during the week) but is available for more work".

south. As Northeast comprised Caprivi Region and Okavango Region, the following findings cover both regions, despite some marked demographic differences between these regions.

3.2.4.1 Fertility

Median age at first birth was 19.7, the lowest in the nation. One-third (35.3%) of all teenage women are either pregnant or mothers, well about the national average of 21.5%. The mean number of children born to women aged 40-49 was 6.6, compared to a national average of 5.7. Findings show that women begin childbearing at a very young age, and have a large number of children. Contraceptive use is low, with only 21.5% of all currently married women having ever used a form of birth control. Spacing children is, however, quite good, at almost three years.

3.2.4.2 Mortality

Infant and underfive mortality are higher in the northeast than in any other part of the country. 83.6 of ever 1000 children born alive in the northeast die before their first birthday, compared to a national average of 61.5 per 1000. 135.4 of every 1000 children born alive die before their fifth birth in the northeast, well above the national average of 91.6/1000.

Health status in northeast health region is the poorest in the nation.

3.2.4.3 Morbidity

Acute respiratory infection rates are highest in northeast region, at 38.8% of all underfives, compared to a national average of 18%. Fever prevalence was twice the national average, at 61.7% compared to 34.2%. Prevalence of diarrhoea was also well above the national average, at 47.2% compared to 20.6%, although use of oral rehydration salts to treat diarrhoea was very high in the region.

Under-five vaccination rates are lowest in the northeast, with a full BCG/DPT/Polio/Measles vaccination rate of only 39.7%, compared to a national mean of 57.9%.

Incidences of sexually transmitted diseases, including AIDS, was highest in the northeast compared to all other regions (SIAPAC, 1995).

3.2.4.4 Maternal and child nutrition

The percent of underfives who were stunted (measuring long-term malnutrition) was 57.1% in the northeast, twice the national average of 28.4%, and higher than the national means for all other countries where data were available (Tanzania, Uganda, Nigeria, Zambia, Ghana, Zimbabwe, Cameroon).

3.2.5 Agriculture

3.2.5.1 Arable agriculture

A 1992 survey by the Namibian Institute of Social and Economic Development (Yaron, Janssen, and Maamberua, 1992) provided basic information on agriculture in Okavango Region. Mahangu (pearl millet) is the main crop, accounting for 74% of production, followed by maize (13%), sorghum (7%), beans (3%) and vegetables (3%), the latter two sometimes intercropped with the mahangu. Shortages of oxen and tractors for ploughing are common, while many households (particularly female-headed households) suffer from severe labour shortages.

According to Tapscott (DERU, 1994), the historical lack of extension services and the lack of attention to communal areas development has meant that agricultural systems have changed little in the past decades. This, coupled with a population increase of 140% from 1970 to 1991, has put increased pressure on prime agricultural land. Traditional slash-and-burn methods which historically replenished the soil have been abandoned as households stayed on the same land for years, and these have not been replaced by fertilisers. Investigations by Yaron, Janssen and Maamberua (1992) suggest that, while the soils are historically better near the river, these problems have resulted in reduced yields. Coupled with the lack of new land near the river for expansion, overall yields have decreased over time, making households in the river area more food insecure.

Summing up the situation, Issacson (1995: 118) noted that "The low productivity of the region is largely due to the fact that existing farming systems have not adapted to changing circumstances and are now considered highly unsuited to their present environment". Elsewhere the author notes (p117) that "Agricultural production in the Okavango is characterized by unadapted farming systems and declining agricultural productivity. Existing evidence indicates that agricultural output in the region is extremely low and seldom exceeds 400kg per hectare of pearl millet (mahangu) in a good year. This can fall to as little as 150kg per hectare in a poor year. This contrasts with the situation in neighbouring Zambia, where the rainfall patterns and soil regimes are similar, yet yields of 1000 to 1500kg per hectare are not uncommon."

Evidence from studies undertaken for the Trans-Capriivi Highway (see Tapscott, Solomon, van Rhyne and Botelle, 1993, and SIAPAC, 1996) show that households along the river have set up second fields near the new highway, particularly at t-junction intersections. However, labour-short households are disadvantaged in terms of their ability to access, and labour on, these new farms, while shortages of transport to and from the fields and an absence of water near the fields means that labour inputs are inadequate to significantly improve food security. Issacson (1995: 118) goes on to note that "with declining soil fertility, little or no technological innovation and limited resource input, households in recent years, have been compelled to clear and cultivate new lands to sustain existing levels of production".

Arable agricultural systems are, in short, ill-suited and perpetuate poverty (see discussions in incomes below).

3.2.5.2 Livestock

Livestock estimates for Okavango Region suggest that, as of 1996, there were approximately 110,000 head of cattle in the region, as well as 42,000 goats, while few sheep or donkeys are kept in the region; these figures do not account for drought losses, for which reliable estimates do not exist (see discussion in Devereux and Naeraa, 1993). Projecting from Yaron, Janssen, and Maamberua (1992), the pipeline area contains an estimated 5,500 cattle and 2,200 goats. Some 65% of all households in the region owned some cattle, with the median herd size at 13. Goats were owned by 43% of all households, with median herd sizes of 17. Livestock are traditionally watered and grazed along the river and floodplains, with tremendous pressure put on grasses near the river, particularly in dry years. Communities along the *omurambas* running north to south from the Okavango River rely on hand-dug wells and boreholes for water for livestock, with water tables apparently in part dependent on flooding from the river. For communities away from the river, there is a heavy reliance on boreholes for most of the year.

3.3 Household incomes and expenditures

In 1993/94 the Central Statistical Office undertook a nationwide Household Incomes and Expenditures Survey (HIES) (CSO, 1996). The aim was to keep detailed records on incomes and expenditures for a three month period for a set of households, giving detailed insights into affordability, wealth status, and economic vulnerability. As the survey grouped west Capriivi with Capriivi Region, findings below focus on both Okavango as well as Capriivi Regions.

3.3.1 Okavango and Caprivi Region findings

Overall median⁶ income is considered for the nation as a whole, as well as for Okavango and Caprivi Regions:

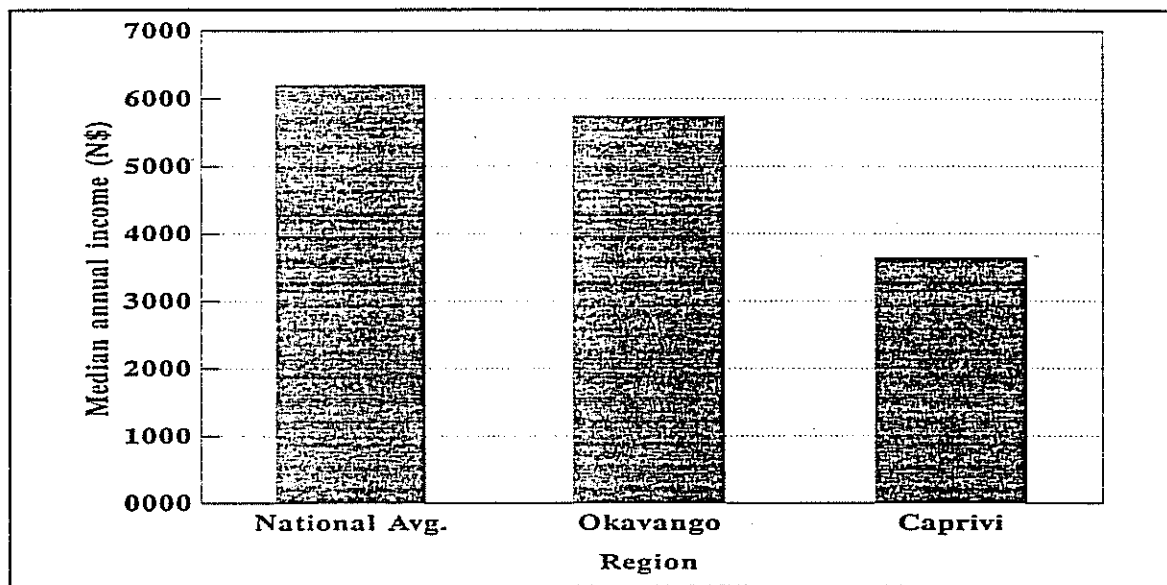


Figure 3.1: Median Income by Region (N\$ Per Annum).

Median income for the nation as a whole was N\$6,233 per annum, with Caprivi Region having the lowest figure in the nation (42.5% below the national average). Okavango Region, by contrast, was near the national average median income, falling approximately 10% below the national average. Mean household expenditure compared to mean income is indicated in Table 3.1.

Table 3.1: Income versus expenditure by region and differential.

Region	Mean Income (N\$)	Expenditure (N\$)	Differential	
			(N\$)	(%)
National Average	17 198	12 893	4 415	34.5
Okavango	8 944	7 537	1 407	18.7
Caprivi	7 248	5 479	1 769	32.3

⁶ Given high levels of inequality within many regions in Namibia, particularly in the central and southern regions, median figures are used instead of mean figures. The use of median figures reduces the impact of 'outliers', particularly high incomes, on the mean values.

Nationally, average household surplus is N\$4,415 per annum, or 34.5% of total income. This ranges from 71.7% for Karas Region to only 9% for Omusati Region and 5.4% for Ohangwena Region. While mean income is lower for Caprivi Region, the differential between income and expenditure is significantly lower for Okavango Region.

