AN INVESTIGATION INTO THE ROLE OF LEADERSHIP IN WATER TECHNOLOGY INNOVATIONS IN ENHANCING JOB CREATION IN KAVANGO EAST REGION IN NAMIBIA

A Dissertation submitted in partial fulfillment of the requirements of a Doctoral Degree in Business Administration (DBA)

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Abstract

The main objective of this dissertation was to investigate the role of leadership in water technology innovations in enhancing job creation in the Kavango East Region. The main theoretical framework comes from theories on leadership as a key aspect to socio-economic development. Inclusive in this framework were perspectives of leadership support such as resources allocation, effective communication and clear vision as the most important qualities and actions which a leader needs to have in order to use water technology innovations to enhance job creation.

A mixed method research design in the form of a case study of the Kavango East Region informed the process of data collection. Data was gathered concerning the distribution of variables such as the grassroots community's experience and understanding towards the role of leadership in water technology innovations to enhance job creation at their villages. Other imperative variables which support the investigation techniques are gender and the age of the respondents.

Informed by this investigation and based on the Kavango East Region case study, this dissertation has arrived at the conclusion that, at present the Kavango East Regional Leadership is not involved in water technology innovations to enhance job creation in the rural grassroots communities. The challenge seems to be that Regional Leaders rarely pay visits to the rural communities to see what the communities are doing and come up with mechanisms to support them. There is no effective communication between Regional Leaders and the local community; there is no leader-community relation. Because of this, leaders do not allocate resources to be used towards water technology innovation projects by the rural communities. Consequently, the Kavango East Region is the poorest in the country with 53% of its population living in abject poverty.

Therefore, leadership involvement in water technology innovations is an issue that needs to be resolved. Informed by these conclusions, this dissertation recommends that Regional Leaders should live within the constituencies where they are elected to serve. There should be a minimum number of villages to be visited by Regional Leaders every year and there must be a performance agreement for Regional Leaders which will be used as a tool to hold them accountable.

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Finally, I thank the team at the Namibia Business School, for their assistance throughout my Doctoral programme as well as towards the completion of this dissertation. I pray and hope that this study will improve the lives of many Namibian Citizens either directly or indirectly.

Dedication

This dissertation is dedicated to my parents Joseph Kawana and Veronica Maliro Kawana, Victorina Singanga Kalimbwe (mother) Uncle Andrias Sinonge, Uncle Matheus Kashandu Tuta, brothers, sisters and the entire family for being there for me during my studies. I am very much humbled by their support, they are the best family in the entire world. They mean a lot to me, I am not able to freely express myself in this document, but without the support of all these people I would not have made it to complete this research.

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I dedicate this study to my beloved wife, Laimi Kawana; you are the best thing that has happened to my life. And to my sons and daughters, nephews and nieces this is for you, I have nothing special to offer to you but my entire youth life dedicated to my studies.

I would still like to dedicate this research to my good friend and brother, Hamutenya Kristian Hamutenya, who encouraged and supported me throughout my studies.

Declaration

This research was undertaken in partial fulfilment of the requirements for the award of the Degree of Doctor in Business Administration, a study programme with University of Namibia (UNAM), Windhoek, in Namibia. The findings, interpretations, conclusions and recommendations are completely of the author, and no part thereof, or its entirety had been reproduced and submitted elsewhere for a degree.

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List of Acronyms

AKRSP: Aga Khan Rural Support Programme

BC: Before Christ

BREW: Business, Research, Entrepreneurship, in Wisconsin

CDF: Confined Disposal Facilities

CRSP: The Coastal Rural Support Programme

EPA: Environmental Protection Agency

ERP: Enterprises Resources Planning

GDP: Gross Domestic Product

GRN: Government of the Republic of Namibia

GVM: Gran Vikas Mandalor

FAO: Food Agricultural Organisation

FGD: Focus Group Discussions

HDI: Human Development Index

IFAD: International Fund for Agricultural Development

ITRC: The Interstakes Technology and Regulatory Council

LGA: Local Government Area

LIFT: Leaders Innovation Forum

MDG: Millennium Development Goals

MPHC: Mombasa Primary Health Programme

MS: Micro Soft

NBS : Namibia Business School

NGO : Non- Gouvernemental Organisation

NLO : National Labour Organisation

NSA : National Statistic Agency

RAISON : Research and Information Service of Namibia

UN : United Nations

UNAM: University of Namibia

UNDP: United Nation Development Program

R&D: Research and Development

SADC: South African Development Community

SPSS: Statistical Package for Social Scientists

STEPP: Storm Water Testing and Evaluation for Products and Practices

SWANLA: South West Africa Native Labour Association

TB: Tuberculosis

VDC: Village Development Committee

VDO: Village Development Organization

WEF: Water Environment Federation

CHAPTER 1: INTRODUCTION

1. Introduction

Advanced countries that have adequately grasped the role of water technology innovation in their daily operations, have realized enhancement in regional development and better living conditions of their people, (Tellis, 2008). According to the Government of the Republic of Namibia (GRN) Vision 2030, the country should develop itself through the use of its natural resources and technology innovation. Namibia has 14 Regions; these Regions are not at the same level when it comes to development or economic growth, delivery and available important infrastructure.

According to the Central Bureau of Statistics, National Planning Commission (2008), Namibia's historic legacy of apartheid colonialism resulted in enormous levels of socioeconomic inequalities, primarily along racial lines, but also according to gender and class. The country's negotiated transition to independence ensured that the economic structure remained largely intact after independence. Despite various attempts by the Namibian Government to provide basic services for all (such as education and health) and despite several policy interventions aimed at redressing the apartheid legacy and extending social protection, Namibia still ranks amongst the most unequal societies in the world. Namibia followed a path of market-oriented economic policies, coupled with moderate social reforms but without a systematic program of redistribution of wealth.

As a result, the country's achievements, in terms of overcoming poverty, unemployment and inequality, were limited. The rural population, vulnerable workers and informal sector workers have experienced only limited material improvements since Independence. Likewise, the achievements of substantive gender equality are still a long way from being

realized. Despite the substantial achievements in terms of legal equality, patriarchal cultures and attitudes are still widespread. Women tend to find themselves in the lowest levels of employment and form the majority of operators in the survivalist informal economy. Gender equality can only be achieved if it addresses the structural impediments that limit the economic independence of self-sufficiency of working women.

According to Jauch (2012), Namibia's economic policies followed largely the neo-liberal dogma and were shaped by the desire to accommodate foreign investment, which was regarded as the engine of economic growth and job creation. However, despite an array of incentives offered to foreign investors, unemployment remains rampant and the country is unlikely to achieve the Millennium Development Goals (MDGs) within the current macroeconomic framework. Experiences in Namibia and elsewhere in Africa point to the urgent need to depart from the market-driven approach to social and economic policy.

Some regions in Namibia are more developed than others. This could be attributed to the colonial leadership of the apartheid South African government which mostly concentrated on regions with mineral resources such as //Karas, Erongo, Khomas, Otjozondjupa and some parts of Oshikoto Region. The calling to use natural resources in order to create jobs and improve the living standards of the community came at the right time, as the world is geared for other economic challenges, which can only be overcome when a given community is self-reliant. Consequently, the role of leadership in water technology innovations in enhancing job creation in the Kavango East Region has become an issue, which needs to be understood. This has inspired this study. By way of making use of a case study of the Kavango East Region, this study probes and benchmarks issues of the role of leadership in water technology innovations to enhance job creation. The aim is to establish a hidden reality in Kavango East Region, as to what extend

Regional Leadership play a role in water technology innovations which can be a key to job creation.

In pursuit of this goal, this chapter outlines the background of the study and problem statement with primary focus on the role of leadership in water technology innovations in enhancing job creation issues in Kavango East Region. It argues that the origin of problems regarding the involvement of leadership in water technology innovations to enhance job creation in Africa, Namibia and Kavango East in particular, is related to education, training, communications and available resources to the communities. The chapter also presents the main objectives of the study, its significance, definitions of major terms and concepts and the layout of the study.

1.2 Background of the study

1.2.1 Leadership and Development issues

The main cause of lack of development in Namibia in general and the Kavango East Region in particular lies in the leadership and developmental plans created by Namibia's colonial masters. This does not mean that people are poor because of colonial policies of the past, but because they live in areas that were previously neglected by the colonial governments in terms of investing in using natural resources to develop the lives of people, in order for them to be self-reliant. Based on this background, one major purpose proceeding from this study is to take account of historical events regarding leadership and relate that to the impact on job creation and development in Namibia in general and Kavango East Region in particular.

Primordial history presents job opportunities for the people of Namibia and Kavango East Region in particular, as being contract workers in South African mines (Johannesburg) and some central, western and southern parts of Namibia, areas which were promoted by the colonial governments in Namibia. Mendelson (2009) stipulates that while social and economic development in Kavango was largely neglected by the South African administration because it was a black homeland, some of the transport infrastructure was developed for strategic reasons by the South Africans during the Namibian liberation war. That administration also started several agricultural development projects along the Kavango river, and allocated about 60 large farms to foster commercial farming by Kavango residents. Those first farms probably provided the foundation for the current massive effort to privatize large farms.

In contrast, the newly independent Namibia presented its National Vision 2030, which states that, the country should develop itself through the use of its natural resources and technology innovation. Namibia has 14 Regions which are not at the same level when it comes to development or economic growth, service delivery and available important infrastructure.

Although this vision is realistic, however, the belief of the inhabitants of Namibia and Kavango East Region in particular is that job opportunities are not available locally, the only way to get a job is to migrate to areas where there are mines, sometimes to other places (Aussenkher and Noordoewer) that are using natural resources (such as water) which are also available in abundance locally (Kavango East Region). However they fail to use them although others use them at other places. Thus, in Namibia and the Kavango East Region in particular, leadership has always regarded existential realities such as poverty, inequality and unemployment as a source of social, political and economic challenges in that region.

One fundamental argument remains that, after Namibia's independence on 21 March 1990, the Kavango East Region has been electing political leaders, but the question that needs to be raised is with regards to what impact this leadership has had on developmental issues such as job creation, poverty eradication and inequality in the area. It is a known fact that development of any given region depends largely on the leadership of that particular region. According to Molenki, (2012), the relationship between leadership and sustainable development is very important, because there is no development without leadership especially in the social, human and cultural dimensions. It is broadly recognized that Africa and Namibia's service delivery in particular is insufficient and will be a major constraint in attaining the Millennium Development Goals (MDGs) and Namibia's well known vision 2030 (GRN, 1999).

Although Namibia is free from colonialism and apartheid, the consequences of the colonial policies still prevail. However the proclaimed Vision 2030 needs to be accompanied by a paradigm shift concerning the issues of how leadership should use the available natural resources in their respective areas of jurisdiction to create jobs and foster development for their regions and Namibia in general.

If leadership is to shift its focus onto using the Kavango River as a key to develop its people and Namibia in general, the Kavango Region could have been a center of wealth a long time ago. Mendelson (2009), agrees and further states that, in a broader context, it is significant that Kavango shares the middle section of the whole river system with Angola, and also occupies a central place between the catchment in Angola and the famous Okavango Delta, downstream in Botswana. As public, political and economic interests in the whole Okavango River Basin grow, the Kavango region is likely to assume an increasingly important and strategic role in the management of the River's health and wealth.

According to Mendelson (2009), a second asset is the location of Kavango and Rundu in particular the major trade routes between Namibia and Angola, Botswana, Zambia and Botswana. The Region already enjoys a variety of benefits from trade along these routes, especially along the Trans-Caprivi Highway. Indeed, Rundu is the only major economic center within a huge expanse that stretches 900 km west to the east from Ondangwa to Katima Mulilo, and about 1,000 km north to south from Menongue in Angola to Grootfontein and Maun in Bostwana. Rundu is thus a major supplier of goods and services to people spread across a very large area.

Finally, the Region and its people are increasingly moving from a traditional, rural economy (based on farming and harvesting natural resources for domestic use) to a cash- and urban-based economy. Rundu is reputedly the fastest growing town in Namibia, and a rapidly escalating proportion of the Kavango residents now live in Rundu and other emerging towns.

Identifying the strength of economic developmental activities for each region in Namibia have been a key aspect on which apartheid and colonial masters used to develop some parts of Namibia, but that was not done for the interest of every person living in that particular area. It was mainly done to benefit the colonial masters. For example if one considers the reasons as to why Walvis Bay in the Erongo Region was turned into a harbour by the colonial masters, one can realise that it was mainly to assist them logistically into better trade. The same applies to Ludertiz in the //Karas Region. It seems the colonial masters worked hard to fight and allocate resources to be used to develop Walvis Bay and Ludertiz. (Mendelson (2009)

Learning from the strategy used by the colonial masters, the leadership in Kavango East Region, in the new independent Namibia, are supposed to look into the strengths of economic

developmental activities. Mendelson (2009), reports that, results from the 1994 Income & Expenditure survey show that only 17% of all Kavango farmers relied entirely on food that they produced themselves. A high degree of reliance on farm cash income is evident from the following table.

Table 1.1

Main source of income	**Percentage of households**
Farming	63%
Business	11%
Wages and salaries	13%
Pension	5%
Remittances	4%
Other	3%
Total	**100%**

Source: 2001 Population & Housing census data

The above table is also supported by the proportions of people over 14 years employed in different sectors in rural areas of the Kavango region Table 1.2 below. We can see that 44% of the employment sector is in agriculture and other natural resources.

Table 1.2

Employment sector	**Percentage of people**
Public and private services	48%
Agriculture and other natural resources	44%
Manufacture, mining, building	6%
Trade	1%
Not stated	1%
Total	**100%**

Source: 2001 Population & Housing Census

If the leadership could only understand this and invest their energy and resources in expanding on the strength of regional developmental activities, the Kavango East Region will contribute more to Namibia's Gross Domestic Product (GDP).

The challenging dynamics often experienced by regional leaders is on how to support their inhabitants to use natural resources to create jobs and develop themselves. Another important aspect worth mentioning here is that the colonial and apartheid governments, used force in their

operations. This made the black communities in Namibia fear them and not engage their leaders to discuss developmental issues. The new independent Namibia adopted the policy of decentralization on which it promotes leader-community interaction concerning development. It promotes open participation in development dialogue between Regional leadership and the communities they serve. Kawana (2013) maintains that, the Government has established thirteen (13) Regional Councils under the Act of 1992. This was a plan to bring the government closer to the people especially the previous disadvantaged black people. The apartheid government operated on the principles of making the black people's living standard worse as compared to whites and the coloured people. This resulted in widening the gap between the black people who are seen as poor people and the white people as rich people. At present the majority of black people work for white people, but very few white people work for black people. This is a result of the apartheid system which taught people that black and while people are not equal.

Kawana (2013), further observes that, after the establishment of Regional Councils in 1992, they were mandated to make sure that the living standards of the people were upgraded in all areas in order to reduce vulnerability and foster self-reliance among the communities of Namibia. This was with the intention of making the Namibian people equal irrespective of skin color and previous backgrounds.

Because the colonial and apartheid governments were undemocratic, there was no opportunity for black people to ask their leaders to account for lack of development and poverty became entrenched amongst them. It looks like even after independence, many inhabitants of Namibia and Kavango East Region in particular are still afraid of confronting their leaders for lack of developmental activities or the provision of resources for development. As a result they remain poor, unemployed, and live lives characterized by inequality. It seems that there have not been

extensive education in the local communities especially in Rural Kavango East Region on their rights and powers as community members over their own elected regional leaders. Because the communities do not confront their regional leaders, the leaders choose to remain unsupportive to them.