3.3.2 *Quartile Data*

The HIES survey allowed 'quartile' breakdowns of the income and expenditure data, dividing the population into categories ranging from the poorest households to the wealthiest households (moving progressively from Quartile 1 to Quartile 4, respectively). Households with a 'Standardised Consumption Level' (SCL) of N\$496.69 per month are considered to be poor, while those with an SCL of less than N\$248.35 are classified as very poor (SIDA, 1995). Using quartile data obtained from the Central Statistical Office, the average household in Okavango Region in Quartile 1 is classified as *very poor*, while the average household in Quartile 2 is classified as *poor*. Households in Quartiles 3 and 4 are classified as *not poor*. Therefore, **approximately half of all households in Okavango Region are defined by Government as poor to very poor.**

Additional data on the quartile basis for Okavango and Caprivi Regions are indicated in the following table. The table shows mean incomes, mean expenditure (consumption), and the annual and monthly differentials between incomes and expenditures by quartile:

Table 3.2: Quartile findings and income/consumption ratios.

Region	Income (N\$)	Consumption (N\$)	Differential (N\$)	
			Annual	Monthly
<i>Okavango</i>				
Quartile 1	2 302	2 246	56	4.67
Quartile 2	4 522	4 196	326	27.17
Quartile 3	7 424	6 720	704	58.67
Quartile 4	21 680	17 104	4 576	381.33
<i>Caprivi</i>				
Quartile 1	1 575	1 538	37	3.08
Quartile 2	3 286	2 632	654	54.50
Quartile 3	5 402	4 628	774	64.50
Quartile 4	18 935	13 259	5 676	473.00

Households in Quartile 1 in both regions, the poorest 25% of all households, had virtually no surplus income in either Okavango or Caprivi Regions, while the differential for households in Quartile 2 for Okavango Region was also quite small, at N\$326 per annum, or N\$27.17 per month.

3.3.3 Foodstuffs expenditures

A second indicator of poverty, the percentage of income spend on foodstuffs, suggests that households which spend over 60% of their income on foodstuffs are poor, while those who spend over 80% of the income on foodstuffs are extremely poor. The percent of households who spend 80-100% of their income on foodstuffs, as well as the percentage who spend 60-79% on foodstuffs, are indicated in the following table for all rural areas and for Okavango and Caprivi Regions:

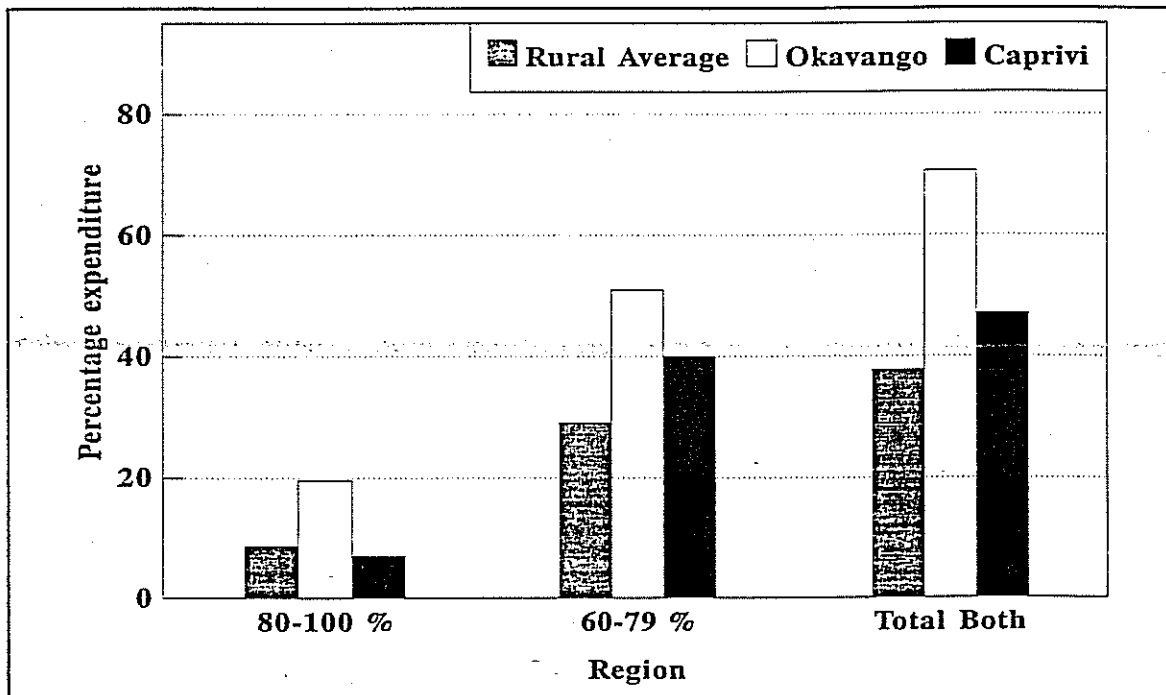


Figure 3.2: Percent expenditure on foodstuffs.

Findings show that households, particularly in Okavango Region, spend much of their total consumption on food, twice the national average, suggesting that some Quartile 3 households in the region should also be considered poor. Given that farming systems, soil types, etc. are similar in eastern Okavango Region and western Caprivi Region, it is likely

that the figures for the affected area in Caprivi Region approximate the figures for Okavango Region.

3.3.4 Affordability of piped and handpump water

More specifically relating findings to the proposed pipeline, the following table gives estimates of affordability by quartile group for two cost categories for pipeline water. The first cost category, N\$100 per annum per household, is based on an average per capita human consumption of 5.1 litres per day, at a cost of N\$6 per cubic metre. The second cost category, N\$32, is based on the current bulk water supply cost of N\$1.93 per cubic metre, with the same consumption levels.

In both cases, an expenditure of 5% of annual income on water is assumed to be affordable. For each of these two costs, affordability figures are also given for an assumed 10.2 litres per day level of consumption, and again given for households with an average of 10 head of livestock (using an average of 45 lcd), with all livestock using improved sources for 9 months per annum:

Table 3.3: Quartile income and affordability of two cost estimates for pipeline offtakes, assuming per capita consumption of 5.1 l/day & 10.2 l/day.

Quartile	Income (N\$)	% of income for 5.1 l/c/d - human consumption only		% of income for 10.2 l/c/d - human consumption only		% of income for 5.1 l/c/d and 10 head of cattle		% of income for 10.2 l/c/d and 10 head of cattle	
		N\$ 100	N\$ 32	N\$ 200	N\$ 64	N\$ 841	N\$ 238	N\$ 941	N\$ 270
Quartile 1	2 302	4.3	1.4	8.7	2.7	36.5	10.3	40.9	11.7
Quartile 2	4 522	2.2	0.7	4.4	1.4	18.6	5.3	20.8	6.0
Quartile 3	7 424	1.3	0.4	2.7	0.9	11.3	3.2	12.7	3.6
Quartile 4	21 680	0.5	0.1	0.9	0.3	3.9	1.1	4.3	1.2

Findings clearly show that pipeline offtake water costs of N\$6 per cubic metre are unaffordable to Quartile 1 households (assuming increased water use to 10.2 lcd), while at current levels of water use and for all other quartiles, N\$6 per cubic metre is affordable. However, assuming that households have an average of 10 head of cattle, and assuming that these livestock water from improved sources for 9 months of the year, water costs of N\$6 per cubic metre are unaffordable for the majority of households. Even at N\$1.93 per cubic metre (the current bulk water supply cost), costs are unaffordable for Quartile 1 and Quartile 2 households. Unless subsidised for the long term, affordability of pipeline water would therefore be a problem.

Doing the same calculations for boreholes equipped with handpumps (50-100 metres average depth), the costs for operations and maintenance are significantly reduced, as shown in the following table (Table 3.4).

Table 3.4: Quartile income and affordability of a single cost estimate for handpumps, assuming per capita consumption of 5.1 ℓ /day and 10.2 ℓ /day.

Quartile	Income (NS)	% of income for 5.1 ℓ /d - human consumption only	% of income for 10.2 ℓ /d - human consumption only	% of income for 5.1 ℓ /d and 10 head of cattle	% of income for 10.2 ℓ /d and 10 head of cattle
		25 ϵ	50 ϵ	NS 22.50	NS 23.00
Quartile 1	2 302	0.0	0.0	1.0	1.0
Quartile 2	4 522	0.0	0.0	0.5	0.5
Quartile 3	7 424	0.0	0.0	0.3	0.3
Quartile 4	21 580	0.0	0.0	0.1	0.1

Findings show that payment for handpump water (operations and maintenance only) would be affordable (and still would be, even in situations where the handpump costs increase due to borehole depth).

The figures for pipeline offtakes and handpumps are not entirely comparable, of course, because the Directorate of Rural Water Supply may choose to subsidise the costs to rural consumers, and also because the above figures for handpump water only cover operations and maintenance, while the figures for pipelines cover other costs incurred by bulk water supply. Nevertheless, as the following table shows, payment for handpump water which also cover 50% of capital costs (full capital costs are estimated at N\$2.40 per cubic metre) as well as operations and maintenance costs is more affordable than unsubsidised water.

Table 3.5: Quartile income and affordability of operations and maintenance full coverage and 50% capital recovery for handpumps, assuming per capita consumption of 5.1 ℓ /day and 10.2 ℓ /day.

Quartile	Income (NS)	% of income for 5.1 ℓ /d - human consumption only	% of income for 10.2 ℓ /d - human consumption only	% of income for 5.1 ℓ /d and 10 head of cattle	% of income for 10.2 ℓ /d and 10 head of cattle
		NS 2.46	NS 4.92	NS 224.81	NS 227.27
Quartile 1	2 302	1.1	2.2	10.0	10.0
Quartile 2	4 522	0.5	1.0	5.0	5.0
Quartile 3	7 424	0.0	0.1	3.0	3.1
Quartile 4	21 580	0.0	0.0	1.0	1.0

Livestock use of improved sources remains unaffordable for Quartile 1 and Quartile 2 households, regardless of technology, if partial cost recovery is assumed. However, this is

marginal for Quartile 2 households, while livestock numbers would be low, and a subsidy likely applied, for Quartile 1 households.

Overall, therefore, unless there is an intention of subsidising pipeline water to keep costs below the value of NS1.93 per cubic metre, affordability will be a clear problem in the pipeline area for pipeline offtakes.

3.3.5 Windhoek findings

As per point 14 listed as part of the TOR in Chapter 1, limited incomes and expenditures data are included for Windhoek.

According to a 1995 survey (TRP Associates, 1996), the 1995 Windhoek population is 181,696. This represents an annual growth rate of 5.44% from 1992. The same report projects Windhoek's population to grow to 250,000 by the year 2001, rising to 667,410 by the year 2020. Given strong social and economic stratification coinciding with location, findings are given for Katutura and Windhoek city separately.

Table 3.6: Median income for Windhoek.

Region	Median Income (NS) Per Annum	Deviation from National Average
National Average	6,233	
Katutura	24,553	4 times national avg
Windhoek City	92,027	15 times national avg.

Average income in Katutura, at NS24,553, is four times the national average, while average income in Windhoek is 15 times the national average income. Findings suggest that affordability, overall, is not problematic in either Katutura and Windhoek. It should be noted, however, that significant squatter areas exist in Katutura which were not disaggregated from the Katutura data. Affordability may therefore be problematic for elements of the Katutura population, highlighting the need to carefully monitor block tariff structures and levels.

3.3.6 Human development index

As a measure of economic status and overall well-being, the United Nations prepared a composite Human Development Index (HDI) (UNDP, 1996). The HDI is composed of

three basic measures: longevity (health), knowledge (education), and acceptable living standards (income). Namibia's overall HDI rating is .734 on a scale range from 0 to 1. However, Okavango Region is worse off than all other regions in Namibia except for Oshana, with Okavango having an HDI ranking well below the national average, at .526. Regarding the composite element of the HDI, Okavango Region has the second lowest life expectancy (57.3 years, compared to a Namibian average of 61 years), literacy is 55% (compared to a Namibian average of 66%), school enrollment approximates the national average (82% for Okavango Region compared to a national average of 83%), while incomes were discussed above.

3.4 Current Water Supply

In 1996 SIAPAC undertook a survey of water use and willingness to contribute for water on behalf of the Department of Water Affairs⁷. Findings from this survey are included here to establish patterns of water use for Okavango Region⁸. Summary findings regarding the current water supply situation are indicated in **Table 3.9**.

90% of the respondents are within Government's stated limit of 2.5 kilometres from their primary water source for human consumption during the wet and dry seasons. Over half of all households in the region use the Okavango River as the main source for human consumption, suggesting that, while people were within the current distance as set by the draft water and sanitation policy, they were using water from unimproved sources. Most of those relying on the river did not have water supply problems, and were largely satisfied with the river as a source of water for human and livestock consumption. Despite this, however, per capita water use is only one-third of what it should be for health and well-being, suggesting that distance, access and lack of time are likely contributing factors.

Whether or not offtakes are provided via the pipeline, Government policy is that people will pay for improved rural water supplies. As part of the DRWS survey (SIAPAC, 1996), therefore, a number of questions were asked regarding willingness to manage rural water supplies, and willingness to pay for water. Findings are indicated in the following figure:

⁷ Because a single sample was pulled for the entire Okavango Region, no sub-analysis by location is possible.

⁸ The Directorate of Rural Water Supply administers the potentially affected area in western Caprivi as part of Okavango Region. For this reason, Okavango Region findings include western Caprivi.

Table 3.7: Current water supply status: Okavango Region.

Water Supply Situation	%
<i>Distance to primary water source: human health consumption - wet season</i>	
Within 400 metres	44.4
Within 1 kilometre	79.8
Within 2.5 kilometres	90.7
<i>Distance to primary water source: human consumption - dry season</i>	
Within 400 metres	44.2
Within 1 kilometre	79.8
Within 2.5 kilometres	90.7
% of households in Okavango Region with the river as their primary water source	58.9
Mean per capita water use per day	7.4 litres
Median per capita water use per day	5.1 litres
Required levels of per capita water use per day for health and well-being	15-25 litres
Human use versus livestock use (livestock : human ratio)	15 : 1
% of households having suffered from water problem in the past 3 months	22.4
% of households commonly suffering from dry season water problems	59.6
<i>Overall level of satisfaction with water supply for human consumption</i>	
Good	64.6
Okay	17.2
Poor	18.2

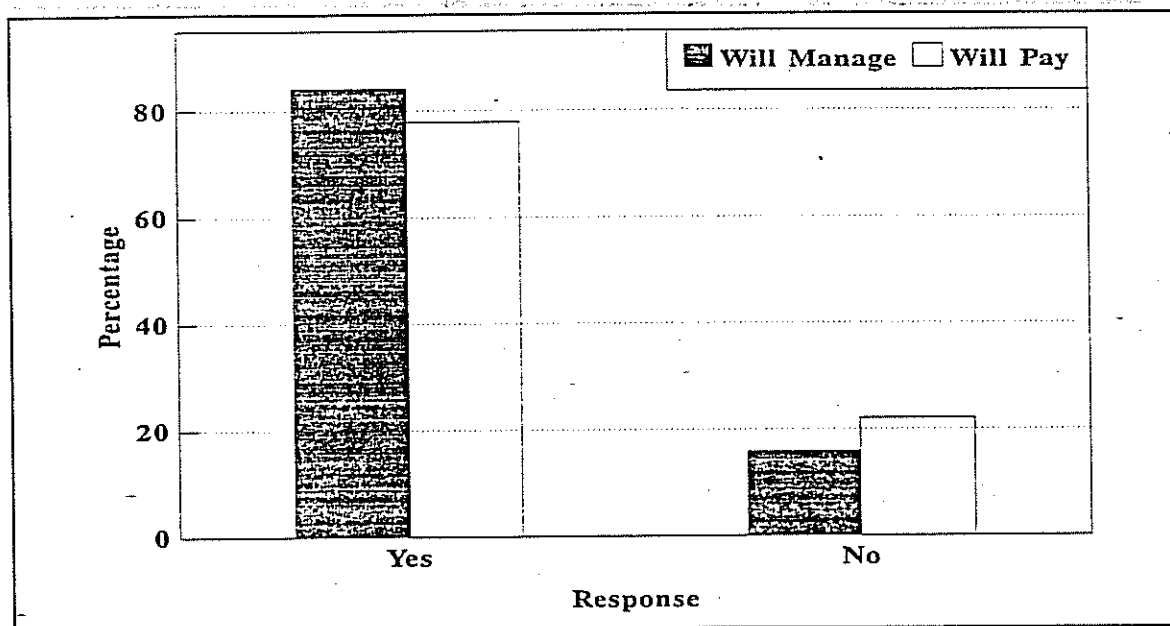


Figure 3.3: Willingness to manage and contribute for water in Okavango Region.

According to survey findings, the majority of respondents in the region are willing to manage, and pay for, improved water supplies. It is interesting to note, however, that the IEE-SC survey found that community leaders were more concerned about payment for water than surveyed households; this was confirmed in discussions held with traditional leaders during the rapid appraisal.

3.5 Social organization

A survey was carried out in 1992 in Okavango Region by the Social Sciences Division of the University of Namibia (Yaron, Janssen and Maamberua, 1992). The book gives a brief overview of social organisation in the region, highlighting the fact that five 'major' ethnic groups exist in the region: Mbunza, living in the area from Rundu southeast (including most of the proposed pipeline route), Kwangali, living west of Rundu (and also including areas near the southern border both east and west of the tar road), Shambyu, living just to the east of the Mbunza (east of Rundu), the Gciriku, to the east of the Shambyu, and the Mbukushu, in west Caprivi. These groups are shown in the following map (Yaron, Janssen and Maamberua, 1992: 4):

A 'social map' drawn by the SIAPAC field team further notes that, in the area to east of the tar road along the cordon fence (the southern border of Okavango Region), a number of ethnic groups exist, most commonly the Nyemba. Further, the map suggests rigid boundaries, although the field team, as well as Yaron, Janssen and Maamberua (1992), note that the various ethnic groups are engaged in a variety of informal and formal exchanges (cultural and economic) that have, over time, led to mixed settlement and inter-marriage, cultural similarities, and a common language of communication (Rukwangali). In addition, many people in the region speak more than one of the region's five major languages.

According to Yaron, Janssen and Maamberua (1992: 21), "The traditional leader of each tribal sub-region, the chief ('Hompa'), is elected from within the royal family of the sub-region, where royal descent is matrilineal ... The position of Hompa can be held for life but a challenge to the incumbent can be made if a significant proportion of the local community demand it". "In making judgments concerning traditional matters, the Hompa is assisted by a council of advisors who are generally elected by the community but, occasionally, may be appointed."

Underneath the Hompa are a series of Senior Headmen (or, in some cases, headwomen) known as *Nkuru Timbi*. Underneath the Senior Headmen are the village headmen (*Timbi*). The *Timbi* is usually assisted by a council of elders who act as advisors. These structures are similar to the *Induna* system present in eastern Caprivi, and, like the system in Caprivi, remain fairly resilient.

Not surprisingly, and also consistent with many other traditional authority structures in Namibia, women are generally under-represented, despite the presence now and again of female Hompas and Headwomen. Most advisors serving at the various levels are men as well. *Consultative structures which rely only on traditional authorities, therefore, lack the necessary broad range of contacts necessary for any development activities or infrastructural interventions.*

Local-level key informants were asked a series of questions about traditional authority structures and how resource utilisation is controlled in their area. In the **pipeline area**, local-level key informants suggested that traditional authority structures were sufficiently resilient to handle key disputes, and further argued that outsiders accessing grazing in areas under the control of the local headman had to follow proper protocols, or they would be taken before the headman and his advisors for consideration of the case. This held true regardless of the ethnicity of the person moving in. Where disputes are not settled locally, communities take cases to the police and court system. Not all communities in the pipeline area reported in-migration from different ethnic groups. When outsiders did come in, both focus groups noted that their headman required a letter from the Mbunza hompa stating that permission had been granted for them to stay in the area. It was then up to the headman and his advisors to decide whether they could accommodate the newcomer.