The use of natural resources can be a key to unlock developmental challenges in the Kavango East Region. There is need for leaders to pay attention to this and provide the needed assistance to the community. Terry et al (1994), agrees and says the Kavango River flows through south eastern Angola towards Namibia, where there are a number of districts that have a high potential for irrigated and flood-recession agriculture. Initial surveys in this area indicate that the region could provide important agricultural and economic development opportunities in the future. The district administration in the region is in need of assistance, both technical and financial.

1.2.2 Natural resources as a catalyst to development

In recent years Namibia has been developing new ways of using natural resources commercially in communal areas. Communities in these areas obtained rights in tourism and to manage and benefit from wildlife and plant products by registering conservancies and community forests. These rights are meant to enable communities to establish their own tourism enterprises, to sell trophy animals, game meat, live game, timber products and other woodland resources, and to establish joint ventures with tourism companies. Trophy hunting and tourism joint ventures have brought in substantial revenue in some areas. Several additional benefits stem from community forests and conservancies. For example, residents gain greater security over communal land and its resources, the value of their land increases, and incentives are created for natural resources to be managed effectively and sustainably.

In the case of Kavango East, the greatest values to be obtained from natural resources are likely to be through tourism along the Okavango River. Mendelson (2009) agree and states that, despite earlier criticism of existing perspectives and approaches to farming in Kavango, there is scope for agriculture that makes efficient use of the River water. This is economically lucrative to the country and that contributes significantly to improving the wealth of residents (as opposed the mere poverty reduction). Irrigation schemes can be used for high-value crops, and the schemes can be economically viable (rather than being dependent on public subsidies). Products such as fresh fish, beef (from cattle in feedlots) avocados, mangos and paprika should be investigated and developed where possible.

According to the United Nations Development Programme report (2007) Kavango is one of the poorest regions in Namibia. This is clearly reflected in a report by the United Nations Development Programme on trends in human development and human poverty (UNDP 2007) which presents data on the Human Development Index (HDI) and the Human Poverty Index (HPI) for Namibia's 13 regions.

The HDI provides a quantitative representation of three main dimensions of human development namely a long and healthy life, knowledge and a decent standard of living. Each of these dimensions is assigned corresponding quantitative indicators. The HDI is then the simple average of the three indices (UNDP 2007). Table below indicates that of the 13 regions, Kavango has the second worst life expectancy at birth, third worse literacy rate, sixth worse gross school enrolment ratio and the second lowest annual average per capita income.

Table 1.3. HDI Indicators for Namibia

	Life expectancy at Birth		Literacy rate, + 15 Years (%)		Gross enrolment ration, 6-24 years (%)		Annual average adjusted per Capita income (N$)	
	2001	1991	2001	1991	2001	1991	2001	1991
Namibia	49	61	84	76	66	68	10 358	5 448
Caprivi	41	53	80	66	60	66	6 411	2 413
Erongo	59	65	94	85	58	63	16 819	8 189
Hardap	50	60	86	79	60	63	12 092	8 977
Karas	57	60	92	88	58	59	12 706	10 049
Kavango	44	57	72	62	63	66	4 427	2 662
Khomas	58	68	96	91	59	57	25 427	17 152
Kunene	55	63	59	51	45	50	7 240	3 327
Ohangwena	41	63	80	71	72	74	4 304	1 616
Omaheke	60	59	67	57	56	51	12 232	5 955
Omusati	45	65	84	78	77	84	5 466	2 193

Oshana	46	62	91	86	75	77	9 963	2 902
Oshikoto	46	61	84	78	71	71	5 895	2 537
Otjozondjupa	61	61	75	66	56	52	9 457	5 525

Source: Adapted from UNDP (2007)

These figures show that Kavango has the second lowest HDI (0.410) for Namibia after Ohangwena (Table 1.3 above).

The Human Poverty Index also concentrates on three essential dimensions of human life; longevity, knowledge, and a decent standard of living. Whereas the HDI provides a measure for the capabilities of individuals, the HPI focuses on deprivation in the same three dimensions (UNDP 2007). Thus the first deprivation relates to survival or vulnerability to death at a relatively early age; the second relates to knowledge or being excluded from the world of reading and communication and the third relates to a decent standard of living in terms of the overall economic provision or poverty as measured by income. Table 1.3 above shows that of the 13 regions, the Kavango has the fourth highest probability of people dying at birth and not surviving to the age 40. In addition the Kavango has the third highest illiteracy rate and the second highest share of the population in households that spend more than 60% of their total income on food.

These indices results in Kavango, along with Omusati and Oshikoto, having the highest Human Poverty Index (45) of the 13 regions as shown in Table 1.4 below. Table 1.4. HDI Namibia 2001-2004 and 1991-1994

Human Development Index

	2001-2004	1991-1994
Namibia	0.557	0.607
Caprivi	0.421	0.441
Erongo	0.705	0.690
Hardap	0.572	0.637
Karas	0.664	0.666
Kavango	0.410	0.480
Khomas	0.732	0.784
Kunene	0.504	0.509
Ohangwena	0.403	0.524
Omaheke	0.627	0.528

Omusati	0.476	0.595
Oshana	0.548	0.602
Oshikoto	0.490	0.555
Otjozondupa	0.638	0.567

Source: Adapted from UNDP (2007)

Table 1.5. Indices for Survival, illiteracy, and Income Poverty

	Probability at birth of not Surviving to age 40 (%)		Adult illiteracy rate (%)		Share of population in households that spend more than 60% of total income on food (%)	
	2001	1991	2001	1991	2003/04	1993/94
Namibia	42	18	16	24	32	38
Caprivi	55	28	20	34	40	46
Erongo	25	14	6	15	5	27
Hardap	39	20	14	21	25	19
Karas	28	19	8	12	18	25
Kavango	50	23	28	38	50	71
Khomas	27	10	4	9	3	8
Kunene	33	16	41	49	39	39
Ohangwena	57	16	20	29	27	40
Omaheke	27	22	33	43	40	53
Omusati	52	13	16	22	50	39

Oshana	49	16	9	14	33	47
Oshikoto	49	16	16	22	53	36
Otjozondupa	24	18	25	34	20	43

Source: Adapted from UNDP 2007

Table 1.5. HPI Namibia 2001-2004 and 1991-1994

Human Poverty Index (%)

	2001 - 2014	1991-1994
Namibia	33	29
Caprivi	43	38
Erongo	18	20
Hardap	30	20
Karas	21	20
Kavango	45	52
Khomas	19	9
Kunene	38	39
Ohangwena	42	31
Omaheke	34	43
Omusati	45	29

Oshana	37	33
Oshikoto	45	27
Otjozondupa	23	35

Source: Adapted from UNDP (2007)

According to NPC (2007) agricultural output alone is not sufficient to sustain most households. Livelihoods therefore are considerably diversified and a major source of income for many families is wages and salaries. Non farming activities, pensions and cash remittances are also important. About 70% of the whole population lives within a ribbon 10 kilometres wide along the River. This is where people first settled because water, good soils and pastures were available. This place is most suited to farming. Nowadays, people are also attracted by greater economic opportunities, especially in Rundu and the surrounding growing settlements, and the services that are available along the River.

Given these reasons, this study finds it appropriate to use Kavango East Region as a living proof of existing problems in the role of leadership in water technology innovations to enhance job creation. The findings from Kavango East Region will illustrate the potential severity of a threat, which Namibia may face especially in using water to address the issue of unemployment and inequalities. Some symptoms of unemployment have already manifested themselves by the manner in which the Kavango East Region is rated with 56% poverty according to the NSA-

poverty profile, 2013. This has led to the formulation of the problem in this study based on the role of leadership in water technology innovations to enhance job creation as presented below.

1.2.3 Statement of the problem

The problem identified by the Kavango Regional Council's Operational Audit Report (2013), is that the communities are not using water technology innovations to create jobs for themselves and to use water effectively, due to a lack of the involvement of their local political leadership. The Report goes on to state that this has resulted in high unemployment and high poverty levels. According to the report developed by Mendelsohn and Obeid (2006), they found that while the focus of Botswana's use of the Kavango has been on its tourism, Namibia viewed the river as a passing resource to be exploited before it leaves at Muhembo. Thus, the river is perceived as a source of water for irrigation and provides water for domestic and industrial needs in the Central Regions. A number of lodges and camp sites have been developed by private individuals and companies, and one conservancy, but the leadership has paid little attention to the creation of wealth and jobs through the use of water in the Kavango River. Traditional Leaders (Headmen) should know about water technology innovations and its importance through awareness and training from the experts through their regional leaders. According to Molenki (2012), the relationship between leadership and sustainable development is very important, because there is no development without leadership especially in the social, human and cultural dimensions.

Although there is leadership in place for the Kavango East Region, they are inactive and ignorant of the use of water technology innovations. According to Molenki (2012), it is clear that leadership plays an important role in administration and this role is in highlighting the human

side than in other aspects. Florida (2002), avers that, the role of leadership in the development and growth of such regions is paramount, with of course the understanding that leadership is one of the most creative elements of the regional economic development process.

According to the UN-World Ecomonic Forum (WEF), (2013), which ranked 144 countries on different performance areas, Namibia has been ranked 93 on water provisioning and 103 on innovation and sophistication factors. Namibia has been falling since 2002 by nine (9) ranks overall. This is worrisome statistics, giving the impression that the Kavango East Region is the poorest in Namibia (National Census, 2001 & 2011). The situation proved to be worse for the Region after the National Census of 2011. The Ministry of Agriculture, Water and Forestry and the Kavango East Regional Leadership find it difficult to understand the importance of water technology innovation in enhancing development, which has resulted in water technology innovation not being given the attention which it should have been given as part of its priorities which can be used to develop the Kavango East Region through the creation of better living conditions for all. Hence, the Region remains the poorest a thing that is difficult to understand because it has an abundance of water resources.

The problem that this study intended to investigate is the impact regional leadership in water technology has in enhancing job creation in Kavango East Region and what the local communities think about the role of their regional leaders in the use of water technology innovations for the betterment of their lives.

The principal questions which this dissertation has tried to answers are:

(a) What are the roles of leadership in water technology innovations to enhance job creation?

(b) How does leadership involvement in water technology innovations contribute to job creation?

These questions will be informed by the distinction between water usage, related job creations and other jobs within the Kavango East Region.

1.2.4 Objectives of the study

In order to examine the role of leadership in water technology innovations in enhancing job creation issues in Namibia the Kavango East Region will be used as a case study. The main objective of this study is to investigate the roles of leadership involvement in water technology innovations to enhance job creation.

The sub-objectives of this study will be:

- To investigate successes and limitations surrounding leadership involvement in water technology innovations to enhance job creation. This information was obtained from literature on World Archeology, the history of water usage in Namibia and Kavango East Region, by using the Kavango River as a sole source of water as well as government statistics reports and poverty profiles, as well as focus group discussions in the villages of Kavango East Region.

- To investigate the relationship between leadership, water technology innovations and job creation. Information was obtained by critically reviewing literature on leadership theories and political influence on leadership including colonialism and apartheid leadership impact on development and job creation. The researcher also consulted the grassroots people in the villages of Kavango East Region for focus group interviews to obtain this information.

1.3. Limitation of the study

The study had numerous challenges some of which were beyond the researcher's control. Financial resources were the major problem, since the grant received from National Commission for Research Science and Technology (NCRST) for this research was very small. This limited the researcher's frequency of travel to the Kavango East Region. The initial proposal was designed to cover at least more than one region for it to be a wider case study. However, due to the limited financial resources this could not be possible.

Another major challenge was time. The time to carry out the research was confined to the May/June academic recess, which meant that the focus group interviews were conducted in a short period of time and some appointments were missed. Lack of time also forced the researcher to work beyond normal working hours.

The area of study was also an issue worth to mention. Names such as Mashare, Ndonga Linena, Ndiyona and Mukwe are understood in two ways. Firstly, they are Constituency names, which are a political demarcation, and stretch across two traditional authorities. Secondly, they are traditional wards or villages, which are not explicitly demarcated, some villages stretches across two constituencies. During focus group interviews some respondents attended the interviews

which were not in their constituency but because the village covers two constituencies, it was difficult to separate the respondents.

The total number of villages from which the research sample was drawn came from the 2011/12 Population Census, which provided some of the research samples of the villages in the Kavango East Region, which are not ordinary rural villages but were upgraded to village council, and settlements namely Divundu and Ndiyona. The good news is that it was detected early and the two were excluded from the sample. This fact has the potential to undermine both the internal and external validity of this research. Another limitation was a lack of cooperation from some household respondents.

1.4 Delimitation of the study

Regional leadership has a role to play in a variety of areas of life in the Kavango East Region, such as health, education, trade, peace and stability. They can also influence the use of natural resources found in the Kavango East Region such as forestry and wildlife which are researchable problems. The scope of this study therefore, was delimited to probe the problem of the role of leadership in water technology innovations in enhancing job creation in the Kavango East Region. This study was narrowed down to focus on the experiences and understanding of the communities at the grassroots level in relation to the role of leadership in water technology innovations to enhance job creation using the Kavango East Region.

1.5 This study vs. the latest research in Kavango East Region

The most recent research on the usage of water in the Kavango East Region was conducted in 2006 by Mendelson and Obeid. Their research was commissioned by Research and Information Services of Namibia (RAISON). Their main objectives were as follows:

1. To provide information on Kavango's comparative advantages and constraints, especially as they relate to decisions on water and land uses and development.

2.To raise awareness and levels of enquiry and debate concerning these issues in Kavango, and to encourage Water and Land Boards to evaluate matters according to how they think about opportunities that provide for sustainable development (Mendelsohn and Obeid 2006:1).

This dissertation supports their approach, which entails that these (referring to the above objectives), and other questions related to the usage of water for sustainable development in the Kavango East Region. However, this study differs from previous studies in important ways namely:

- The previous study focused mainly on land and water usage in the Kavango East Region, while this dissertation goes beyond water and land to include the role of leadership in water technology innovations to enhance job creation in the Kavango East Region.
- The previous research was conducted 9 years ago, thus some contextual factors might have changed since then.

1.6 Significance of the study

Theoretically, this study explores significant theories and the literature on the role of leadership in water technology innovations that make it an important source of information for future researchers in this field. It provides a comprehensive investigation on the current theoretical parameters on leadership involvement in water technology innovations to enhance job creation in the Kavango East Region and how that influences development.

At African and SADC level, this dissertation contributes new knowledge about issues of leadership involvement in water technology innovations to enhance job creation which is the key in the fight against poverty and unemployment in Africa. Information uncovered in this study will enhance the reader's understanding of the complexity of leadership involvement in water technology innovations in Africa and SADC in general and Namibia in particular.

This study is particularly significant to Namibia, since Namibia is a country where the research was conducted and the result was predominantly based on the empirical data in the Namibian context. Based on this case study, the grassroots perspective will be better understood. This will also emphasise the need to involve communities in policy formulation, considering the role of civil society and community-based organisations in the use of water technology innovations to enhance job creation for the rural poor.

It also contributes to the body of knowledge regarding the role of leadership involvement in water technology innovations to enhance job creation by introducing another important dynamic of individual and community understanding of the role that leadership is supposed to play for them to use water technology innovations effectively to develop their respective villages.