Regarding livestock damage to crops, normally the matter is resolved by the two parties involved. However, if the damage is serious, or if no settlement can be reached, the problem is normally settled by the local headman and his advisors. Livestock theft, reported to be a serious problem in the area, is taken directly to the traditional authorities and advisors, and is then taken upwards to the tribal court, normally headed by the Chief of Senior Headman. However, if the matter cannot be resolved at the tribal court, because one party does not respect the judgment of the court, the matter is referred to the Government's court system.

In the **riverine area**, local level key informant interview findings across strata suggest that traditional authorities also control access to land for arable agriculture, although there appears to be far less control exercised over grazing land for livestock in all but River 4. In addition, in River 2, local level key informants stated that traditional authorities in their area had problems enforcing decisions made; this was not the case for the other river strata. In the River 1 strata, local level key informants mentioned that disputes often arose regarding livestock damage to fields. Respondents in River 2 strata noted that livestock were allowed to graze wherever there was water.

In River 1, local level key informants noted that there was extensive in-migration into their area, while this was apparently less common in River 2, River 3, and River 4.

3.6 Summary

Approximately 74,000 people could be directly affected by the project. Affected populations are significantly poorer than the average Namibia, with at least half considered poor or very poor, while overall health status was the worst in the nation. Agricultural systems are ill-suited to current demands, while grazing quality for livestock is extremely poor.

Okavango Region is comprised of five main ethnic groups which, while maintaining differences, nevertheless show signs of strong social and economic interaction, and are linked by a common *lingua franca*, Rukwangali. In the pipeline area, traditional authority structures appear to be sufficiently resilient to accommodate in-migration although, based on findings in Chapter 4, the scope for in-migration under the project may undermine these structures.

Along the pipeline route, affordability of pipeline water depends on Government decisions about subsidy levels. In all cases, pipeline water is more expensive than handpump water, suggesting that, if conditions are suitable, handpump water may be a preferred option.

Regionally, the existence of the Okavango River means that many households have reliable water supplies for human and livestock consumption. Rates of water consumption can be estimated at 8-12 litres per person per day and 35-45 litres per large livestock unit per day, and 12-20 litres per small livestock unit per day. Using these estimates, and assuming that the entire population (74,000 souls) to obtain all their water directly from the Okavango River, total water consumption by populations along the Okavango River could amount to:

Component	Number	Consumption Rate (ℓ/day)	Total Consumption (ℓ/day)
People	74,000	8-12; Average = 10	740,000
Cattle	110,000	35-45; Average = 40	4,400,000
Goats	42,000	12-20; Average = 16	672,000
TOTAL DAILY CONSUMPTION :			5,812,000

Thus water consumption by communities living along the Okavango River could amount to 5,812 m³/day or 2,121,380 m³/year when water consumption by livestock is included in the calculation. This is approximately equivalent to 40 % of the water consumed by formal communities or organizations located along the Okavango River.

4. RIVERINE AREAS

4.1 Introduction

The findings in this chapter are based on the quantitative and qualitative work undertaken in four strata along the river. River Strata 1 comprised the area along the river from Rundu to the Omatako Omuramba. River Strata 2 comprised the area from the Omatako Omuramba to the confluence of the Okavango and Cuito Rivers. River Strata 3 comprised the area from the confluence towards the end of the Angolan border, and River Strata 4 comprised the area from a point west of the end of the Angolan Border to the border with the Mahango Game Reserve. These strata were based on ecological criteria established by the natural environment team; no 'social' variation was anticipated, and therefore did not form one of the criteria in establishing the strata. All findings are therefore presented by each strata.

A total of 600 quantitative questionnaires were administered, while four focus group discussions were held, and twelve local level key informant interviews conducted.

4.2 Demographic background information

Between 26% and 28% of all households in the riverine strata were headed by females, with the remaining three-quarters headed by males. This is consistent with findings from other northern communal areas (although lower than the Cuvelai, and lower than the pipeline area), reflecting out-migration of males to seek employment. Household heads were largely engaged in subsistence agriculture in all four strata (Strata 1: 45.8%; Strata 2: 44.6%; Strata 3: 41.6%; and Strata 4: 47.7%), while one-third were employed (Strata 1: 33.3%; Strata 2: 37.8%; Strata 3: 35.6%; and Strata 4: 30.9%), while self-employment was rare (ranging from 2.7 to 4.7%), and much lower than the pipeline area. In many cases across strata, households with employed household heads also had other household members in employment. Findings were also consistent for subsistence agriculture and 'staying at home'. As with the pipeline strata, the findings suggest that the distribution of cash income is likely to be unequally distributed across households.

Household characteristics are given in Table 4.1.

Average household size was high for all four strata, while households also displayed high dependency ratios, with children 16 and younger comprising between 58% and 62% of the population.

Table 4.1: Demographic characteristics of the riverine strata.

Strata	# of People	Average Household Size	% Over 16	% 16 and Under
Strata 1	1520	9.9	38.0	62.0
Strata 2	1516	10.2	37.7	62.3
Strata 3	1452	9.7	42.1	57.9
Strata 4	1652	11.0	39.8	60.2

Community action groups were fairly common in the four riverine strata, ranging from 74.5% for Strata 3 and Strata 4, and 75.1% for Strata 2 and 64.5% for Strata 1. Church groups were the most common, as well as school committees and social groupings; according to local level key informants, waterpoint committees were less common, due to reliance on the river. Overall, findings suggest that social organisation via committees is fairly well established in the area.

4.3 Knowledge of, and attitudes about, the proposed scheme

4.3.1 Initial Attitudes

Respondents were asked whether they had heard about the proposed scheme and, if so, what they had heard and what they felt about it. Knowledge of the proposal scheme was very high in all four riverine strata, ranging from 87.6% in Strata 1, to 73.8% in Strata 2 and Strata 3, and 74.7% in Strata 4. Between 86.7% and 95.5% of the respondents had heard that "Windhoek would receive the water", while up to 45% had heard that "a pipeline would be built", with those closer to Rundu being consistently more aware than those farther to the east.

Many respondents stated that they had heard that the river would run dry due to the project, with those closer to Rundu being more likely to have heard this (Strata 1: 69.4%, Strata 2 55.5%; Strata 3 45%; and Strata 4 31%), one-third (Strata 1: 36.6%, Strata 2 23.6%; Strata 3 32.4%; and Strata 4 38.1%) heard that "all water would be taken from the river", while one-fifth (Strata 1: 20.1%, Strata 2 17.3%; Strata 3 16.2%; and Strata 4 22.1%) heard that "Government will take our water". Clearly, people had heard a number of rumours about the project via others, reflected in the 'attitudes' stated in response to a question about what they had heard, with those nearest to Rundu the most likely to have heard.

When asked specifically what they thought of the proposed scheme, over 90% had an opinion. Responses are indicated in the following table:

Table 4.2: Attitudes towards the proposed scheme.

Response	Strata 1	Strata 2	Strata 3	Strata 4
Our river would run dry	88.1	78.4	80.4	77.0
Our lives would be negatively affected	70.1	49.5	54.5	61.9
I do not want the scheme at all	57.5	62.2	65.2	62.8
No right to take our river	41.0	31.5	45.5	30.1
Government is only developing Windhoek	40.3	24.3	19.6	11.5
If water provided, will reduce overgrazing at river	23.1	23.4	23.2	8.0
We must have improved water	3.7	3.6	1.8	0.9
Its everyone's water	4.5	6.3	1.8	3.5

As with the pipeline interviews, households were quite concerned about the proposed scheme. Up to 90% felt that the river would run dry, and up to two-thirds stated their disagreement with the proposed scheme. Of interest, one-quarter of riverine respondents had apparently heard that *water would be provided for them*, which they felt would reduce the serious problem of overgrazing at the river. If water were indeed provided, there would likely be a propensity to establish more permanent structures in the area (assuming that the pipeline extension continued east from Rundu).

Local level key informants were also quite concerned about the impact of the scheme on the river. Noting that they had heard from the radio (and, in some cases, from political and traditional authorities as well), key informants repeated their concerns about the river drying up, and noted a number of problems arising from the current low level of the river, including lowered fish numbers, poor grass quality, and inadequate levels of other natural resources. One key informant felt that one reason for the river being so low was the agricultural projects along the river. None of the key informants expressed support for the scheme.

As with the pipeline respondents, riverine respondents were clearly against the project, and were worried that it would negatively affect them.

In many cases, Local Level Key Informants (Table 4.3) and Focus Groups (Table 4.4) had closing comments about the project.

Table 4.3: Closing comments: Local Level Key Informants.

River 1 - "I'm begging the Government to do us a favour and leave our river along to flow like it did in the past".
River 1 - "We don't want the people of Windhoek to suffer, we want to help them, but the problem is that the river is too low. Government can go to Walvis Bay and put pipes from the sea to Windhoek because the sea is deep and will not dry up".
River 1 - "I oppose the pipeline scheme. Don't want water to be taken from the Kavango River. Should go and take water from Kunene because the Kunene is very deep, not like the Kavango River. If the scheme starts, then Kavangos will be killed because they will be without water".
River 2 - "Instead of the Kavango River, water must be taken from Otjikoto Lake or the Kunene River".
River 2 - "Its a good idea but its a problem to Kavango residents in the future. If the river will dry up then we don't know where they will find water to drink and for livestock use. It's very difficult to take water from the river while its already at a low flow. Another idea for the Government is to take sea water because the sea is bigger and will not dry up. The river is low because of the rain and because of agricultural projects in the region".
River 3 - "This issue will bring confusion between us and the communities in the central area if we refused this idea".
River 4 - "Government has to consider the views of the people about the scheme. We care about the problem but the river is at a low flow".
River 4 - "We are rejecting the scheme".
River 4 - "What will happen if the Kavango people refuse to give permission ?"
River 4 - "Botswana doesn't accept this plan. I heard it through Botswana radio".