1.7 Definition of Major Terms

(a) Allocation: To reserve or select for a specified purpose: allocated time for recreation; appropriated funds for public education; assigned the new computers to the science lab; designated a location for the new hospital; money that was earmarked for a vacation. Distribution of limited resources among competing requirements for employment creation. Specific allocations (e.g., air sorties, nuclear weapons, forces, and transportation) are described as allocation of air sorties, nuclear weapons.

(b) Community: Makins (1993:269) refers to community as a "group of people having cultural, religious, or other characteristics in common or interest." For example, as llles (ibid) explains, the community is a village (ward) of the rural Kavango Region who belongs to the same ethnic group. This definition is used in this study to refer to the communities of the Kavango East Region, who live in the rural villages.

(c) Constituency: a constituency is the body of people who are eligible to vote and elect a

leader, or a group of supporters or potential supporters. In this study it is also referred to as a group of people in a given area (district) who vote for their leader.

(d) **Economic water scarcity:** is caused by a lack of investment in infrastructure or technology to draw water from rivers, aquifers or other water sources, or insufficient human capacity to satisfy the demand for water. One quarter of the world's population is affected by economic water scarcity. Symptoms of economic water scarcity include a lack of infrastructure, causing the people without reliable access to water to travel long distances to fetch water, that is often contaminated from rivers for domestic and agricultural use. Large parts of Africa suffer from economic water scarcity; developing

water infrastructure in those areas could therefore help to reduce poverty. Critical conditions often arise for the economically poor and politically weak communities living in dry environments, says the United Nations.

(e) **Empowerment:** Community empowerment refers to the process of enabling communities to increase control over their lives. "Communities" are groups of people that may or may not be spatially connected, but who share common interests, concerns or identities. These communities could be local, national or international, with specific or broad interests. 'Empowerment' refers to the process by which people gain control over the factors and decisions that shape their lives. It is the process by which they increase their assets and attributes and build capacities to gain access, partners, networks and/or a voice, in order to gain control. "Enabling" implies that people cannot "be empowered" by others; they can only empower themselves by acquiring more of power's different forms (Waisbord S. (2005)). It assumes that people are their own assets, and the role of the external agent is to catalyse, facilitate or "accompany" the community in acquiring power.

Community empowerment, therefore, is more than the involvement, participation or engagement of communities. It implies community ownership and action that explicitly aims at social and political change. Community empowerment is a process of re-negotiating power in order to gain more control. It recognises that if some people are going to be empowered, then others will be sharing their existing power and giving some of it up (Baum, 2008). Power is a central concept in community empowerment and health promotion invariably operates within the arena of a power struggle.

Community empowerment necessarily addresses the social, cultural, political and economic determinants that underpin health, and seeks to build partnerships with other sectors in finding solutions. Globalisation adds another dimension to the process of community empowerment. In today's world, the local and global are inextricably linked. Action on one cannot ignore the influence of or impact on the other. Community empowerment recognises and strategically acts upon this inter-linkage and ensures that power is shared at both local and global levels.

Communication plays a vital role in ensuring community empowerment. Participatory approaches in communication that encourage discussion and debate result in increased

knowledge and awareness, and a higher level of critical thinking. Critical thinking enables communities to understand the interplay of forces operating on their lives, and helps them make their own decisions.

This research will focus on the conceptual and practical issues in building empowered communities. Through examples and case studies it will analyse how successful partnerships with communities can be forged even within the environment of vertical health programming. It will examine how empowerment oriented health promotion can be practiced both in local and global settings. In this study, the term is used to describe the action that leadership of the Kavango East Region is supposed to do to the community in order for the local community to be self-reliant and reduce poverty.

(f) **Enhance:** To raise to a higher degree; intensify; magnify, to raise the value or price of, to improve someone's life. The term is used in this study to refer to the enhancement of job creation in the Kavango East Region of Namibia.

(g) **Headmen/Headwomen**: A man or women who is the leader of a tribe or village in a rural setup. In this dissertation headmen/headwomen refers to the leader of the village in a rural setup of the Kavango East Region.

(h) **Inequality:** Economic inequalities are most obviously shown by people's different positions within the economic distribution - income, pay, wealth. However, people's economic positions are also related to other characteristics, such as whether or not they have a disability, their ethnic background, or whether they are a man or a woman. While The Equality Trust recognises the importance of these measures, the focus of our work is specifically the gap between the well-off and the poor in the overall economic distribution. This is reflected in the choice of terms and statistics in this section.

There are three main types of economic inequalities namely;

1. Income Inequality

Income inequality is the extent to which income is distributed unevenly amongst a group of people. Income is not just the money received through gainful employment, but all the money received from employment (wages, salaries, bonuses etc.), investments, such as interest on savings accounts and dividends from shares of stock, savings, state benefits, pensions (state, personal, company) and rent. Measurement of income can be on an individual or household basis – the income of all the people sharing a particular household. Household income before tax that includes money received from the social security system and is known as gross income. Household income excluding all taxes and other deductions is known as net income.

2. Pay Inequality

A person's pay is different from their income. Pay refers to payment from gainful employment only. This can be on an hourly, monthly or annual basis. It is usually paid weekly or monthly and may also include bonuses. Pay inequality therefore describes the difference between people's income and this may be within one company or across all income received.

3. Wealth Inequality

Wealth refers to the total amount of assets of an individual or household. This may include financial assets, such as bonds and stocks, property and private pension rights. Wealth inequality therefore refers to the unequal distribution of assets in a group of people.

(i) **Job creation:** The process by which the number of jobs in an economy increases. Job creation often refers to government policies intended to reduce unemployment. Job creation programs may take a variety of forms. For example, a government may lower taxes and reduce regulation to make hiring less expensive. On the other hand, a government may empower the community with resources for them to create jobs for themselves.

Kavango river: According to Mendelsohn (2009), The Kavango river is not an ordinary river. It is one of very few rivers that do not flow to the sea, and its water is unusually clean. There are no dams constructed on the river and it is much less polluted than most

other rivers. The delta downstream in Botswana is the largest RAMSAR wetland proclaimed with some international importance. As an oasis of extreme beauty and home to a rich assemblage of wildlife, the delta provides a lucrative tourism industry that forms the basis for a substantial part of Botswana's economy. Most formal employment in northern Botswana is based directly or indirectly on tourism to the delta.

Approximately half of the flow of the Okavango river comes down the Cuito, while the other half is in the Cubango as it enters Kavango at Katwitwi. Flows along the Cuito are much more stable while those from the Kubango vary from season to season. The highest flows follow good summer rainfalls in the upper catchment of the Kubango. No rivers or water flows into the river from Namibia or Botswana, and so all the river water comes from Angola. Similarly, whatever Namibia does to the river affects the quality and quantity of water flowing into Botswana.

(j) Leadership: is a person's ability to be a leader. A leader is one or more people who selects, equips , trains, and influences one or more follower(s) who have diverse gifts, abilities, and skills and focuses on the follower(s) to the organisation's mission and objectives, causing the follower(s) to willingly and enthusiastically expend spiritual, emotional, and physical energy in concerted efforts to achieve the organisational mission and objectives. A leader achieves this same state for his/her own self as a leader, as he/she seeks personal growth, renewal, regeneration, and increased stamina-mental, physical, emotional, and spiritual-through the leader-follower interactions (Bruce et al.,

2006). Leadership and Transformational leadership is likely to be more appropriate to the creative innovation process than Transactional leadership, since the creative endeavour

requires risk-taking, experimentation, change and challenge to the status quo - which transformational leadership encourages (Oke et al., 2009). This in short, explains that change, which brings development, needs leadership in order for it to take place.

(k) **Natural resources:** is all that exists without the input of human beings. This includes all natural characteristics such as magnetic, gravitational, and electrical properties and forces. It includes sunlight, the atmosphere, water, land (all minerals) along with all vegetation and animal life that naturally subsist in the universe.

Particular areas such as "The rainforest in Fatu-Hiva" are often characterised by the biodiversity and geodiversity that exist in their ecosystems. Natural resources may be further classified in different ways. Natural resources are materials and components (something that can be used) that can be found within the environment. Every man-made product is composed of natural resources (at its fundamental level). A natural resource may exist as a separate entity such as fresh water, and air, as well as a living organism such as a fish. It may also exist in its raw form which must be processed to obtain the resource such as metal ores, mineral oil, and most forms of energy.

There is much debate worldwide over natural resource allocations. This is partly due to the increasing scarcity (depletion of resources) but also because the exportation of natural resources is the bedrock of most economies (particularly for developed nations).Some natural resources such as sunlight and air can be found everywhere, and are known as ubiquitous resources. However, most resources only occur in small sporadic areas, and are referred to as localised resources. There are very few resources that are considered inexhaustible (will not run out in foreseeable future) – these are solar radiation,

geothermal energy, and air (though access to clean air may not be). The vast majority of resources are exhaustible, which means they have a finite quality and can be depleted if managed improperly. In this study, water from the Kavango River is referred to as a natural resource.

(l) **Physical water scarcity:** where there is inadequate water resources to meet a country's or region's demand, including the water needed to fulfil the demands of ecosystems to function effectively. Arid regions frequently suffer from physical water scarcity. It also occurs where water seems abundant but where resources are over-committed, such as when there is over development of hydraulic infrastructure for irrigation. Symptoms of physical water scarcity include environmental degradation and declining groundwater as well as other forms of exploitation or overuse.

(m) **Poverty**: Condition where people's basic needs for food, clothing, and shelter are not being met. Poverty is generally of two types: (1) Absolute poverty is synonymous with destitution and occurs when people cannot obtain adequate resources (measured in terms of calories or nutrition) to support a minimum level of physical health. Absolute poverty means the same everywhere, and can be eradicated as demonstrated by some countries. (2) Relative poverty occurs when people do not enjoy a certain minimum level of living standards as determined by a government (and enjoyed by the bulk of the population) that vary from country to country, sometimes within the same country. In this study, poverty is referred to as the condition of the rural community of the Kavango East Region.

(n) **Region:** According to the United Nations, regions are areas broadly divided by physical characteristics (physical geography), human impact characteristics (human geography),

and the interaction of humanity and the environment (environmental geography). Geographic regions and sub-regions are mostly described by their imprecisely defined and sometimes transitory boundaries, except in human geography, where jurisdiction areas such as national borders are clearly defined in law.

Apart from the global continental regions, there are also hydrospheric and atmospheric regions that cover the oceans, and discrete climates above the land and water masses of the planet. The land and water global regions are divided into sub regions geographically bounded by large geological features that influence large-scale ecologies, such as plains and features.

As a way of describing spatial areas, the concept of regions is important and widely used among the many branches of geography, each of which can describe areas in regional terms. For example, ecoregion is a term used in environmental geography, cultural region in cultural geography, bioregion in biogeography, and so on. The field of geography that studies regions themselves is called regional geography.

(o) **Role:** According to the Oxford Dictionary, a role is a prescribed or expected behaviour associated with a particular position or status in a group or organization. In this study it is referred to the role of leadership in water technology innovations in enhancing job creation.

(p) **Socio-economic:** An individual's or group's position within a hierarchical social structure. Socioeconomic status depends on a combination of variables, including occupation, education, income, wealth, and place of residence. This term is used in this

study to define the impact of leadership involvement in water technology innovations to enhance job creation which will result in socio-economic development.

(q) **Sustainable development:** The international Institute of Sustainable Development (2015), suggests that Sustainable development has been defined in many ways, but the most frequently quoted definition is that, "Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs. It contains within it two key concepts: the concept of needs, in particular the essential needs of the world's poor, to which overriding priority should be given; and the idea of limitations imposed by the state of technology and social organizations on the environment's ability to meet present and future needs."

All definitions of sustainable development require that we see the world as a system that connects space; and a system that connects time. When you think of the world as a system over space, you grow to understand that air pollution from North America affects the quality of air in Asia, and that pesticides sprayed in Argentina could harm fish off the coast of Australia. And when we think of the world as a system over time, we start to realise that the decisions our grandparents made about how to farm the land continue to affect agricultural practices today; and the economic policies we endorse today will have an impact on urban poverty when our children are adults.

We also understand that the quality of life is also a system. It is good to be physically healthy, but what if one is poor and doesn't have access to education? It is good to have a secure income, but what if the air in our part of the world is unclean? And it's good to have freedom of religion, but what if one cannot feed their family?

The concept of sustainable development is rooted in this sort of systems thinking. It helps us understand ourselves and our world. The problems we face are complex and serious—and we can't address them in the same way we created them. But we can address them.

(r) **Technology innovation:** In the literature, technological innovation is generally understood as bringing a new product, process, or service successfully to the market, meaning that it can be sold for a profit (Freeman, 1997). Technological innovation thus goes beyond invention, which depicts the elaboration and prototyping of a new technological principle; it is related to diffusion, which refers to the spread of new technology into the wider society. In this study water technology innovations is used as a catalyst to enable communities maximize production.

(s) **Traditional authority:** Traditional authority (also known as traditional domination) is a form of leadership in which the authority of an organization or a ruling regime is largely tied to local traditions or customs. The main reason for the given state of affairs is that it 'has always been that way'.

(t) **Unemployment:** Unemployment occurs when a person who is actively searching for employment is unable to find work. Unemployment is often used as a measure of the health of the economy. The most frequently cited measure of unemployment is the unemployment rate. This is the number of unemployed persons divided by the number of people in the labor force.

(u) **Village**: Is a clustered human settlement or community, larger than a hamlet but smaller than a town, with a population ranging from a few hundreds to a few thousands. Though

often located in rural areas, the term village is also applied to certain urban neighbourhoods.

(v) **Water:** Water (from the Anglo-Saxon and Low German word, wæter) is a colourless, tasteless, and odourless substance that is essential to all forms of life that we know of. There is a lot of water on our planet, and it exists in many places and forms: mostly in oceans and polar ice caps, but also as clouds, rain water, rivers or freshwater. Water is continuously moving through the cycle of evaporation, precipitation, and runoff, back to the sea. All known forms of life need water. Humans consume "drinking water" - water which has qualities compatible with the human body. Ordinary rain water in many countries is polluted and therefore not safe to drink. This natural resource has become scarce with the growing world population, and its availability is a major social and economic concern. Water takes many different forms on the earth: water vapor and clouds in the sky, waves and icebergs in the sea, glaciers in the mountains, and aquifers in the ground, to name but a few. Through evaporation, precipitation and runoff, water is continuously changing from one form to another, in what is called a water cycle.

Because of the importance of precipitation to agriculture, and to mankind in general, we give different names to its various forms: while rain is common in most countries, other phenomena are quite surprising when seen for the first time, for example hail, snow, fog or dew.

In many African countries, snow is a very rare phenomenon. When appropriately lit, water drops in the air can refract the beautiful colours of a rainbow. Similarly, water

runoff has played a major role in our history. Rivers and irrigation supply the water needed for agriculture. Rivers and the seas offer opportunities for travel and commerce. Through erosion, runoff play a major part in shaping our environment providing river valleys and deltas which provide rich soils and levels the ground for the establishment of population centres. Water also infiltrates the ground and goes into aquifers.

This groundwater later flows back to the surface via springs, or more spectacularly via hot springs and geysers. Groundwater is also extracted artificially from wells. Because water can contain many different substances, it can taste or smell very differently. In fact, we have developed a way to evaluate the drinkability of water: we avoid the salty seas and the putrid swamps, and we like the fresh pure water of a mountain spring. In this study, water is used to state an existing opportunity to produce food, in this way it can be used by leaders to create employment for the rural poor.

(w) **Water crisis:** is when there is not enough potable water for a given population, the threat of a water crisis is realised. The United Nations and other world organisations consider a variety of regions to have water crises of global concern. Other organisations, such as the Food and Agriculture Organisation, argue that there is no water crises in such places, but steps must still be taken to avoid one.

1.8 Organization of the study

The study is organized to investigate the role of leadership in water technology innovations to enhance job creation in the Kavango East Region. Hence, this gives it two major levels of investigation namely, the role of leadership in the Kavango East Region and the impact of leadership in the Kavango East Region. The study is divided into five parts as follows;

CHAPTER 1: INTRODUCTION AND BACKGROUND

This chapter clarifies issues and the framework of the research. It begins by contextualizing the study, its topic, relevance and importance. Generally, this chapter outlines the background to the problem in the role of leadership in water technology innovations to enhance job creation in the Kavango East Region. The chapter also discusses the statement of the problem with emphasis on the role of leadership in water technology innovations to enhance job creation as one of the major challenges to the development of Kavango Region. Furthermore, other important components of the study, such as its objectives, research design and methodology, as well as its significance, are also covered. The chapter ends by outlining the organisation of the study, definition of major terms and a summary.

CHAPTER 2: LITERATURE REVIEW

This chapter explores the relationship between theory and the research of leadership. In the first part it discusses various theoretical perspectives on the role of leadership in water technology innovations to enhance job creation in broader terms. It goes on to discuss the link between leadership and rural development, and outlines the importance of leadership-community relations as a key to sustainable development in the Kavango East Region. It also looks into the types of leadership, and then it discusses the challenges facing leadership in promoting the use of water

technology innovations to enhance job creation in the Kavango East Region. The chapter also briefly discusses and reflects on leadership accountability as an imperative for development efforts. This chapter also provides a general historical overview of water technology innovations in the global, continental and ultimately the Kavango East Region. It gives an outline of the old and new models of water technology innovations in Egypt, and discusses the problems experienced in Egypt, comparing it with the problems experienced in the Kavango East Region.

The chapter also critically looks at the history of job creation. It also uncovers current trends in job creation in the agriculture sector. The chapter also highlights the reasons for job creation in the water sector. This chapter also discusses the types of job creation in the agriculture sector as well as the history of job creation for Kavango East Region. The chapter also discusses gender and job creation, gender and policy, affirmative action, linking it to women empowerment.

CHAPTER 3: METHODOLOGY

This chapter highlights the research design and methodology used in this study. Research Design and Methodology contains practical information on how this research was conducted within the communities in the Kavango East Region. Data collection and assessment strategies, interpretation methods, and important ethical considerations also receive significant coverage in this chapter. The chapter condenses the wide-ranging topics of the field into a concise, accessible format in terms of sampling and data collection techniques.

CHAPTER 4: RESULTS AND DISCUSSION

Empirical data drawn from the case study of the Kavango East Region is analysed, discussed and interpreted in terms of the research problem that informs the basis of this study. The findings from the case study are considered against the theoretical provisions of the study to clearly

determine the gaps that are in the field that needs urgent attention. This chapter ends with a comprehensive summary.

CHAPTER 5: CONCLUSIONS AND RECOMMENDATIONS

The last chapter summaries the findings deduced from the case study. While the purpose of this research project was to bridge the gap in the existing knowledge established by previous research on leadership involvement in water technology innovations to enhance job creation in the Kavango East Region, it is pointed out here to what degree the results obtained from this case study succeeded in achieving this goal. Recommendations or policy implications are proposed in line with research results and conclusions. Finally, all references used in the text are listed at the end to enable the reader to consult these references as well as appendixes reflecting materials used.

1.9 Conclusion

This chapter contextualises the study by linking the topic to the research problem. The researcher relates how the decision on the topic was made. Furthermore, the researcher shows the preliminary literature review that led to the refinement and focusing of the initial ideas in the study. Hence, this chapter introduces the background and problem statement of the study. This leads to the conclusion that the major challenge for water technology innovations to enhance job creation is a gap experienced as the leadership interacts with the grassroots communities. Therefore, the focus of this study is on the role of leadership in water technology innovations to enhance job creation in the Kavango East Region. Part two of the study presents the principal theories of leadership and current trends in water usage in the Kavango East Region.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

This chapter contains the theoretical framework of this study with special reference to contested interpretations of issues of leadership involvement in water technology innovations to enhance job creation in the Kavango East Region. The focus on water technology innovations was informed by factors such as the fact that it is the key natural resource that is not scarce to find in the Kavango East Region and that can be used to promote job creation. This will, in turn help the poor inhabitants of the region as well as strengthen socio-economic developments in the area as well. Linking leadership to water technology innovations is one way to understand how communities can be empowered by using water in order to be self-reliant.

This chapter also links leadership involvement in water technology innovations with job creation. In this regard the study tested the impact which leadership can have if they consider using water as a tool to create jobs for the local communities of Kavango East Region. The chapter looks at leadership in general, the main theories of leadership and types of leadership. It critically analyses regional leadership of Kavango East Region, as well as delves into the link between leadership and rural development. After looking at the theoretical framework of leadership in general, another historical imperative of the role of leadership in water technology innovations to enhance job creation in the Kavango East Region was also dealt with.

Given this fact, this chapter draws heavily from published literature on the history and different research previously conducted in African countries such as Egypt and around the world. This

chapter starts by way of delineating the history of water technology innovations around the globe. It goes on to highlight some major aspects of water technology innovations such as challenges and opportunities facing water technology innovations around the globe, Africa, Namibia and Kavango East Region in particular. The chapter also considers the origin of water technology innovations in Africa, and why it was started. The chapter critically analyses the background realities of water technology innovations in Kavango East Region. The chapter also ponders the need for using water as a tool to enhance socio-economic development.

The chapter presents leadership as being a catalyst in socio-economic development. The chapter underscores the importance of leadership by looking into why leadership is needed in water technology innovation and also looks at the overriding perspectives on leadership involvement in water technology innovations to enhance job creation in the Kavango East Region. The focus on water technology innovations was informed by fact that water is a key natural resource that is not scarce in the Kavango East Region and that it can be used to enhance job creation among the poor inhabitants of the region. This is expected to strengthen socio-economic development. The chapter also discusses the types and models of leadership that suits the use of water technology innovations available to enhance job creation in the Kavango East Region. Linking leadership to water technology innovations was the way to understand how communities can be empowered by using water to be self-reliant.

The chapter uses an illustration through the study conducted by Ozor and Nwankwo (2008), in Nigeria. The overall purpose of the study is to ascertain the role of local leaders in community development programmes to Local Government Area (LGA) of Imo State. Specifically, the study aims to:

1. Ascertain the various roles played by local leaders in community development programmes in the study area;
2. identify the sources of information on community development;
3. describe the gender issues in local leadership as it relates to community development;
4. identify the constraints that hinder local leaders from achieving results in community development in the area, and;
5. draw implications for extension policy and practice. It is generally accepted that self-sustained rural community development is vital to the economic and social progress of any developing nation like Nigeria.

The chapter reviews the literature on what other authors have discovered regarding the role of leadership in water technology innovations in enhancing regional development. In the literature, technological innovation is generally understood as bringing a new product, process, or service successfully to the market, meaning that it can be sold for a profit. Technological innovation thus goes beyond invention, which depicts the elaboration and prototyping of a new technological principle; it is related to diffusion, which refers to the spreading of technology.

This chapter draws heavily from published literature especially on the history and different research previously conducted in Africa such as Egypt and around the world. This chapter starts delineating the history of water technology innovations around the globe. It goes on to highlight the major aspects of water technology innovations such as challenges and opportunities facing water technology innovations around the globe, Africa, Namibia and Kavango East Region in particular.

The chapter looks at the origin of water technology innovations in Africa, and why it started. The chapter critically analyses the background realities of water technology innovations in Kavango East Region. The chapter ponders on the need for using water as a tool to enhance socio-economic development. It continues with a less water –more yield concept. The chapter picks up leadership as being a catalyst to socio-economic development. Towards the end the chapter looks into the reasons why leadership is needed in water technology innovation.

With the above background, this chapter is looks at the impact of leadership on water technology innovations on job creation, in the Kavango East Region. With that done one has to move on to discuss the history of job creation, and look at the current trends in job creation in the agricultural sector. Here one has to consider the reasons for job creation through water technology, and highlight the common types of jobs created. In addition one will discuss the history of Job creation in the Kavango East Region as well as the labour migration in the Kavango East Region. The stimulus of labour migration in the Kavango East Region will also be considered here. Focus will be placed on policies of gender and job creation. The chapter ends with a discussion on affirmative Action.

2.2 Leadership in general

Literature on rural leadership is full of descriptions of the challenging nature of rural areas. Leadership is necessary to assist rural areas to expand their traditional boundaries and bring meaningful development. As society becomes more complex, rural areas become equally complex, placing a greater demand on the individuals who lead them.

But what is leadership? Do leaders have special personalities and/or physical traits? Is a leader an individual who closely monitors the performance of others? Are leaders individuals who

articulate a vision and inspire other members in the organization to believe in that vision? Do leaders tell people what to do, tell them when to do it, and punish them if things are not done as prescribed? Do leaders have a specific behavior that they exhibit in the course of their interaction with others? Or, are leaders individuals who can cultivate a special type of relationship with people, making each individual feel unique? In pursuit of answers to these questions and to establish a clear definition of leadership theorists, researchers and practitioners have spent over a century researching and analyzing various theories on the subject of leadership.

In the majority of the literature accumulated over the past century, it is clear that definitions and meanings of leadership are numerous and at times conflicting. For example in an earlier work, Burns (1978) indicates that there are 130 definitions of leadership. Furthermore, Bennis and Namus (1985) postulate that over 350 definitions of leadership have been coined over three decades.

Leadership has also been defined from a behavioural and interpersonal perspective. For example, Avolio (1999) defines leadership as the quality of the behavior of individuals whereby they guide people or their activities in an organized effort. Despite the multiple definitions of leadership, the following components can be identified as being central to the phenomenon of leadership:

(a) leadership is a process;

(b) leadership involves influence;

(c) leadership occurs within a group context; and

(d) leadership involves the attainment of goals.

2.2.1 Main theories of leadership

Leadership can best be defined as a process whereby an individual influences a group of individuals to achieve a common goal (Skidmore, 1990). Defining leadership as a process means that it is not treated as a trait or characteristic residing in the leader alone, but as a transactional event that occurs between the leader and his or her followers. It is a process which implies that a leader affects and is also affected by those whom he or she leads. It emphasises that leadership is not a linear, one-way event, but rather an interactive event. However, it is important to note that it is the leader who often initiates the relationship, creates the communication linkages, and carries the burden for maintaining the relationship.

Defining leadership as a process also emphasises the significance of relationships, which are very important in rural areas. The type of leadership effective in rural areas must value relationships, individual differences and the important characteristics of rural communities (Avant, 2006). Therefore, to be an effective leader in rural areas, a special type of leadership style should be present. Leadership style may be defined as a pattern of specific behaviours or attitudes that a leader places on different leadership functions (Casimir, 2001). Although leadership is viewed as a process, leadership style is the glue that holds the process together.

Approaches to studying leadership have resulted in a focus on leadership styles prevalent in the 1990s and in the first decade of the 21st century. Literature reveals a number of schools of

thought about leadership styles. It suggests that leadership styles have developed through at least four main generations of theories namely:

- trait theories,
- behavioural theories,
- situational theories and
- transformational theories.

The available literature also points out that the four theories are not mutually exclusive or time bound. In other words, although it is true that the progression of thinking tends to follow a sequential path, it is very evident in the literature that elements of the four generations of leadership theories have experienced cross-fertilisation (Bass, 1998 ; Yukl, 2006).

The first of the four generation of theories are the trait theories, where a universal set of effective characteristics is identified. Some of the earliest studies of leadership in the United States are based on the assumption that good leadership is synonymous with the possession of certain traits (Stogdill, 1948). Specifically, some of the traits include such widely diverse attributes as social characteristics, intelligence, and even physical appearance. Other traits highlighted are the ability to supervise, initiative, self-assurance, and individualised approaches to work (Ghiselli, 1963).

The first half of the 20th century was dominated by research that examined leadership traits. In the early 1970's, there was a noted shift from defining leadership traits to an approach that

related those traits to leader effectiveness, reflecting a shift from trait research to behavioural research that was in progress.

The second are the behavioural theories, where a universal leadership style was identified. Behavioural theories began to have a major influence on leadership studies during the 1950s and 1960s. The Ohio State University Leadership Studies that began in 1945 are considered to be the origin of the behavioural approach. Those studies established two of the most well-known approaches to understanding leadership styles. For example, the studies resulted in leadership behavior being charted on two dimensions namely: initiating structure, wherein the leader acted to further the work objectives of the group, and consideration, in which the action focused on interpersonal relations and the needs of the workers.

Leaders who are high on the initiating structure concentrated on employees' tasks and procedures. They devoted much of their efforts on scheduling work, devising work activities, and communicating information about the work. Leaders high on consideration structure focused much on understanding their employees and building productive working relationships. Behavioural theories implied, at least theoretically, that training and education in leadership could create effective leaders (Avant, 2006 ; Likert, 1967 ; Yukl, 1998).

At the same time as the Ohio State University's studies, Bales (1950) and his associates concluded from their studies that two categories of leadership behaviour were primary namely: task-oriented and socio-emotional. Leadership studies at the University of Michigan also identified these two dimensions, calling them job-centred and employee-centred (Likert, 1967). Other terms for these two dimensions include task behaviour and relationships (Hersey & Blanchard, 1977) and concern for production and people (Blake & Mouton, 1964).

Several researchers saw these dimensions as opposite sides of the same coin. A leader that was high on one dimension was not necessarily low on the other. Blake and Mouton (1964), however, feel that a leader could be either high on both dimensions at the same time, low on both dimensions at the same time, or somewhere in between. This combination was the basis of their managerial grid, where the leader's style is determined by the amount of attention given to both dimensions. This grid has nine levels of concern for people and nine levels of concern for production.

The third are the situational theories, where a combination of leader, subordinate, and situational characteristics were considered (Hersey & Blanchard, 1982; Sommer, 1995). Two well-known researchers on leadership, Douglas McGregor (1960) and Fred Fiedler (1967) were very instrumental in the development of situational theories. McGregor theorised that individuals' potential for leadership is greatly influenced by their assumptions about the nature of human beings. Fiedler believes in the contingency theories which states that leadership is based on situational factors. He sees the leaders' capacity to influence subordinates as largely a matter of the leader's style and personality, the characteristics of the work group, and the needs of the work situation (Kettner, 2001). Similarly, Hersey and Blanchard (1977) identify four different leadership styles that could be drawn upon to deal with contrasting situations. In their research, they provide an influential discussion of choosing the appropriate style for a particular situation.

The other theory is the transformational theory where the focus of the leader is on the unique connection between the leader and the followers. This form of leadership accounts for performance and accomplishments for the larger group and the organization (Bass, 1985). Transformational leadership theories evolve from the transactional theory which focuses on the

leader awarding or disciplining followers depending on the adequacy of their performance (Bass, 1998).