Table 4.4: Closing comments: Focus Groups.

"The low flow has already affected the fish catch. We cannot get enough fish even now. Our children will not be able to see fish because the river will dry up".
"Birds are also already scarce nowadays".
"We do not see hippo as often as usual".
"The proposed pipeline will have a detrimental effect on all the creatures dependent on the river, including the plants".
"The fish supply, plants in the river used for food, and the water supply to the community will be negatively affected".
"Many agricultural projects are using the river now. They are also taking a lot of water. The scheme will have a negative impact on these projects in our area".
"There will be no more floodplain farming".
"Grazing will disappear".
"There is no conclusive proof that the river will not dry up. By looking at time through the ages, this river is in the state of going dry. Rainfall is no longer promising. Therefore, nobody is in the position to guarantee that the river will not go dry".
"We expect that the Government will consider the views of our community, as was mentioned in the introduction to this discussion, especially considering the current low flow of the river".
"This river is indispensable to our survival. Therefore we will only discourage the Government, and kindly request them to refrain from this idea".
"The Government should scrutinize this proposed plan very carefully before implementing it".
"Why can't Government find some other sources of water like the sea or the Kunene River ?"
"Frankly speaking, this proposed scheme will have a detrimental effect on all communities living along the river. This includes the communities in all the nations sharing the river – Namibia, Angola and Botswana".
"We are all against this proposed scheme".
"Everything will be affected. Even our own lives are in danger. Government must abandon this idea".
"We are on the brink of disaster. We are already devoid of development and progress. If the Government is persistent in implementing this proposed scheme, then we are doomed".
"If one observes nature and its environmental changes through the passing years until the present, the decline of good rains, deforestation, fast evaporation of water from the pans, pools, and the river as a result of extremely high temperatures has all culminated in this devastating drought situation. This pipeline scheme is then leaving us with not little, but no hope or optimism".
"Is the Government's policy of protecting and preserving our natural resources not applicable in the content of the Okavango River and its various living species ?"

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Table 4.4 (Continued).

"We condemn this idea in vehement terms! Not because we are prejudiced against our brothers and sisters in Windhoek and the central parts of Namibia, but because water cannot be taken from the Okavango River as we depend on it and this would be very problematic, especially at this juncture when the water is flowing at its lowest every recorded in history".
"Government must refrain from this notion and drill more boreholes in Windhoek and central areas, or consider getting water from the Kunene. We sympathise with the people in central Namibia, however, we nor our children unfortunately cannot opt for any alternative exchange or compensation in our struggle for existence at the margin of subsistence".
"The river is our life. If the river should dry up then we will die".
"We are thankful for the Government sending people to ask us as people living near the river. We thought that Government would just proceed with its plan without asking us if we agree or not. What if our water also dries up? Does the Government want us to die of thirst and people in Windhoek to survive?"

4.3.1.1 Workshop findings

At Kayengona, a workshop was held including people living up to 80 kilometres east of Rundu along the river. The workshop was attended by 18 men (2 younger, 16 older) and 6 women (3 younger and 3 older). Respondents re-stated their opposition to the scheme 'with very strong emotions'. Respondents noted that fish were very important to their households for both consumption and income from sales, and with the river affected by the pipeline, they would seriously suffer. They also expressed concerns that they would lose their reeds and thatching grass, and the cattle would suffer because grazing areas would worsen. Other strong comments included 'this Government is just like the previous Government, because they always try to destroy the Kavango people'. They asked why we held consultations when 'we know that people do not want this and have refused the project at previous meetings', concluding that 'a stand by the Kavango people has been taken. This project is out of favour everywhere in Kavango'.

Of interest, the workshop included people from the Mbunza area, people who also generally inhabit the proposed pipeline route area. They noted that 'Government has refused to provide the inland areas with water, and now they want to take our water and send it to Windhoek', and further added that 'even if Government tried to provide the inland with water, we will still not support the pipeline idea'.

In the meeting with the *homp*a and one of his advisors west of Rundu, SIAPAC asked for feedback on the social findings. When the issue of waterpoints in the pipeline area was discussed, the participants wanted to know why water had not been provided to the area before, 'now we are being bribed with water'. The respondents also felt that water in the pipeline area would indeed attract in-migration, which would make it difficult for the headmen to accommodate them. When asked how we should continue contact, the respondents concluded 'we don't want to hear from anyone, otherwise they will think we agree with the project. Don't come, we don't have any head to hear'. Prior to the first riverine workshop, meetings were held with three other *homp*as as well. In one meeting,

the *homba* raised concerns about existing offtakes and what effect this had on the river, but still strongly felt that the study should be allowed to proceed, because it might be shown to have no impact. He indicated a willingness to participate in future consultations, sympathised with the fact that people in Windhoek needed water, and concluded that the pipeline connection to the Cuito should also be investigated. The second *homba* said that she was told by the environmental team that the river would not dry up due to the project, and she believed them. 'We cannot let Windhoek suffer from thirst'. When asked whether the project would affect poverty, she asked 'how would the river affect this?' 'Now, we need to hear from the environmentalists, they should be clear and honest with us. If they are, people will believe them'. Finally, the third *homba*, near Divindu, asked if the final decision had already been made and, if so, will it be imposed ?

At a workshop held in the far east (Mukwe), where the Okavango River turns south and crosses into Botswana, included 5 female and 28 male participants (3 younger women, 2 older women, 7 younger men, 21 older men). Despite the comparatively high flow of the river in the area (compared to the river before the Cuito confluence), responses were similar to those for the previous workshop. Respondents were concerned at the low level of flow of the river, and the serious problems which would arise if the river dried up. They felt that the river belonged to people in the area, not to Windhoek. They later said that 'their lives depend on the river and why does Government want to kill the few and have more come to Windhoek. Why is the Government considering them as animals and not human beings. We have experienced the dramatic effects the agricultural projects have on the river, so this is one reason for our disapproval'.

On a more direct note, some of the participants expressed 'concern about the field workers getting killed or injured while we come over and over and over again trying to convince them to give away their water, which they will never give away'. They wanted to meet the person who had made the decision to go ahead with the scheme, and did not want to see the researchers again. They had heard rumours that 'some people had agreed to the scheme, but this is not the case'. Emotions ran high, with people saying 'we have had enough of this nonsense', so the workshop was closed early.

4.3.2 Attitudinal statement responses

To secure additional information about attitudes towards the scheme and its implications, and to allow the inclusion of additional questions in a rapid quantitative questionnaire, a number of attitudinal questions were added to the Rapid Quantitative Questionnaire. Findings are indicated in the following table (Table 4.4):

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Table 4.5: Attitudinal statements regarding the proposed scheme: percent in agreement with the statement.

Response	Strata 1	Strata 2	Strata 3	Strata 4
"If water is drawn from the river, some areas will dry up, affecting people living in these areas"	84.8	99.3	95.9	95.3
"If the pipeline is built, the river will dry up completely"	86.0	97.2	94.6	94.0
"The river is already very low, so getting lower will not affect it much"	11.3	32.2	34.8	20.0
"If the pipeline is built, we will lose our fish"	70.7	96.4	95.1	92.6
"Okavango Region would benefit from the project because we would get jobs"	22.9	12.3	18.3	30.2
"If the pipeline is built, our wildlife would be disturbed" (only asked to Strata 4)	na	na	na	76.2

Findings are consistent with initial comments made about the proposed scheme. There are clear concerns about the project, although of interest those in the strata closest to Rundu were less likely to agree that the project would harm them; the level was still, however, high. Of interest, fewer than one-third of the respondents foresaw any employment benefits for Okavango Region (22.9% for Strata 1, 12.3% for Strata 2, 18.3% for Strata 3, and 30.2% for Strata 4, responding to the statement "Okavango Region would benefit from the project because we would get jobs").

Local level key informants noted that, in addition to the river itself drying up, resulting in the loss of fish, birds and river animals, there would be a loss of reeds, grazing, and veld products for own consumption, sale and curio production.

Focus groups were asked about the potential impact of the project if there was only a small decrease in water levels. One group stated that "we do not trust that the Government will only draw a little water", while another group argued that even a small decrease would cause the river to dry up and "we will die". When asked whether only dry season offtakes would be better, two of the four groups stated that Government will take water during both the wet and dry seasons, noting that "if they start in one season, they will just carry on taking". One focus group refused to answer the question (nor the questions which followed), just saying "NO PIPELINE! It will be really inhumane if the Government proceeds with this plan".

4.3.3 *Perceived local impact of the proposed scheme*

The riverine focus groups mentioned a number of natural resources that were already negatively affected by the river's low flow, and would be further affected by any additional offtakes. These included a variety of trees, plants such as *Phragmites australis* reeds, *ndjwiya* (used for traditional beer), *namayara* (the leaves are used), and *mbare* palms (*Hyphaene petersiana*), used for basketmaking. More generally, the groups noted that "all the plants with roots and fruit that we eat will be affected ... all the plants which grow in the river and on the riverbank will be affected by any additional water offtakes as the low flow has already affected many of them". Focus groups also noted that animals, such as hippos, as well as fish, *muuma*, and *nijenda* are "already gone far from the places where they used to be". They also noted that many of the birds living near the river had already migrated and would be further negatively affected.