Transformational leadership goes beyond the attempts of the leader to satisfy the followers through transactions or exchanges based on contingent rewards. In contrast, transformational leaders typically heighten awareness and interest in the group or organization, increase confidence, and move followers gradually from concerns for existence to concerns for achievement and growth. Furthermore, transformational leaders develop followers to the point where they are able to take on leadership roles and perform beyond established standards or goals (Avant, 2006 ; Bass & Avolio, 1994).

Each of the leadership models discussed above offer suggestions of various aspects that might be appropriate for rural leadership. Taken together, these and literally hundreds of other leadership models identify fundamental aspects of leadership that are appropriate for developing a rural leadership model. In summary, some of these aspects include the significance of the work environment and the importance of tasks and relationships. Other attributes of leadership models include trust, integrity, power, influence and finally cultural competence (Northouse, 2007). The authors propose that of all the leadership models discussed they seem to point to the fact that the transformational leadership is the best model for rural areas. This leadership model is also a good model for this study.

Rural Leadership Model

According to Arches (1997), transformational leadership theory is an example of the development of leadership theories that have surpassed the traditional bureaucratic organizational models of leadership. Transformational leadership is a model that includes a

structure that stresses leadership styles that allow for flexibility and individualization. It encourages input in decision making and stresses the importance of teamwork and social relationships. A transformational leader is very important to the community. This leader has a clear perception of her/his followers and is aware of his/her own values, needs, vision, and acts in a manner that promotes the needs of both. This leadership model recognizes the importance of the connectedness of the individual, the work group, and the community. It calls for individual input while working for the overall benefit of the community. This type of leadership is ideal for the situation in the Kavango East Region, since there seems to be a challenge for a leader-community relationship.

As a result, individuals feel included and they are prone to want to spend more time and energy to meet the needs of the community. Transformational leadership creates an atmosphere in which all individuals feel included and appreciated which motivates them to enhance their own satisfaction while working to promote the good of the community (Barling, Weber & Kelloway, 1996).

Transformational leadership is empowering and participatory because it promotes decision-making and fosters local leadership. Teamwork is emphasised and the community is viewed as a system of people working together with common dreams. This leadership style creates a culture based on openness, trust, respect, and inspires a team spirit. Transformational leadership

has several implications for addressing the problem of leadership in rural areas. It has been well established in extant literature that rural areas are in need of good leadership (Arches 1997).

Transformational leadership is a model that provides the type of leadership necessary to deal with the complexities that exist in most rural communities. It has the elements of trust and respect that facilitates the cooperation needed for effective teamwork. Furthermore, it emphasises a relational approach in which leaders show interpersonal consideration through relationship building, empathy, and interdependence that is so appropriate for rural areas (Avant, 2006).

Pigg (1999) suggests that community leadership should be based on our knowledge of communities rather than organisations. He supports this claim by stating that community leaders cannot rely on formal authority or power positions. Leaders should, on the contrary, depend on their ability to build relationships and support from the community itself. This idea of building relationships is not the way organisational leaders conduct business. The authors use this difference between community leaders and business organisations as one way of supporting their rejection of formal leadership theories.

Transformational leadership is a model that goes beyond the traditional approaches to leadership. It approaches the community as an interactional field. The community field is a process of interrelated actions through which residents express their common interest in the local society. Transformational leadership influences relationships among individuals, leaders and collaborators who bring about real change that reflect their mutual purposes (Northouse, 2007; Chemers & Ayman, 1993). By thinking of leadership as relationships rather than

associating the term with position and responsibilities could help overcome many rural community residents' reluctance to "get involved" or "be a leader" (Pigg,1999). This way of thinking certainly lends credibility to the problems facing rural community leadership development today.

One major concern is the unwillingness of members of society to get involved in their communities. Defining leadership as a relationship might alleviate the fear certain people have in being called leaders. This model also has some major practical implications for examining leadership in social work education and profession. One of the main premises of this leadership model is also an interactional approach.

This model stresses the importance of social relationships when working with communities and redefining one's perception of leadership. Leadership has been traditionally conceptualised as an individual skill. The corresponding approach to research and theory testing assumes an individualistic conceptualisation of leadership, in which a sharp distinction is drawn between leaders and followers. Within this tradition, leadership and leadership development is thought to occur primarily through the individual. Much research has shown the complex nature of interaction between a leader and the social and organisational environment. From this perspective, the transformational leadership model proposes a way of working with communities to build new leaders and engage communities. In many geographical locations, social work practitioners are viewed as being very distant from the local community (Podsakoff, Mackenzie & Bommer, 1996).

According to (Avant, 2006), transformational leadership is important for social work practitioners when working with rural communities. This theory approaches leadership as a social process that appears to engage everyone in the community by moving away from the formal structure that guides many organizations. As indicated earlier, leadership in the social work profession is becoming increasingly more important and complex as the profession itself has changed. This theory proposes an approach to leadership that will assist rural communities in addressing some of the social, cultural, economic, political and demographic factors that are creating changes in human services delivery systems.

Shifting the focus of leadership from the leader to emphasising the quality of the relationship between the leader and the followers creates the opportunity to build new communities and address some of the issues facing rural communities (Pigg, 1999). Transformational leadership suggests some practical applications to addressing the problems in leadership facing rural communities (Yukl, 2006). Based on extant literature the issue of leadership is critical to rural communities in the 21st century. Transformational leadership appears to be a model that can benefit rural communities. However, further research is needed to assist social work leaders in understanding the depth of this theory so that it may be used more effectively to bring about change in rural areas.

2.3 Regional leadership of Kavango East Region

The Kavango East region is facing a lack of leadership, which is supposed to bring about water technology innovations at the centre stage to enhance job creation for the local inhabitants. Lack of leadership is a ticket to lack of development. According to Mendelsohn and Obeid (2006), "…a number of lodges and camp sites have been developed by private individuals and

companies, and one conservancy, but the leadership has paid little attention to the creation of wealth and jobs through the use of water in the Kavango River".

Molenki (2012) suggests that, the relationship between leadership and sustainable development is very important, because there is no development without leadership, especially in the social, human and cultural dimensions. Anantatmula (2010), also agrees and further suggests that leadership role is of great importance in motivating people and creating an effective working environment in order for the project team to meet greater challenges in today's global economy.

Advanced Countries that have adequately utilised water technology innovation in their daily operations, have realised enhancement in regional development and better living condition of their people, (Tellis, 2008). According to the Government of the Republic of Namibia (GRN) Vision 2030, the country should develop itself through the use of its natural resources and technology innovation. Namibia has 14 regions and these regions are not at the same level when it comes to development or economic growth, service delivery and available important infrastructure. The 14 regions are at different levels, due to the apartheid policies, which turned some regions to be core regions (Khomas, Erongo and Karas Regions) because to their better water technology innovation, while many northern and north eastern Regions (Zambezi, Kavango east, Kavango west , Ohangwena, Oshana, Omusati, Kunene and some parts of Oshikoto Region) were not given enough attention in terms of the use of water technology in enhancing development, and are now regarded as Resource Frontier regions. These Resource Frontier regions are characterised by high poverty levels, lack of public infrastructure and a high migration of its population to other regions.

The Government of the Republic of Namibia (GRN) has established fourteen (14) Regional Councils under the Act of 1992; this law was a plan to bring the government closer to the people especially the previously disadvantaged. According to a Practical Guide of Decentralisation Enabling Act (2008) of Namibia, the main responsibility of regional councils is to draw up regional development plans and administer formal settlements (Regional Council's Act 22, 1992.). Additionally, they should also be responsible for delivering basic services, like rural water supply, primary healthcare and primary education, according to the Decentralisation Policy for Regional Councils.

The results of the study can be used to develop a base of knowledge from which regional and local leaders could assess their leadership roles ‘strengths and weaknesses, and improve their leadership performance through in-service leadership training in water technology innovations to study other regions in Namibia. Additionally, this study will contribute to the body of knowledge as it will provide a basis for the development of materials for capacity building in leadership and pre-service courses in leadership in the decision making process of water technology innovations to promote job creation.

Many argue that leadership may be the catalyst through which these changes may occur. Communities that are creative, entrepreneurial, and committed to building a shared vision and consensus are found to be better prepared to address community needs (Bell & Evert, 1997). For rural communities to be sustained, there is need for local leadership to take charge and guide the way into the future. A new generation of leaders is needed to build local partnerships for managing change in today’s diverse communities (Tabb & Montesi, 2000). Leadership itself has played a fundamental role in nearly every aspect of society, and is particularly important in developing rural communities.

In 1908, President Theodore Roosevelt initiated the Country Life Commission and charged it to study the major aspects and issues in rural areas in the United States of America. A primary finding of that study was the overriding lack of quality leadership within rural areas. Yet, reflecting on leadership by itself is inappropriate leadership (as defined later within this chapter) is the accomplishment of group purpose, which is furthered not only by effective leaders, but several other factors including innovators and entrepreneurs, available resources, and social capital, or contributing to the common good (Gardner, 1990). Therefore, leadership must be considered within a context, regarding a specific purpose, in this case the role it plays in the use of water technology innovations to enhance job creation in Kavango East Region.

Therefore, one of the context and purpose behind this study is, the rural communities and how leadership relates, interacts, and affects individuals, social capital, and change within the communities of the Kavango East Region.

2.4 Leadership and rural development

Rural communities have unique ideals and values, as well as a culture and life of their own. Unfortunately, many of today's rural areas are in trouble. Issues facing rural communities are vast and numerous; more specifically, rural communities in Namibia. Still, many argue that leadership may be the catalyst through which positive changes can take place. Local leaders are concluding that if economic and community development is to take place, it is their responsibility to make it happen. Fortunately, some of today's rural communities are doing exceptionally well. But what makes these communities different? And what community aspects

come into this equation? Finally, could the presence of effective community leadership be the key to leading troubled communities to a brighter tomorrow.

Ozor and Nwankwo (2008), conducted a study in Nigeria. The overall purpose of the study was to ascertain the role of local leaders in community development programmes in Idea to Local Government Area (LGA) of Imo State. The study aimed to:

1. Ascertain the various roles played by local leaders in community development programmes in the study area;

2. Identify the sources of information on community development;

3. Describe the gender issues in local leadership as it relates to community development;

4. Identify the factors that hinder local leaders from achieving results in community development in the area; and

5. Draw implications for extension policy and practice.

They said that, it is generally accepted that self-sustained rural community development is vital to the economic and social progress of any developing nation like Nigeria. Unless the ways and means of massively accelerating development in the rural areas where over 80% of Nigeria's population reside (Guardian Newspapers, 2008) our national goal of self-sufficiency and control over resources may continue to evade us. Interestingly, the resources already exist, but what is missing is the mastery of the practical wisdom and technology to mobilise them for our overall benefit (leadership). The main argument in favour of community-based development is that communities are deemed to have a better knowledge of the prevailing local conditions (such as who is poor and deserve to be helped, or the characteristics of the local micro-environment), and

a better ability to enforce rules, monitor behaviour, and verify actions related to interventions (Platteau and Gaspart, 2003).

The true success of a comprehensive economic and social development programmes in Nigeria is primarily dependent upon the extent it contributes to the well-being of those living in rural areas. This is because the majority of Nigeria's population that reside in rural areas, depend on agriculture for their livelihoods. The development that is envisaged is not merely a handout of benefits to people in need, but a process of empowerment where rural communities can acquire mastery over their own destiny through the realisation that they, individually and collectively can do something to improve their circumstances. This is a refocusing strategy different from waiting on government, oil companies or other organisations/donors to solve their own problems themselves.

According to Ajayi (1995) community development is a social process thorough which human beings can become more competent to live with and gain some control over local conditions and the changing world. Sustainable community development cannot take place through force or order, but is most likely to happen when all actors participate and share their ideas, visions and responsibilities equally and democratically in steering and implementing their community or village development projects (Ajayi and Otuya, 2006).

According to Orapin (1996), one approach in creating sustainable rural development is through giving the main actors (villagers living in the community) an equal opportunity to think and plan their own future. This underpins the need for effective leadership at the local community level in order to harness the efforts of the rural people towards their own development. Usually, community development programmes aim at creating awareness of rural possibilities; providing

information on resources, inputs and infrastructure; deploying technical assistance; skills acquisition and development; increasing literacy levels; improving productivity and productive systems; adapting appropriate technology in agriculture; sensitising potential volunteers and donors among other things.

Ideally, most community development programmes in developing nations focus on peoples' felt needs and basic amenities such as the provision of good roads, electricity, health clinics, markets, school buildings, and farm settlements among others. These goals can only be achieved through the combined and collective efforts of all those who share the conviction that rural community development must be accorded a high priority in our drive for poverty alleviation and national self-sufficiency.

Furthermore in order to help bring a rural community to action, it is necessary for individuals and groups to provide good leadership. When good leadership is provided, the people participate voluntarily in the accomplishment of stated objectives. The approach to rural community development is always through local leaders who not only act as pioneers of projects but also help in influencing and motivating their people to action.

For any rural community development to be successful, influential local leaders must be involved or else they might undermine the progress of such programmes. Therefore, any agency or organization coming up with a development programme for the community must initially "clear" with these influential local leaders, a process otherwise referred to as legitimisation. It is saddening to recall that rural community development was neglected by successive government since colonial rule in Nigeria. For instance, while the colonial government concentrated their development projects such as roads, schools, hospitals, and pipe-borne water around the major

cities and built network of roads to areas where they exploited our natural resources, the rural areas were completely left out. The post-independence governments are not equally left out in the practice of rural neglect as only communities whose sons and daughters were in government benefited from development projects otherwise referred to as "national cake". Even where good development programmes were designed for rural areas, in most cases they failed because there were no scientific and empirical studies of the target rural communities which could guide their implementation. Since the 1980's, Nigeria and many African countries have experienced a rising wave of revolts and restiveness by some rural communities. Governments have not been able to tackle these crises because there were no reliable baseline studies on the problems of such rural people (Ovwigho and Ifie, 2004).

It is estimated that Nigeria has over 25 million families living on farms who are supposed to be reached by extension workers. Currently, the extension worker farm family ratio is 1:250. This means that 100,000 extension workers have to be at work in the rural communities. Unfortunately, Nigeria cannot boast of one tenth of this number currently. This dearth of extension workers indicate that many farmers are not reached and therefore not exposed to new innovations and technologies in agriculture. Since it will take years to produce the required number of extension workers, and no government can afford to employ the number needed for effective coverage of extension work in the rural communities, the only logical solution will be to utilise the services of local leaders to compliment and accomplish the rural development tasks. It therefore falls on the people in rural areas to free themselves from the shackles of underdevelopment with or without government support. The questions now are what roles do the local leaders play in community development efforts in the place under study? What are the

sources of information for community development? What are the gender issues existing in community development in the area? And what are the constraints to effective leadership in community development programmes in the area. These questions form the focus of this research study. (Ovwigho and Ifie, 2004).

The study in Nigeria was carried out in Ideato LGA of Imo State Nigeria in 2006. Ideato LGA is made up of 24 communities. These communities were stratified into five zones based on their geographical location. One community was randomly selected from each zone. These include Dikenafai, Ogboka, Akpulu, Ntueke, and Arondizuogu. The population comprised all the leaders and non-leaders in the selected areas without restriction to any other socio-economic characteristic. A stratified random sampling technique was used in selecting the two categories of respondents in each community.