One focus group described the importance of the hippo to their culture. It is customary, they said, to sacrifice a hippo annually for the chief "to show our honor and respect to him". The chief must eat the meat of the hippo. Right now the hippos are migrating due to the low flow. "If more water is extracted the river will become dry and these animals will no longer be available".

Another group mentioned that "fishing is the backbone of our economic sustainability". Although they used to rely on arable farming, inconsistent rainfall has led to less than expected harvests. "What will Government do if this river dries up?"

4.4 **Riverine-specific findings**

A number of questions on the Rapid Quantitative Questionnaire were specific to the riverine environment. Questions ranged from use of the river to questions of specific interest to the natural environment team.

4.4.1 *Use of the river*

Respondents were asked to indicate dry season use of the river for the following:

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Table 4.6: Use of the Okavango River.

Usage	Strata 1	Strata 2	Strata 3	Strata 4
<i>Household Use</i>				
Collecting water for a garden	31.4	34.9	34.2	36.7
Obtaining drinking water	86.8	89.3	85.9	84.7
Obtaining household water for non-drinking uses	85.0	89.3	85.2	84.7
Livestock watering	74.5	88.6	80.5	76.7
Mud for home use	54.2	62.4	62.4	76.0
Collecting thatching grass for home use	83.6	87.9	86.6	77.2
Collecting edible plants for home use	57.5	63.1	73.2	63.8
Collecting plants for medicine	46.7	57.7	66.2	59.3
Fishing for home use	78.9	91.9	85.2	76.7
Collecting sand for house-building	38.6	43.9	38.9	53.7
Transport up/down/across the river	65.8	83.9	62.4	65.8
Collect worms/snails for fish bait	68.6	88.6	75.8	65.8
Harvest crabs for household use	17.8	15.4	15.4	7.4
Swim	85.6	96.0	84.6	82.7
Washing clothes	85.0	89.2	83.9	84.5
Personal bathing	85.0	90.5	85.2	84.5
Soaking wood for carvings	28.1	48.6	39.6	40.5
Collecting shells for necklaces	18.3	30.6	18.8	20.3
Collecting stones for decoration	18.3	23.8	17.6	18.2
<i>Enterprise Use</i>				
Collecting thatching grass for sale	54.9	49.0	63.8	56.0
Collecting reeds for sale	56.9	52.7	65.1	56.0
Collecting edible plants for sale	37.9	42.6	48.3	37.3
Fishing for sale	63.2	68.5	67.1	50.3
Collecting water for brewing beer	59.2	67.1	58.4	67.3
Collecting water for making bricks	28.8	43.6	32.9	42.7
Harvest crabs for sale	23.5	17.4	15.4	8.0

The table clearly shows the multiple dry season uses of the river, both for home use, and for earning in-kind or in-cash income (usually on an irregular basis). Regarding household uses, the river clearly serves a variety of functions in the home, including accessing drinking and other use water⁹, for watering livestock, and for collecting a variety of natural resources for home use (e.g., mud, thatching grass, fish, worms, etc.). In many cases, the river also served to bring in much needed income through sales of thatching grass, reeds, edible plants, crabs or fish, as well as for collecting water for brewing beer and making bricks.

⁹ In this respect, the earlier finding that a number of households expected improved water supplies if the project went ahead is not too surprising.

Grazing was uniformly reported to be very poor in the riverine area.

Local level key informants complained that fishing was terrible, and molapo farms had dried up. They also reported that river plants were no longer present, including reeds. One key informant noted that the low level of the river meant that households had trouble reaching the water. Some households shifted to temporary pans after seasonal rains because of distance and access difficulty of the river. Many reported an increased reliance on purchased food.

Focus groups were asked about how their households and communities coped with drought, especially regarding consequent reductions in food supplies. Three of the four groups (the fourth group refused to answer the last set of questions, following the discussion on potential project impacts) noted that they collected and relied heavily on two plants from the bush during drought years: *ntimba* fruits (*Dialium engelaranum*) and *maroro*. Two groups mentioned that they got food from Government (drought relief feeding). Two groups increased veld harvesting. Two groups said they ate less food, sometimes down to only one meal a day. One group noted that people used to cultivate their own lands, but now they are dependent on irrigated small-scale agriculture. The river played a particularly important role, with two groups noting that they collected and relied on *ncaba*, *nakakore*, and *namayara* from the river, while fish was particularly important.

4.4.1.1 Quantities of water used for irrigation

Households involved in small-scale irrigation were asked to estimate the amount of water collected from the river in the previous 24 hours¹⁰. For Strata 1, the median amount used was 200 litres in the previous 24 hours. For Strata 2, the median amount used was 180 litres. For Strata 3, median use was 220 litres, while for Strata 4, median use was much lower, at 80 litres.

Projecting from the number of user households in the samples, Strata 1 households used a total of 368 cubic metres of water for irrigation in the previous 24 hours, compared to 544, 458, and 72 cubic metres for Strata 2, 3 and 4 households, respectively. This gives a total of 1,442 cubic metres of river water used for bucket small-scale home irrigation in the previous 24 hours across the four strata.

Regarding the use of river water for irrigation, an additional 3.8%, 3.4%, 2.4% and 2.2%

¹⁰ A number of techniques were used to ensure that reliable estimates were obtained, including counting bucket loads and reviewing, in detail, irrigation activities with respondents and other household members.

for Stratas 1-4, respectively, had fields which they normally irrigated, but were currently not in use.

4.4.1.2 Floodplain farming

While there is significant use of river water for small-scale irrigation, floodplain farming along the river is far less common, with only 4.7%, 7.6%, 4%, and 2% of households in Strata 1-4, respectively, engaged in floodplain farming. In some cases this included fields on the Angolan side of the border, covering half of those in Strata 1 (42.9%), but only 13.3% of those in Strata 2, and none of those in Strata 3 or Strata 4.

4.4.1.3 Fishing

Respondents were asked whether they had fished in the past month:

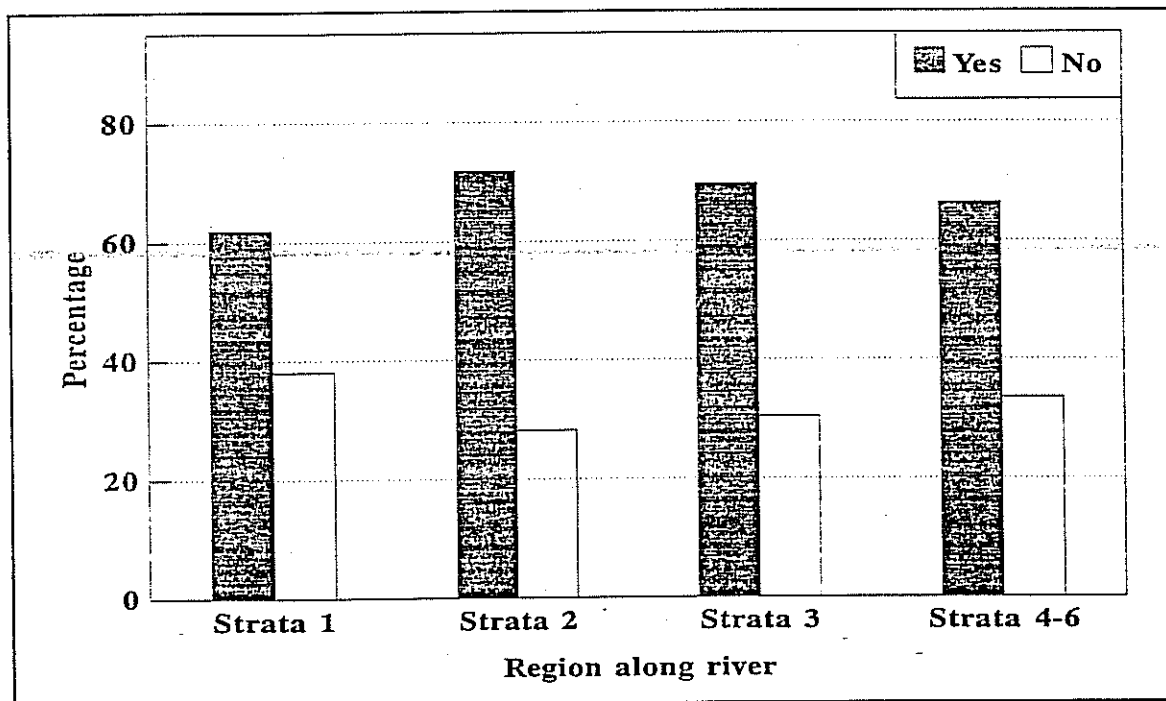


Figure 4.1: Fishing.

Additional questions were asked about fishing. The responses obtained are shown in Table 4.7, below.

Table 4.7: Fishing.

Fishing	Strata 1	Strata 2	Strata 3	Strata 4
<i>Quantity of fish caught in the previous month</i>				
None	7.5	32.7	42.7	50.5
1-5	14.0	8.4	12.6	8.1
6-10	5.4	7.5	8.7	11.1
11-20	8.6	5.6	5.8	5.1
21-40	10.8	12.1	7.8	7.1
41-100	11.8	8.4	3.9	8.1
101+	41.9	25.2	18.4	10.1
<i>Fish Sold</i>				
Yes	8.0	11.1	6.9	25.0
No	92.0	88.9	93.1	75.0
<i>Fish catches compared to last year</i>				
Higher	19.5	23.3	16.9	17.3
Same	25.3	8.2	25.4	15.4
Lower	55.2	68.5	57.6	67.3
<i>Impact on fish of low river level</i>				
Less	90.8	80.8	79.7	75.0
More	4.6	8.2	6.8	11.5
No difference	4.6	11.0	13.6	13.5
<i>Fishing better or worse on Namibian or Angolan side</i>				
Namibian	34.9	31.5	32.2	19.6
Angolan	47.7	34.2	39.0	19.6
No difference	17.4	34.2	28.8	60.9

Between one-third and one-half of all respondents caught fish over the past month, of which up to 45% caught over 100 fish in the past month. There was, however, variation across quantities caught by Strata. Of interest, up to half of those who went fishing did not catch any fish in Strata 4, declining to only 7.5% in Strata 1.

Fish sales were relatively uncommon, except in Strata 4. Most respondents reported that fish catches were down from last year, with a high majority of respondents noting that the low river level had had a negative effect. Fishing was reported to be better on the Angolan side, particularly in Strata 1 near Rundu.

-Yaron, Janssen, and Maamberua (1992) noted that most households used a stationary fish corral (91%), while 71% use a fish funnel, 46% used hook and line fishing techniques, and 30% use a push basket system. Yaron, Janssen, and Maamberua (1992: 94) note that "Fish consumption for riverine communities in Okavango constitutes the major source of protein in the diet. This gives it an importance greater than its limited role in household income" [emphasis added].

All four focus groups felt that fish were particularly affected by the low flow of the Okavango River. One could no longer fish in the flood zones, while no ponds existed near the islands which used to hold fish. One focus group argued that they would no longer be able to obtain fish from the flooded areas. Two focus groups felt that any reduction in flood zone water would lead to a short supply of fish in the area, resulting in overfishing of the remaining fish.

A large number of fish traps have been constructed with stones gathered from the Okavango River. Most of these stone traps are found in the area immediately upstream and downstream of the Cuito River confluence where silcrete outcrops are exposed in the river channel. The efficiency and importance of these traps is not known.

4.4.2 Other river-related uses

The natural environment team requested that the Rapid Quantitative Questionnaire include a few additional river-related use questions.

One question was asked about hand-dug wells, which were virtually non-existent in all strata except Strata 3, where 12.4% of the respondents indicated that there was a hand-dug well in their community. For Strata 3, in all cases the hand-dug wells had dried up, generally immediately after the rains ended.

A second question concerned whether and when respondents had last seen a crocodile or hippo in the river. Findings are indicated in Table 4.8. The data in Table 4.8 show the relative absence of crocodile and hippo along the river until the middle of Strata 4, near Divindu.

Table 4.8: Crocodile and Hippo.

Last Seen	Strata 1	Strata 2	Strata 3	Strata 4
<i>Crocodile</i>				
Never	10.7	2.7	8.8	18.1
Long Ago	67.3	71.6	56.5	22.2
Beginning Last Wet Season	8.0	8.8	6.8	6.9
End Last Wet Season	10.0	0.7	2.0	3.5
Beginning Last Dry Season	3.3	6.1	3.4	0.7
End Last Dry Season	0.7	2.7	3.4	3.5
Regularly	0.0	7.4	19.0	42.4
<i>Hippo</i>				
Never	12.7	2.7	9.5	22.1
Long Ago	80.0	88.6	75.5	15.9
Beginning Last Wet Season	1.3	4.0	5.4	4.1
End Last Wet Season	6.0	2.7	2.7	3.4
Beginning Last Dry Season	0.0	0.0	0.0	1.4
End Last Dry Season	0.0	1.3	3.4	3.4
Regularly	0.0	0.7	3.4	42.8

4.5 Potential use of the pipeline area by people living along the river

A few attitudinal questions were raised regarding the propensity to use resources in the pipeline area *among people in the riverine strata*. The findings are indicated in **Table 4.9**:

Propensity to move and move livestock away from the riverine area was fairly low, despite land shortages and the extremely poor condition of grazing near the river. For the one-quarter who said they would move for grazing, the majority said they would still move even if they had to pay for water.

Respondents were clearly concerned about conflicts which might arise if they moved livestock into the pipeline area; this is consistent with findings from the pipeline strata.

Findings suggest, overall, a fairly low propensity to migrate to the pipeline area if water is made available near grazing. Nevertheless, fully one-quarter of the respondents were willing to consider the idea, even if water had to be paid for.

Table 4.9: Attitudes towards potential use of pipeline area.

Attitudinal Statement	Strata 1	Strata 2	Strata 3	Strata 4
"Land is in short supply in our area, so if water was made available elsewhere in the region away from the river, we would seriously consider moving"	24.5	19.9	29.3	26.1
"If pipeline water is provided along the road, we would move our animals there for grazing"	23.0	19.0	27.2	24.1
[For those who said they would move] "If water is provided, we will move our animals even though we will have to pay for water"	78.4	64.3	40.0	77.1
"If we move ourselves or our livestock into the pipeline area, there will be no conflict even if we came from a different <i>homba</i> "	8.1	8.1	10.8	17.9
"Grazing in our area is so bad that we would be willing to move anywhere where water would be available near good grazing"	16.7	21.1	24.5	22.9
[For those who said they would move] "We would move to this new grazing area even if we had to pay for water"	60.9	77.4	60.6	54.5

While *actual* propensity to move could not be fully considered, a few assumptions about in-migration can be made from the above findings. If we assume, given poor grazing and over-crowded conditions at the river, that households in Strata 1 coming from the Mbunza *homba* area would have a fairly high propensity to migrate (but not other communities, given concerns over the potential for conflict also stated above), and if we assume that approximately 20% of all households would migrate for at least seasonal grazing use), this would imply an in-migration potential of up to 3000 people across 300 households; a more conservative estimate would still mean that between 150 and 200 households would access resources in the pipeline area. This would represent an increase of up to 45% in the population using resources in the pipeline area. Again, these findings raise questions about the potential natural environment effects of in-migration.

4.6 Areas of historical or cultural importance

Local level key informants along the river noted a number of items of historical or cultural importance. Areas included meeting trees (e.g., Bagani, Vungu-Vungu), a gathering place for singing and dancing (Dyapanga), a tree planted by the chief (*uvunguvungu* tree), cemeteries, the *uvunguvungu* tree at Vungu-Vungu, planted by the elders and used for many medicinal purposes, and areas of importance due to a tragedy (e.g., at Muronga, a *homba* had drowned along with his family).

Local level key informants were also asked about use of the river for spiritual activities, including baptisms, festivals, and ceremonies, and whether any of these had been affected by low river flow. Baptisms were very common, and were not affected by the level of the river, although distance was becoming an increasing problem, and fewer deep spots in the river were available (respondents also felt that, if the river dries up, no one can be baptised). Others noted that the body of a dead spouse was washed in the river (including use of traditional herbs) prior to burial, and that women who first began menstruation were 'cleansed' by the river; this was also mentioned by one of the focus groups. Others reported that a black cow would be taken to the river, killed and cooked by the elders in the community. During this time, the elders would speak with their ancestors and ask for rain. Finally, it was also noted that Christmas festivals were held at the river.

4.7 Summary

Attitudes towards the proposed scheme were extremely negative, and there was serious concern over the perceived impact of the project on the river. Many complained about the quality of grazing along the river.

Large family sizes and high dependency rates, coupled with the incomes findings in Chapter 3, suggest that poverty is a serious problem in riverine communities. Community action groups exist in a variety of communities. Waterpoint committees were not that common, mostly due to a reliance on the river.

During the dry season, households have many uses for the river, including household uses such as drinking water, livestock watering, and for collecting a variety of natural resources for home use, and also including economic uses, such as the sale of thatching grass, reeds, edible plants, etc.

Fishing was reported to be very poor in comparison to previous years, with up to one-half of fishing households reporting zero catches; near Rundu, however, fish catches were still over 100 in the past month for most fishing households.

Despite severe environmental degradation, most households stated that they would not be likely to move their livestock to the pipeline area for water and grazing, in part due to severe labour shortages in riverine households. Many felt that moving into the pipeline area might raise conflicts with communities in the area. Regardless of seemingly low propensities to migrate to the pipeline area, even marginal propensities to move would mean a population increase of up to 45%.

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5. CONCLUSIONS

5.1 Introduction

Based on the findings from the field effort, interviews, the rapid appraisal and secondary materials review, summary findings are offered below. The findings are organised on a terms of reference-by-terms of reference basis, with findings given under each TOR heading. This summary also includes the extent to which information remains uncertain. This is followed by the major concerns arising from the IEE-SC. Finally, the last section in this chapter makes provisional suggestions regarding *additional* information needs from the wet season SIA.

5.2 Summary findings

Based on field and secondary data collection activities undertaken during the IEE-SC, initial findings on a terms of reference-by-terms of reference basic are included as follows.

5.2.1 *Cultural and traditional constraints and opportunities*

Regarding traditional constraints and opportunities along the river, findings suggest that, for the most part, traditional authority structures are quite strong. At this point, no other traditional constraints and opportunities appear to apply for the project.

5.2.2 *Age, gender and social class*

Okavango Region households are characterised by high dependency ratios and high levels of poverty. While relatively low in comparison to the Cuvelai, female-headed households still comprise one-third of all households in the region. Women are poorly represented in traditional authority structures, as well as among elected politicians, while findings from Yaron, Janssen and Maamberua (1992) suggest that women occupy a disadvantaged position in the local economy, and provide the bulk of all labour inputs for on-farm production. Yaron, Janssen and Maamberua also point out that female-headed households tend to be the most labour short, *and* the most dependent on existing arable land near the river (having less labour to exploit the opening up of new land near the Trans Caprivi Highway, for example).

Given the current poor state of many households in the region, findings suggest that households would be extremely vulnerable to any interventions which would worsen their position, including a reduction in fish catches, the allocation of more labour to access water, a reduction in water for small gardens, etc. More generally, any intervention which threatened access to important river resources would be particularly problematic during drought years, when households are particularly reliant on the river for natural resources for sale and home use, and protein from fish. Labour short households, which are in abundance in the region, including female headed households, would be particularly vulnerable.