In order to select the actual leaders and non-leaders in the communities, a pre-test was conducted. In the pre-test, the village heads in each community were asked to identify 30 leaders in their respective communities. Subsequently, the identified leaders were equally asked to identify 20 actual leaders in their respective communities. From the later list which was ranked, 12 leaders were finally selected from each community giving a total of 60 leaders from the five zones. On the other hand, the non-leaders comprised any other member of the communities who were not selected in the first or second instance. Twelve non-leaders were selected from a list of 80 farm families provided by the extension agents in the respective communities. This gave a total of 60 non-leaders from the five zones. However, valid responses that are suitable for analysis were obtained from only 48 leaders and 56 non-leaders giving a grand total of 104 respondents for the study.

A well-structured and validated interview schedule with items based on the objectives of the study was used for primary data collection. The instrument was pre-tested for reliability using the split-halve correlation technique and validated by experts in the agricultural extension and rural development profession (the academia, extension administrators and rural development experts). The pre-test shows a reliability coefficient of 0.82 and was significant at 0.00 probability level. According to Bryman (2004), a reliability coefficient of 0.8 and above implies a satisfactory and an acceptable level of internal reliability. Focus group discussions (FGD) were conducted in each zone to make the study more interactive and participatory oriented. Items discussed were centred on the specific objectives of the study. Trained extension agents assisted in the collection of data under the supervision of the researchers. The researchers assessed the role played by local leader in community development.

In order to ascertain the various roles played by local leaders in community development programmes, statements bordering on roles of local leaders in community development obtained from extensive literature and interviews with experts was structured and used. A four point likert type scale with values of very important = 4; Important = 3; less important = 2; and not important = 1, was used to identify the most important roles played by local leaders in rural community development. A cut-off mark of 2.5 was used to indicate the level of importance of each statement. Statements with values of ≥2.5 indicated an important role as perceived by the respondents while statements with values <2.5 indicated an unimportant statement as perceived by the respondents. In order to identify the sources of information for community development in the area, a list of possible sources of information for community action and development also obtained from literature and interviews with experts was prepared and the respondents were allowed to indicate the most reliable sources of information. To describe the gender issues to

local leadership as it relates to community development, relevant questions bordering on gender issues and obtained from literature and case studies were structured and used in a Focus Group Discussion (FGD). This discussion was organised in each of the five zones that were chosen for the study.

In identifying the constraints that hinder local leaders from achieving results in community development in the area, a four point Likert type scale was used to determine the extent to which some list of issues may pose as a constraint or possible solution to the constraints. These constraints were obtained from practical experiences, case studies and related literature on local leadership and community development issues worldwide. The response options and values assigned were; not at all = l; to some extent = 2; to a great extent = 3; and to a very great extent = 4. Statements with values of ≥2.5 indicated a major constraint to effective leadership in rural community development and vice versa. Percentage scores, mean scores, and standard deviations were utilised in realising the objectives of the study.

Results show that the most important roles played by local leaders in community development in the area constituted about 78% of the perceived roles and they include; making decisions on different issues affecting the community that require an integrated approach (= 3.82); acting as liaison between governmental and non-governmental agencies and the community for financial and technical assistance (= 3.80); monitoring and evaluation of projects for proper implementation (= 3.78); and raising funds through levies, donations, launchings, etc to finance community development projects in the area (= 3.76). Other important roles include statements 5-18. On the other hand, the respondents viewed statements 19-23 as unimportant roles played by local leaders in community development in the area. This constitutes about 22% of the overall perceived roles. In most rural communities, local leaders are normally democratically elected to

represent the different sections in the community. This provides the opportunity for the elected leaders to make genuine decisions that will favour the majority of the people.

Decision-making is a difficult task especially when it concerns rural communities. This is because the integrity of the decision-makers is always at stake hence they strive to live up to expectations in taking good decisions for their people. In the Focus Group discussions conducted, the respondents noted that they hold the decisions of their leaders in high esteem and endeavour to comply with the directives they give. Extension workers therefore should make good use of this opportunity by harnessing the efforts of the local leaders into their programmes to ensure sustainability and success. They can achieve this by involving local leaders in programme development and implementation (Chukwuone, Agwu and Ozor, 2006). Given the fact that the local leaders are always vocal, intelligent, cosmopolitan, knowledgeable, and sometimes educated, their role in liaising between agencies of development and their communities stand out clearly. The respondents also observed that in seeking external financial or technical aid, they have always used their best brains in the community to obtain that. This is because such people are well connected to the corridors of power or to influential people/organisations.

They also know the best approaches to bring them into the community for assistance. Such leaders can also promote extension work especially where they have been involved from the outset. The success of any development project depends on whether it has good machinery for monitoring and evaluation. Monitoring and evaluation is necessary in order to make prompt adjustments during the life of the project and to ensure compliance with targeted objectives. Respondents noted that the failure to properly monitor and evaluate projects in the past has led to the collapse of many development projects initiated in their community.

One of the major roles played by local leaders in the area of study was the issue of raising funds for community development. When this is done internally, it was through launchings, donations, levies and fines, as opposed to donor funding that comes from outside the community. The respondents noted that raising funds for projects in the rural community is a very sensitive task because most in most cases, the funds are not properly used due to corruption and a lack of transparency. This has often generated crises in most communities where some interest groups that are not satisfied with the way previous projects were executed, may boycott participating in future launchings or paying levies. This may result in actions that may deteriorate into open chaos. Extension workers should be careful not to involve themselves with community finances and concentrate on their educational responsibilities (Ozor, 2006).

The study conducted by Ozor and Nwankwo (2008), indicated that where there are strong and well informed and educated local leaders, their community tend to be empowered more and this contributes to rural development. Observation show that this sort of leadership is lacking in the Kavango East Region. Their study also revealed that, Local leaders are indispensable set in any community. Where such leaders are dedicated, honest, and hardworking, the community tends to develop rapidly whilst living in peace. Respondents noted through the FGD conducted that most of the community development projects in the community were initiated by the local leaders who also educate the people on the consequences and impact of such projects before they are implemented. The leaders were able to play this role because of their high level of intelligence, being cosmopolitan, good level of education and good connections. Extension should always make good use of the local leaders in galvanising mass participation and adoption of innovations in the rural communities because of their strong influence on the people. When Extension

workers work hand-in-hand with the local leaders, they can provide more information for rural community development.

Some of the key findings on the role played by local leaders in rural development was that, among the prominent roles played by the local leaders include; making decisions on different issues affecting the community that require an integrated approach, acting as the liaison people between governmental and non-governmental agencies and the community for financial and technical assistance, monitoring and evaluating projects for proper implementation, and raising funds through levies, donations, launchings, etc to finance community development projects in their areas. Further results showed that the main source of information on community development in the area was through the local leaders. This role played by local leaders in Nigeria concerning rural community development is lacking among the leadership of Kavango East Region.

It is worth noting that their study revealed some constraints; the results showed that out of the 23 constraints considered, respondents perceived 19 factors as major constraints and four as not being constraints. The most important of the constraints include; incompatibility of government policies with community programmes (= 3.84), insufficient sources of funds for community development projects (= 3.83), poor implementation of programmes (= 3.80), and gender bias (= 3.77).

Some of these constraints have been detected to be the same in the Kavango East Region, such as lack of funding, and gender bias. The study revealed that, when programmes are poorly executed or implemented, the grassroots get discouraged to participate in other programmes initiated by the leaders. Leaders should therefore ensure that they gain the credibility of their subjects and

sponsors and further commit their energy and time in a transparent way towards achieving success in community development programmes. To check this, erring local leaders must be disciplined through appropriate mechanisms. Such mechanisms must involve the possibility of detecting embezzlement and punishing the leaders in the event of a proven fraud (Platteau and Gaspart, 2003) By requiring the leader to repay the aid money which he or she has misappropriated, other leaders will desist from the same practice. Gender bias, especially against women was highlighted as one of the limiting factors to local leadership in the area of study.

According to Ugbo (2007), the role of the local leaders in rural and community development is influenced by their gender. Ugbo (2007), maintains that women do not play the same level of leadership role as their male counterparts. The respondents noted that in most cases, women were not involved in decision-making processes because they felt that women had little or nothing to offer. Numerous studies have proven the contrary, that women possess the necessary skills and capacity to deliver good programmes in the community (Ajayi and Otuya, 2006; Ugboh, 2007; Manju, 1995). Therefore, both men and women should be involved in leadership roles in community development so that they complement each other's efforts where necessary. Mechanisms to make local leaders account for any irregularities and mismanagement added value to the success of the rural development efforts in Nigeria, a thing which is lacking in the Kavango East Region.

2.5 The Role of Leadership in water technology innovations

The study reviews extant literature on what other authors have established on the role of leadership in water technology innovations in enhancing regional development. In the literature available, technological innovation is generally understood as bringing a new product, process, or service successfully to the market, meaning that it can be sold for a profit (Freeman, 1997). Technological innovation thus goes beyond invention, which depicts the elaboration and prototyping of a new technological principle. It is related to diffusion, which refers to the spread of new technology into the wider society.

"Consumers today have a better standard of living than those consumers had a decade ago and are much better off than consumers were a hundred years ago. That improvement is due to technological innovation. Thus, technological innovation is a critical driver for improvement in consumers' living standards, survival, growth, success and the wealth of nations. Understanding innovation is of great importance because of its huge impact on these three levels of consumers, and nations"(Tellis, 2008, p.1).

Accelerating innovation and technology will help address the complex challenges facing America. Technology innovation can be a means to ensure that future actions are more sustainable and be an economic driver, help businesses thrive, create jobs and be a source of U.S. exports (EPA, 2013). The improvement of water treatment and management systems and technological solutions in recycling and sea water desalination together with other non-technological solutions should be explored. These approaches require the attention and action of governments around the world (Rights, 2014). This means that leadership involvement is a paramount aspect to any developmental activity. My opinion is that leadership should be

involved in order to see development taking a centre stage in the Kavango East Region, in the form of employment creation.

Among the factors listed by the researchers mentioned below, that affect water technology innovation in enhancing development are executive management support (Bingi, 1999; Buckhout, 1999; Sumner, 1999), willingness to allocate resources (Holland et al., 1999), clear business plan and vision (Wee, 2000; Buckhout et al., 1999) and effective communication (Fakowsk et al., 1998; Rosaria, 2000). We will explore these factors briefly below;

1.Executive management supportTop management support is needed throughout the implementation process. The project must receive approval from top management (Bingi, 1999). Managers should legitimise new goals and objectives. A shared vision of the organization and the role of the new water technology innovations should be communicated to employees.2. Willingness to allocate resource

Top management needs to publicly and explicitly identify the project as a priority (Wee, 2000). Senior management must be committed with its own involvement and willingness to allocate valuable resources to the implementation effort (Holland et al., 1999).

3. Clear business plan and visionA clear business plan and vision to steer the direction of the project is needed throughout the ERP life cycle (Buckhout et al., 1999). A business plan that outlines proposed strategic and tangible benefits, resources, cost, risks and timeline is critical (Wee, 2000). Hence, the role of water technology innovations in enhancing regional development can be realised.

4. Effective communication

Falkowski (1998) suggests that Effective communication is critical to ERP implementation. Wee (2000) adds that Expectations at every level needs to be communicated. The management of communication, education and expectations is critical throughout the organization. On March 27, 2014 Environmental Protection Agency in the U.S, office of water issued a Blue print for Integrating Technology Innovation into the National Water Program, which highlighted EPA's initial ideas and plans for advancing technology innovation across various water programs (EPA, 2014). This shows that leadership involvement is a key issue if any given country desires to use its water effectively to contribute to development. In order for Namibia and Kavango East Region in particular, to develop, it is important to take into consideration the role of water technology innovations in socio-economic development.

Leaders should encourage rural territories to explore new ways of becoming or to remain competitive, in order to make the most of their assets and to overcome the challenges they may face, such as an ageing population, poor levels of service provision, or a lack of employment opportunities. In this way, Leaders contribute towards improving the quality of life in both farming and the wider rural population. It uses a holistic approach to address rural problems. It recognizes that being competitive in the production of food, having an attractive environment and creating job opportunities for the local population are mutually supportive aspects of rural life, requiring specific skills, appropriate technologies and services that need to be tackled as a coherent package and with tailored policy measures.

2.6 Challenges facing leadership in water technology innovations

One should imagine a holistic and integrated approach to water quality and water quantity management, which maximizes ecosystem restoration. It is difficult to envision sustainable solutions to our water challenges without technological innovations, such as the distinct opportunities identified above. While these water resource challenges and market opportunities are framed as individual pursuits, ideally, many of these can be achieved in an integrated manner. So, for example, in the case of a traditional municipal wastewater treatment facility, one should imagine a utility that generates energy; captures nutrients for resource recovery; sells their water for reuse; generates half the volume of bio solids; emits substantially less greenhouse gases; uses green and natural infrastructure to manage storm water, mitigate climate impact and provide aesthetic cityscape benefits; and contribute to a comprehensive watershed monitoring program in partnership with a diverse set of partners. Just imagine if we put all of the pieces together.

Extant literature on this issue deal with it at the international level. According to Environmental Protection Agency (EPA) 2015, it is stated that, whether it's the ongoing response to California's devastating drought or the latest round of battles over proposed regulations, there's no escaping to the fact that water issues are increasingly in the national spotlight. What is often overlooked in the ongoing discussion over solutions is the fact that the water crisis presents an abundance of opportunities for innovation and economic growth.

Environmental Protection Agency (2015), further stated that, a new approach to a variety of such challenges facing the world today is to develop public-private partnerships focused on innovation

and commercialization. That does not only solve problems, but it also supports regional economic development efforts. These “clusters” are fast becoming an innovative means to foster partnerships in a coordinated manner. A cluster is a geographic concentration of interconnected companies, universities and other organisations with a specific focus on industry. The goal of these dense networks is to leverage a region’s assets to create economic opportunities and catalyse innovation. Clusters spur innovation and create an environment where companies and organisations can easily share ideas and solutions.

A successful and active cluster is a great benefit to a region’s technology transfer efforts. Clusters accelerate the development of new technologies, and connections within clusters lead to partnerships between businesses and researchers. In addition, clusters streamline the adoption of new technologies by providing companies with easier access to potential partners for pilot studies and encouraging communication between companies and regulators.

The Environmental Protection Agency has recognised the potential of the cluster concept and is actively supporting its development nationwide through Environmental Technology Innovation Clusters Program. The program's initial focus is on creating a strong cluster network with an emphasis on water technology. At present, EPA has identified 14 such water clusters throughout the United States in various stages of engagement and development, with more still at the formative stages.

“The program is solving water problems while creating regional economic opportunities,” says Sally Gutierrez (2015), director of the program. “Clusters are in a position to leverage the unique assets of a region—assets that might include academic and research organisations, water utilities, investment networks or other resources.”

Each cluster has its own unique focus and goal within the realm of water technology. For example, Pittsburgh's Water Economy Network is focused on how water and energy issues intersect, while the Nevada Center of Excellence in Water is working to bring together water resource management with Big Data. However, all are working to reduce the barriers to quick commercialisation and adoption of innovative water technology. And as the cluster movement grows, so does its track record of success. The EPA water cluster movement is based in Cincinnati, a city with a rich history of water research and a unique concentration of labs and testing facilities. The Confluence, which is a cluster organization covering southwest Ohio, northern Kentucky, and southeast Indiana, has partnered with EPA to use these resources to aid the development of a number of promising water technologies. The EPA began collaboration with Urbanalta in 2012. Urbanalta is a Cincinnati-based small business, that develops novel measurement methods and technology for monitoring combined sewer overflows

Urbanalta is currently adding design engineers to its R&D team and building pre-production prototypes of a Flowing Water Scope. Urbanalta has licensed the technology and is working with a local government utility in the first deployment. This collaboration received the 2014 Federal Laboratory Consortium Midwest Partnership Award.