5.2.3 *Community organisation*

Communities in the region show a high propensity to organise into groups, often around what have historically been strong churches. Beyond the churches, however, waterpoint committees in the pipeline route area appear to be functioning sufficiently well to manage diesel purchases, while school committees exist in a number of pipeline and riverine communities. Findings suggest that, should social organisation into committees be needed in response to infrastructural developments, this would be accepted by local communities.

5.2.4 *Authority structures*

This was partially discussed under 6.2.1. It is likely that in-migrants to the pipeline area would come from wealthier, labour-surplus households which would probably retain their fields and livestock along the river, and simply expand livestock numbers to accommodate newly-available grazing. Labour-short households, which coincide with those who are poverty stricken (including female-headed households), are unlikely to be able to take advantage of new grazing and arable land opportunities in the pipeline area. If, therefore, the project has a negative impact on the riverine environment, it will likely disproportionately affect poorer households.

Along the river, traditional authority structures are well-established and obtain a legitimacy arising, at least in part, from the 'elected' nature of these authorities.

5.2.5 *Growth rate of local populations*

Unfortunately no sub-national growth rates are available from the Central Statistical Office. Using a national growth rate of 3.1%, the 1997 population of Okavango Region (including

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affected areas of western Caprivi) is projected to be over 150,000, of which 120,000 live in Okavango Region, and 30,000 live in western Caprivi. Projections suggest that 74,000 people would be **directly** affected.

5.2.6 *Current adequacy of local services*

This concerns the potential in-migration pipeline route communities, and was therefore discussed in the pipeline report.

5.2.7 *Settlement patterns and migration*

This concerns the potential in-migration pipeline route communities, and was therefore discussed in the pipeline report.

5.2.8 *Relocation of people and livestock*

This concerns the potential in-migration pipeline route communities, and was therefore discussed in the pipeline report.

5.2.9 *Land and resource tenure considerations*

Most land and resource tenure considerations concern the pipeline route communities, and are therefore discussed in the pipeline report. Regarding riverine areas, respondents are clearly concerned about the impact of additional offtakes from the river on a number of natural resources riverine households depend on (see comments on drought implications discussed above). This raises the question of the possible need for 'downstream' compensation, and requires that the land act, when finally passed, be reviewed to consider the scope for awarding such compensation.

Regarding households along the *omurambas*, this has been investigated by the natural environment teams, and is included in their report.

5.2.10 *Traditional land use patterns*

This concerns the potential in-migration pipeline route communities, and was therefore discussed in the pipeline report.

5.2.11 *Dependence and use of natural resources*

This forms part of the natural environment report. The IEE-SC team collected initial field data on these variables, and turned over field materials to the natural environment teams. In addition, the IEE-SC team investigated resource use along the river. Findings show that the river forms an important source of natural resources.

5.2.12 *Privatisation*

This concerns the potential in-migration pipeline route communities, and was therefore discussed in the pipeline report.

5.2.13 *Employment*

Half of the population of Okavango Region are classified as economically active, with the region overall reflecting high dependency ratios. Underemployment is a serious problem for the few who are in formal or self employment, while arable agriculture only contributes in part to household food needs (Yaron, Janssen and Maamberua, 1992 estimate that arable production only contributes 16% to total food intake during a drought year).

Respondents were fairly dubious regarding job opportunities arising from the scheme, consistent with a clearly stated disapproval of the scheme. It is unclear how this might affect interest in being employed on the project; this would have to be investigated further.

5.2.14 *Income distribution*

Considerable attention was devoted to a discussion of this issue in Chapter 3. Findings, when considered with arable and pastoral agriculture findings, clearly show that over half of all households in the region are poor or very poor, and could ill-afford to be negatively affected by any such project.

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5.2.15 Public health and safety

This was not measured during the IEE-SC, given that priority attention was focused on other topics. However, members of the natural environment team did collect information on waterborne diseases, information which is included in their report.

5.2.16 Altered access to schools, clinics and other services

This concerns the potential in-migration pipeline route communities, and was therefore discussed in the pipeline report.

5.2.17 Altered access for livestock to grazing and water

This concerns the potential in-migration pipeline route communities, and was therefore discussed in the pipeline report. This will indeed affect riverine communities, however, if the pipeline were to extend to the Cuito; if so, this would need to be investigated in detail.

5.2.18 Theft, poaching, vandalism

While attention was not focused on this issue in detail during the IEE-SC, local level key informants and focus group discussion participants both noted that livestock theft was a problem in the region, and pointed out that both traditional and state court systems were used to resolve these problems. Respondents also reported problems with livestock damage to fields. While regional figures are not available, national findings (see SIAPAC, 1996) suggest that one in seven waterpoints have been vandalised over the past few years. More attention should be focused on these issues during the wet season SIA.

5.2.19 Historical and cultural monuments

Findings from the archaeological reconnaissance are included in the natural environment report. It was felt that the wet season SIA would also need to employ Oral History approaches to gain further information about areas of historical and/or cultural importance. This would be done in close co-operation with the archaeologist.

5.2.20 *Public participation at the local level*

Through the IEE-SC, respondents were able to voice their views through quantitative and qualitative instruments. In addition, in January, three workshops were held in the region to provide feedback on natural and social environment findings, to solicit further information and gain further feedback. In addition, meetings were held with senior *hompas* for the one pipeline and four riverine strata.

5.2.21 *Natural resource utilisation*

This is largely being handled by the natural environment team, in part based on tables completed via the IEE-SC field teams. Other natural resource utilisation issues have been discussed above, including reliance on natural resources during times of drought.

Wet season measurements would occur as part of the wet season environmental assessment.

5.2.22 *Inventory of water users along the river*

The instrument was prepared, implemented and compiled by Parkman, supported in terms of questionnaire modification and field implementation by SIAPAC.

5.2.23 *Water usage*

Households in Okavango Region only use an average of 5.1 litres of water per day for domestic consumption (median figure), well below the amount of water needed for health and well-being purposes. 90.7% are within 2.5 kilometres of their primary water source for human consumption, and only 22.4% had suffered from late dry season water problems during 1996. However, along the river, this is because most households relied on unimproved water from the Okavango River. Households relying on improved waterpoints, particularly diesel systems, reported regular problems with these sources.

Whatever decisions are made about the project, there is a clear need to increase the *quantity* of water consumed in the region.

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5.2.24 *Local knowledge of erosion and trends*

This was not investigated during the IEE-SC. However, grazing conditions were discussed, with respondents generally noting that rangeland had declined markedly over the past few years, and was currently in very poor condition.

5.2.25 *Use of river islands and use of the northern border*

This is covered in the natural environment report. Natural environment findings show that there are high levels of use of the Angolan side of the border by Namibians, in part due to the natural environment decline along the Namibian side.

Floodplain farming for households directly along the river was carried out by approximately 5% of all households.

5.2.26 *Backyard irrigation demands*

Use of river water for small-scale irrigation was measured through the Rapid Quantitative Questionnaire. Approximately one-third of all households usually used river water to water their gardens. Approximately 1,442 cubic metres of river water was estimated to have been used in the 24 hours prior to the survey by all households living along the river. Cumulative impacts of these offtakes is discussed in the natural environment report.

5.2.27 *Water cost estimates*

Discussed above. The actual charge to consumers is based on a Government decision in this regard.

5.3 **Summary concerns**

The findings from the IEE-SC raises the following concerns which would need to be considered before a decision is made regarding whether, and if so how, to proceed with the project:

- 1) In-migration into the proposed pipeline route area is a definite possibility. Despite reasonably strong traditional authority structures in the area, in-migration would definitely pose a problem for these authorities. Findings also suggest that waterpoint committees in the area would have trouble coping with heavy in-migration, while educational structures are already under strain. It is therefore not sufficient to consider the short-term job potential for the area and the long-term water supply potential from the project as sufficient for the affected area. Remedial action must be taken to accommodate potential negative impacts, all of which should be considered in light of the strong negative attitudes towards the project. var
1)
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- 2) Attitudes in the pipeline and riverine areas are almost uniformly negative. While this clearly calls for strong, well-thought-out public relations activities, the strength of the negative attitudes suggests that the problem is more serious than can be dealt with merely through a public relations exercise. How to deal with these negative attitudes should be carefully considered by the Department and by the Ministry. 3)
- 3) Households in the affected area are, by and large, quite poor, with many households depending on marginal agricultural and economic systems, and extremely vulnerable to outside shocks. If the project had negative impacts particularly on riverine households, these impacts would disproportionately affect poorer households, including poorer female-headed households. 4)
- 4) If and when the provisional pipeline route is identified through Rundu, detailed investigations in the affected area would need to be conducted. It is assumed that, given Rundu's status as a town, standard urban compensation approaches would be employed.
- 5) A skills assessment would need to be undertaken through a sample survey to determine the relative availability of relevant skills, including low level skills. A decision would first need to be made by Government regarding whether jobs will be reserved, in the first instance, for affected households.

5.4 Wet season recommendations

Despite fairly considerable data having been collected and processed, the IEE-SC was necessarily limited by time and other resource constraints. A full wet season SIA would allow the detailed exploration of key social impact variables, and would also allow the collection of data for the natural environment teams. *In addition to* further exploring the

variables just discussed, the wet season SIA would also need to explore the following:

- 1) Gaining more accurate and detailed information on resource use, and the timing of resource use, both for the natural and social environment teams.
- 2) Following a decision by the Department regarding water supply alternatives for the pipeline route area, as well as information on costing, the SIA could explore in-migration and affordability issues in sufficient detail to determine likely social impacts.
- 3) Oral histories would need to be carried out with elders in villages along the proposed pipeline route and along the river to better determine areas of historical and cultural importance, and to obtain key historical timeline data. For the pipeline area, in co-operation with the archaeologist, this would need to be registered on a GPS.
- 4) More detailed estimates of current water offtake for households would need to be secured, allowing the natural environment teams to better estimate cumulative impacts.

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