The EPA and Confluence provided support for local startup CitiLogics, for demonstrating their technology at various Kentucky and Ohio water utilities. As a result CitLogics has signed its first contract with the Greater Cincinnati Water Works, allowing the company to hire its first employee in only two years. CitiLogics is bringing economic growth into the region, generating $300,000 in research grants in 2013, $500,000 in 2014 and an expected $2.5 million in 2015.

Confluence was working to bring down barriers to technology commercialisation and to expedite the regulatory approval process. On January 16, 2013, Confluence brokered the landmark signing of a multi-state agreement with the EPAs of Ohio, Kentucky and Indiana to help streamline and harmonise the approval process of emerging drinking and waste water treatment technologies.

The EPA developed and patented a green-infrastructure detention basin retrofit device (the Kraken) that is being demonstrated in collaboration with the Boone County Conservation District and Sanitation District #1 of Northern Kentucky. A Northern Kentucky company has licensed the Kraken technology from EPA to distribute in Ohio, Indiana, Kentucky and Tennessee with projected sales in excess of $6 million in the next 3 to 5 years. Confluence's work is getting noticed, as it was awarded the 2015 FLC State and Local Economic Development award. But the cluster movement is nationwide, and water clusters all over the U.S are accelerating technology transfer as well.

Boasting an abundance of water technology companies and academic institutions with dedicated water science and water business programs, the Milwaukee and South Wisconsin area is internationally known for its freshwater expertise. The Water Council (Milwaukee's cluster organization) works to coordinate these resources, bringing solutions to the market timeously while positioning the area to be a leader in the burgeoning water industry.

One of the most powerful tools at the disposal of the Water Council is the Global Water Center, a water research and business accelerator center that combines water research facilities, space for established water companies and accelerator space for startup water companies. This collection

of water resources and facilities is unique in the world, and a major driver of innovation and commercialisation in the Milwaukee area.

Working with the Wisconsin Economic Development Corporation, the Water Council also created the BREW (Business, Research, Entrepreneurship, In Wisconsin), a freshwater seed accelerator program. The BREW has demonstrated impressive success – 9 of 11 winners from its first two "batches" has received patents or have patents pending.

One winner from Batch 1, and a company that has taken advantage of the cluster effort in Milwaukee is Vegetal I.D., a company that provides green roof solutions to help control storm water. Through The Water Council and the BREW, Vegetal I.D. received space in the Global Water Center, a startup grant from WEDC, technical and business assistance from two of Wisconsin's academic institutions (including the University of Wisconsin-White water Institute for Water Business), and funding and testing plots from local utilities, helping to bring its products to the market faster and better positioned for success.

The Water Council and the BREW continue to provide an accelerated path to commercialisation, working both locally and globally. The BREW's latest batch of startups range from a Toronto-based company with a non-invasive pipe inspection technology to a wastewater company based in Ireland, to a Milwaukee company with a laser scanning technology for water treatment processes.

Cleveland Water Alliance (CWA)

Cleveland, once known for its environmental problems, is now widely regarded as a success story for renewal and revitalisation. The Cleveland Water Alliance (Cleveland's cluster organization) helps develop partnerships between the region's world-class water industry and its governmental and academic institutions. Focusing on diverse areas such as flocculation chemicals and combined sewer overflow management, CWA is poised to make Northeast Ohio a leader in the emerging "Blue Economy."

With the help of CWA, a partnership between the Port of Cleveland, the Ohio EPA, and regional companies Kurts Bros and Streamside Technologies have led to unique technological solutions for sustainable sediment management. With Confined Disposal Facilities (CDFs) for dredged sediment nearing capacity, the partnership developed an approach to extend the CDF capacity by 50 years or more, by reducing required dredging through "bed load interception." This patented and sustainable technology traps bottom sediment from rivers before it can settle in the ship channel. The trapped sediment can then be treated as a commodity for such varied purposes as brownfield redevelopment and basement fills for demolition structures. The CWA Executive Director Bryan Stubbs (2015), said that "We see the cluster efforts here solving problems in Ohio first...which then can be exported throughout the cluster program nationally and internationally."

CWA is also finding entirely new ways to approach water innovation, as evidenced by a unique partnership with the Great Lakes Biomimicry Institute and the University of Akron. UA's Biomimicry Corporate Fellowship program allows PhD students to split their time between

research at UA and research at the sponsor's Research and Development (R&D) labs, creating a vibrant meeting of theory and practice, and closing the gap between idea and development. Local companies Sherwin Williams, GoJo, and Ross Environmental, as well as local utility Avon Lake Regional Water, have become active participants in this program, addressing problems like frazil ice and algal toxins while helping develop new technologies for water purification and industrial processes. CWA also has an office within the Biomimicry program which includes a water sensor development program. Bryan Stubbs (2015), Executive Director of CWA, said that "The biomimicry approach is a brand-new way of looking at innovation."

2.7 leader-community relations

According to Collins (1988), Leader-community relations can be understood better by using the Social Exchange Theory which is a relationship maintenance theory that examines how people arrive at their decisions in relationships. It is based on a central premise that the exchange of social and material resources is a fundamental form of human interaction. It deals with both the ties that bind people together and the effects of interactions between people (Collins, 1988). In rural communities, relationships are paramount to accessing resources and meeting basic needs. As researchers have suggested, there exists a limitation on the type and quantity of resources available in rural areas (Daley & Avant, 1999; Mackie, 2012). Consequently, relationships in rural communities are beneficial for sharing resources and accessing services connecting people to family, groups, organisations and communities both within and outside the rural areas.

The idea of using social relationships and exchanges as a central principle for effective leadership in rural social work emphasises the importance of the strengths perspective (Daley &

Pierce, 2011). The degree of deficits existing in rural communities is due to the nature of their geographical location and access to formal resources (Daley & Pierce, 2011). The strengths of social relationships, the cohesion of rural communities, and the exchanges that occur create opportunities to improving the quality of life in rural communities (Daley & Pierce, 2011).

By using social relationships and exchanges, rural individuals develop an increased understanding of their roles in the community and environment (Avant, 2013). This understanding, along with shared experiences increase their commitment to building a better community. Gemeins chaft, Social Exchange Theory and the Strengths Perspective combined present an organizing framework for rural leadership where individuals in rural areas are able to recognize their own capacities and identify with their environments (Daley & Avant, 2004).

Daley & Avant (2004), further suggest that, as a leader, we constantly strive to define our role. Every day we look at ways to better our organisations, our teams and our workforce. It is not as simple as just telling followers what to do and expecting instant results. Depending on the situation, our work teams or individual followers sometimes contribute more and sometimes they contribute less. Some excel and others just do what it takes or the bare minimum. The groups that excel are typically the in-groups and those that do not are commonly referred to as the out-group. What is critical to understand here is that by no fault of their own, the leader will typically have a better relationship with, or put more energy towards the in-group than they do to the out-group. Some believe this could be somewhat unfair, but the truth of the matter is that the Leader-

Member Exchange theory clearly describes this state of affairs by stating that a leader will always tend to revert to their star players or teams that have energy and that produce. It is simple; those that contribute more receive more and those that do not, receive less.

Daley & Avant (2004), conclude that, the key here is the dynamic relationship between the leader and follower. This relationship is the centerpiece of the leadership process with effective leadership being contingent on effective leader-member exchanges. Most people can relate to this theory because they tend to gravitate towards work groups that have energy and the ones who get more work done.

From the researcher's experiences, communication in the in-group is by far better than in the out-groups. Everyone want to be in the in-group but everyone can't be in this group. To have an in-group, you need the out-group. This study will not go into the competition theory between the groups but will maintain that competition can exist between these two groups. Typically, an organization will not let an in-group stay together for long because it is better to pass the "wealth" or what is being done correctly so that the other groups can grow.

According to Northouse (2013), communication is key when working with followers. Not just communication, but high-quality exchanges, which are indicative to the LMX theory. Northouse (2013), further, suggests that this exchange is the result of an effective leader with years of understanding the communication process, and then fostering an environment of passing critical information while weeding out the unneeded material within his group. Most people believe that communication is somewhat of a process of providing information. Many people have also established in their day-to-day interaction with their work force that communication must go

beyond just the simple transmission of information. It must achieve new understanding while creating better awareness.

Over the years, Northouse has observed out-groups, but also what he refers to as out-group leaders. Such leaders will sit in their offices with the door closed and rarely interact with their subordinates. For the most part these individuals never move up and only accomplish a minimal amount of work. Their teams perform moderately. Communication between the out-group leader and out-group rarely happens. When it does, it is mostly ineffective. This out-group leader theory deserves additional study.

In most cases, the leader treats the out-group supervisor and out-group teams fairly and according to their contract, but they rarely gain special favor or special attention for their efforts. Take for instance a group of office secretaries, that have been in the same positions for many years. They have not received a raise in their salaries and they do the minimal amount of work. They are treated accordingly as an out-group of the community.

2.8 Leadership Accountability

Extant and recent literature on the issue of accountability is written by Ozor and Nwankwo (2008), who conducted their study in Nigeria. Just like in any normal setup, Ozor and Nwankwo (2008), found out that leaders' creditability influenced all projects implemented. According to Ozor and Nwankwo (2008), when programmes are poorly executed or implemented, the grassroots get discouraged to participate in other programmes initiated by the leaders. Leaders

should therefore ensure that they gain the credibility of their subjects and sponsors and further commit their energy and time in a transparent way towards achieving success in community development programmes. To check this, erring local leaders must be disciplined through appropriate mechanisms. Such mechanisms must involve the possibility of detecting embezzlement and punishing the leader in the event of proven acts of fraud (Platteau and Gaspart, 2003).

For example by requiring the leader to repay the aid money which he or she has misappropriated other leaders will not repeat the same mistake. Gender bias, especially against women was seriously implicated among the limiting factors to local leadership in their area study. According to Ugboh, (2007), the role of the local leaders in rural and community development is influenced by their gender. Ugboh maintains that women do not play the same level of leadership role as their male counterparts. Respondents noted that in most occasions, women were not involved in decision-making processes because they felt that women had little or nothing to offer. However many studies have proven the contrary, that women possess the necessary skills and capacity to deliver good programmes in the community (Ajayi and Otuya, 2006; Ugboh, 2007; Manju, 1995). Therefore, both men and women should be involved in leadership roles in community development so that they complement each other's efforts where necessary.

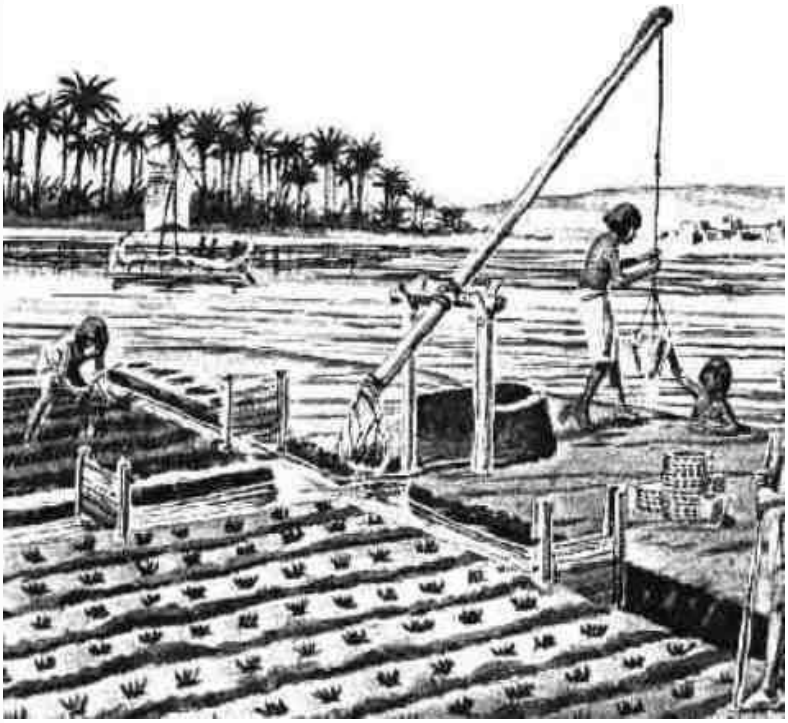
Ugboh, (2007), said that, mechanisms to make local leaders account for any act of irregularities and mismanagement added value to the success of the rural development efforts in Nigeria. This system is lacking in the Kavango East Region. Sadly in most developmental projects and activities, Namibia and the Kavango East Region have been failing to enforce accountability. This has also contributed to poverty and inequalities among the people of Kavango East Region because, the communities are not benefiting from those funds which are intended to benefit

them. Regional leaders have no performance contract, hence it is very difficult for them to be held accountable to the service they render to the community that elected them.

2.9 The History of Water Technology Innovations

Water technology innovations is not a new thing to be associated with mankind. It has been among mankind since the beginning of time. However, it is worth noting that water technology innovations have been changing and developing from time to time as mankind started to come up with effective and efficient ways of using water to enhance economic development and create jobs. The bulk of recent literature one can find on the history of water technology innovations, is at continental level. This is true especially in the case of Egypt.

According to Fekri et al (1997), the Egyptian water technology commenced with the invention of a device called a shaduf. This is a device that has been used in Egypt since early times to get water for irrigation. This is a machine that draws water from a lower place to a higher place. The shaduf is made up of a large pole that is balanced on a crossbeam with a rope and bucket on one end and a heavy counter weight at the other side. When the shaduf is placed into the water and gets full it is lifted, and then placed into a canal or field to water the crops. The shadufs are still used in most rural parts of Egypt today. These were and continue to be very helpful to Egyptians especially in rural areas close to the river Nile. Below is a picture showing the shaduf.Figure 2.1: Egyptian water technology Irrigation fact sheet.



Source: www.waterhistory.org

According to Fekri et al (1997), a striking contrast of the early Indus civilisation and those of Sumer, Akkad, Babylonia, and Assyria in Mesopotamia, the great Egyptian civilisation in the Nile River valley, is that it has sustained itself for some 5,000 years without interruption. It lasted through warfare and the conquest by the Persians, Greeks, Romans, Arabs, and Turks, as well as through pandemics that devastated its population. Yet its agricultural foundation remained intact. Only in more recent times has the sustainability of the Egyptian agriculture come into question. In response to a 20-fold increase in its population over the last two centuries-from 3 million in the early 1800s to 66 million today, Egypt replaced its time-tested agriculture based on the Nile's natural flow rhythms with an intensified irrigation and flood management that require the complete control of the river.

Fekri et al (1997), further says, compared with the flash floods of the Tigris and the Euphrates, the historic Nile floods were much more benign, predictable, and timely. As is the case today, most of its flow originated from monsoon-type rains in the Ethiopian highlands. The remainder came from the upper watershed of the White Nile around Lake Victoria. With almost calendrical precision, the river began to rise in southern Egypt in early July, and it reached flood stages in the vicinity of Aswan by mid-August. The floods then surges northward, getting to the northern end of the valley about four to six week later.

At its peak, the floods would cover the entire floodplain to a depth of 1.5 meters. The waters would begin to recede to the South by early October, and by late November most of the valley would be drained and dry. Egyptian farmers then had well-watered fields that had been naturally fertilised by the rich silt carried down from Ethiopia's highlands and deposited on the floodplain as the water spread over it.

They planted wheat and other crops just as the mild winter was beginning, and harvested them in mid-April to early May. By this time, the river's flow had diminished, sustained only by the more constant flow of the White Nile; the floodplain was completely dry. Then, magically to the ancients, the cycle started all over again. Even into modern times, every June 17th Egyptians celebrate the "'Night of the Drop,' when the celestial tear fell and caused the Nile to rise."

The Egyptians practiced a form of water management called basin irrigation, a productive adaptation of the natural rise and fall of the river. They constructed a network of earthen banks, some parallel to the river and some perpendicular to it, that formed basins of various sizes. Regulated sluices would direct floodwater into a basin, where it would sit for a month or so until the soil was saturated. Then the remaining water would be drained off to a basin down-gradient or to a nearby canal, and the farmers of the drained plot would plant their crops.

The earliest evidence of water control in ancient Egypt is the famous historical relief of the mace head of Scorpion King which dates to around 3,100 BC. It depicts one of the last predynastic kings, holding a hoe and ceremoniously cutting a ditch in a grid network. Besides attesting to the importance of these waterworks and the great ceremony attached to them, this picture confirms that Egyptians began practicing some form of water management for agriculture about 5,000 years ago.

According to Fekri et al (1997), Egyptian irrigators did not experience many of the vexing problems that plagued (other historic) irrigation societies. The single season of planting did not overly deplete the soil, and fertility was naturally restored each year by the return of the silt-laden floodwaters. In some basins, farmers planted grains and nitrogen-fixing legumes in alternative years, which helped maintain the soil's productivity. Fallowing land every other year, which was essential in (areas like) Mesopotamia, was thus unnecessary in the Nile valley.

Neither was salinisation a problem. The summer water table remained at least 3-4 meters below the surface in most basins, and the month or so of inundation prior to planting pushed whatever salts had accumulated in the upper soil layers down below the root zone. With salt buildup

naturally checked and fertility constantly restored, Egyptian agriculturists enjoyed not only a productive system, but a sustainable one.

Fekri et al (1997), indicated that, for nearly 1,500 years Egyptian farmers cultivated about 800,000 hectares under this system of basin irrigation. The shaduf, the water-lifting device already in use in Mesopotamia appeared in upper Egypt sometime after 1500 BC (see Illustration bellow). This technology enabled farmers to irrigate crops near the river banks and canals during the dry summer. This would have allowed the cultivated areas to expand by 10-15 percent. A similar increase might have been afforded by the waterwheel, introduced sometime after 325 BC (see illustration below). So by the time Egypt had become a breadbasket for the Roman Empire, some 1 million hectares of land were effectively under cultivation throughout the course of a year.

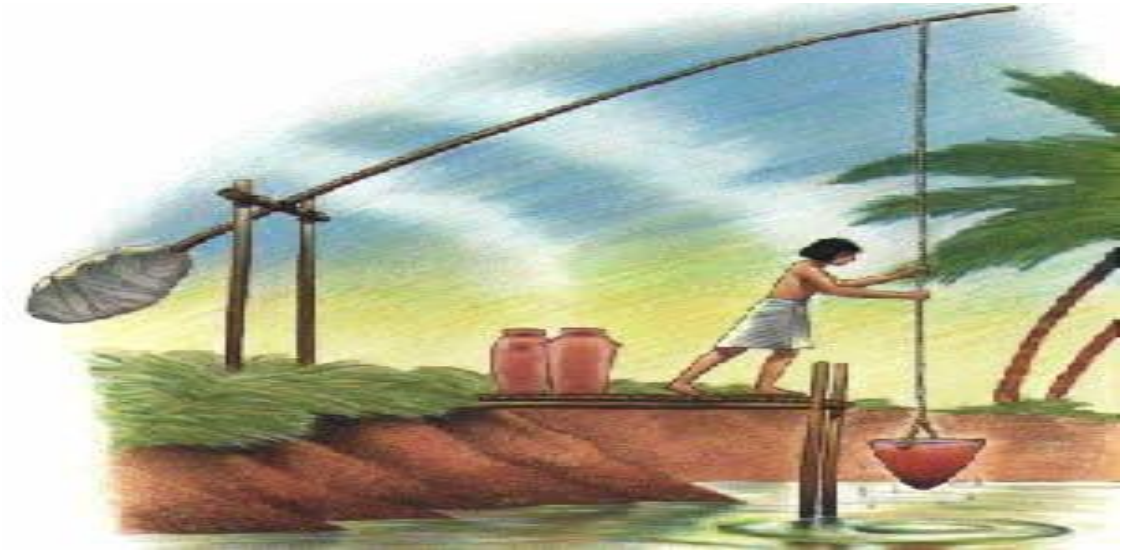


Figure 2.2. A shaduf was used to raise water above the level of the Nile. Source: www.waterhistory.org

Figure 2.3: *A noria, buckets attached to a waterwheel, was another device used to lift water.* Source: www.waterhistory.org

The blessings of the Nile were many, but they did not come without some costs. A low flood could lead to famine, and too high a flood could destroy dikes and other irrigation works. Even a 2-meter drop in the river's flood level could leave as much as a third of the floodplain unwatered. The well-known biblical account of Joseph and Pharaoh's dream is a reasonable reflection of the threat of famine that Egyptians periodically faced. Asked to interpret his ruler's dream, Joseph foretells several years of abundant harvests followed by seven years of food shortages, and advises Pharaoh to begin storing massive quantities of grain to avert famine. During a period of disappointing floods between the reigns of Ramses III and Ramses VII in the twelfth century BC, food shortages caused the price of wheat to rise markedly. Prices stabilised at a high level until

the reign of Ramses X, and then fell rapidly as shortages eased by the end of the Ramessid Dynasty, about 1070 BC.

According to Fekri et al (1997), ancient Egyptians developed a system for measuring the height of the Nile in various parts of the country because of the link between the Nile's flow level and Egyptian well-being. This monitoring allowed them to compare daily river levels with years past and to predict with some accuracy the coming year's high mark. At least 20 "nilometers" were spaced along the river, and the maximum level of each year's flood was recorded in the palace and temple archives (see the photograph below).

Figure 2.4 *: The nilometer on Elephantine Island, Aswan, consists of stairs and staff gauges.* Source: www.waterhistory.org

The reliability of the Nile floods and the unpredictability of its magnitude rooted ancient Egyptians deeply in nature and fostered respect for order and stability. Rulers were viewed as interveners with the gods to help ensure prosperity. The father of all gods was the god of the Nile-Hapi-who although male was portrayed with breasts to show his capacity to nurture. The Egyptians worshipped Hapi not only in temples, but through hymns such as the one below:

> "Praise to you, O Nile, that issues from the Earth, and comes to nourish Egypt . . .
>
> If his flood is low, breath fails, and all people are impoverished; the offerings to the gods are diminished, and millions of people perish. The whole land is in terror . . .
>
> When he rises, the land is in exultation and everybody is in joy . . .
>
> He fills the storehouses, and makes wide the granaries; he gives things to the poor".

In contrast to (other historic) civilisations, early Egyptian society did not centrally manage state irrigation works. Basin irrigation was carried out on a local rather than a national scale. Despite the existence of many civil and criminal codes in ancient Egypt, no evidence exists of written water law. Apparently, water management was neither complex nor contentious, and oral tradition of common law withstood the test of a considerable amount of time.

According to Fekri et al (1997), although difficult to prove, the local nature of water management, in which decision making and responsibility lay close to the farmers, was probably a key institutional factor in the overall sustainability of Egyptian irrigation basin. The many political disruptions at the state level, which included numerous conquests, did not greatly affect the system's operation or maintenance. While both slaves and *corvee* labor was used, the

system's construction and maintenance did not require the vast numbers of labourers that Mesopotamia's irrigation networks demanded. The waves of plague and warfare that periodically decimated Egypt's population did not result in the irrigation base falling into serious disrepair, as occurred in other historic systems.

Local temples appear to have played an important role in redistributing grain supplies to help cope with the periodic famines. From very early times, boats plied the Nile and were used to transport grain from one district to another. The surplus from several districts might be stored in a central granary and shared to secure food supplies for the whole region. Fekri Hassan, a professor in the department of Egyptology at the University of London, speculates that the emergence of kingship in Egypt was linked to the need for larger coordination in collecting grain and providing relief supplies to districts experiencing crop failure. The central government imposed a tax on the peasant farmers of about 10-20 percent of their harvest, but the basic administration of the agricultural system remained local. As Hassam observes, "Egypt probably survived for so long because production did not depend on a centralised state. The collapse of government or the turnover of dynasties did little to undermine irrigation and agricultural production on the local level."

Fekri et al (1997), stated that, overall, Egypt's system of basin irrigation proved inherently more stable from an ecological, political, social, and institutional perspective than that of any other irrigation-based society in human history. Fundamentally, the system was an enhancement of the natural hydrological patterns of the Nile River, not a wholesale transformation of them. Although it was not able to guard against large losses of human life from famine when the Nile flood failed, the system sustained an advanced civilisation through numerous political upheavals and

other destabilising events over some 5,000 years. No other place on Earth has been in continuous cultivation for so long.

Hughes (1992) also adds that, we know that ancient Egypt was blessed with the longest river on earth, the Nile. Farming was the occupation of the majority of the population. This rainless land had an extremely dry and hot climate.

Figure 2.5 Water technology innovation in Egypt. Source: www.waterhistory.org

The annual flooding of the river Nile left the Egyptian soil fertile and rich, ideal for farming. Therefore, the prosperity of this civilisation depended almost entirely on the great Nile River. This is illustrated by the fact that the majority of the Egyptian population lived around the river.

The river was worshipped in the form of Hapi, the Nile god. Records show that Egyptians practiced some form of irrigation around 5000 years ago.

It can be said that this waterway was the sole (but powerful) source of water for the Egyptian communities. At its peak, the flood would cover the entire floodplain to a depth of 1.5 meters. Hence irrigation works could be planned very early. The ancient Egyptians built a network of earthen banks, some parallel to the river and some perpendicular to it, which formed basins of various sizes.

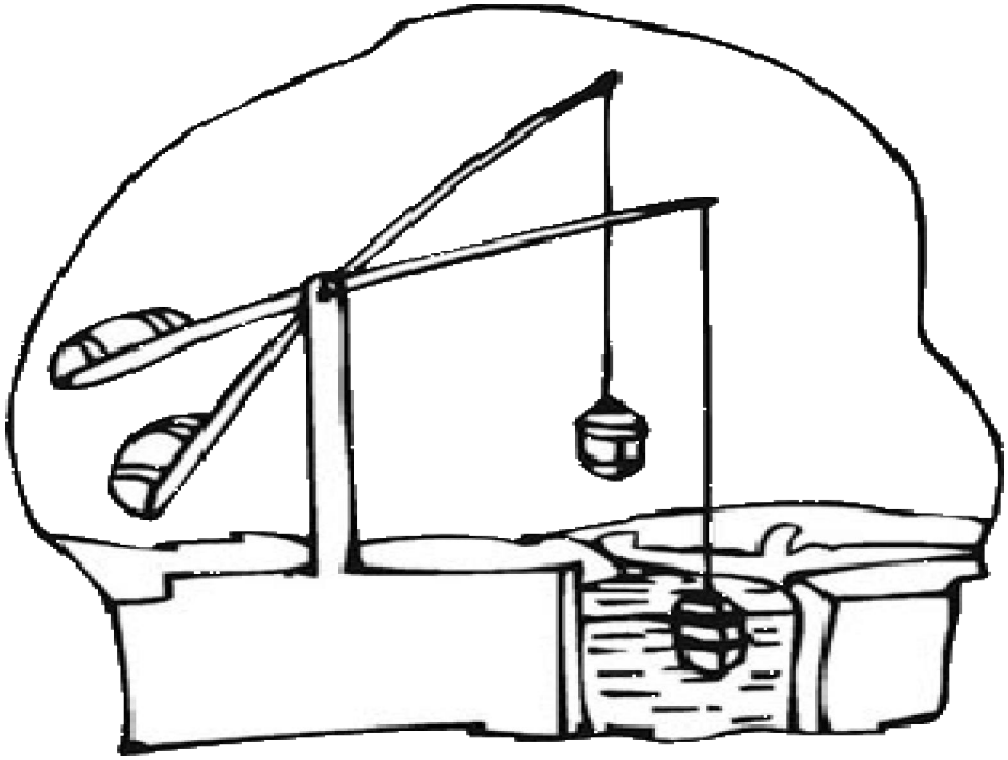


Figure 2.6: Basic design of Water technology innovation tool: Source: www.waterhistory.org

Simple sluices diverted water into them at the peak of the flood. Water was allowed to stand in the fields for 40 to 60 days, and then was drained off the crops at the right moment in the growing cycle, downstream back into the river.

There was always plenty of water, so salt never built up in the soil; and the flow in the canals and ditches was strong enough to avoid silting. Ditches and canals were short, and the typical irrigation scheme was very local.

According to Fekri et al (1997), The ancient Egyptians dug a long canal called Bahr Yousuf to bring water from the Nile to the Faiyum Depression for irrigation. Egyptians developed a system of "Nilometers" at various points along the valley. This was helpful in comparing past and present water levels. Water storage was not attempted by the Egyptians. Water was transported in jugs as illustrated in many places.

The people were at advantage because of the natural restoration of fertility every year and irrigation did not occur to them as a difficulty. The shaduf was the water lifting device used by the farming population appeared after 1500 BC. It consists of a container made of animal skins or clay attached to a lever counter balanced by stones. The container is dipped into the river, when full it is lifted out and dumped into a canal. The shaduf by the museum can hold 20 litres of water. The fortunate people of Egypt made use of the timely flooding of the Nile, which

indeed remains, for many number of decades, as a blessing to the valley.

2.9.1 Water Technology Innovations in the Global Context

A recent publication on water technology innovations in the Global Context is the one released by Guardian Sustainable Business (2015) the report states that, the well was a transformative invention, though it is often overlooked. This source of freshwater, vital for the expansion of inland communities, dates back nearly 10,000 years – 3,000 years before the wheel was ever imagined.

The well is but one of a long list of innovations in water technology that has enabled human development to continue apace. Sophisticated pipeline networks and treatment plants today furnish us with this elixir of life and industry. As intense pressure is placed on the planet's limited water supplies, businesses are again turning to technological innovation. New and emerging inventions should see human civilisation through the 21st century and, with any luck, the next 10,000 years. This tells us that, water technology innovation is not a new discussion, on the socio-economic arena. It has been in existence for a long time, and has improved many lives around the globe.

2.10 The origin of water technology innovations in Africa

The most recent document concerning the history of water technology innovations in Africa is a report produced in Israel, entitled *Israeli Irrigation: Fighting hunger and promoting Economic Growth* (2015). The report says that almost 50 years after the success of their first drip irrigation system, Netafim is still a world leader in growing more crops with less water. “We bring their irrigation systems to rural communities, where people are dependent on agriculture for both food

and income. Even in times of drought, Netafim technology helps farmers grow the crops which they need to feed their families and to sell in local markets".

This report reveals that water technology innovations started more than 5 decades ago. However, what is important to note is the magnitude to which Israel's economy has been transformed by the use of water technology innovations. Israel is still a leader not only in Africa but in the entire world on using very limited water to grow more crops. Water technology innovations can be an answer to some socio-economic challenges faced by Namibia in general and the Kavango East Region in particular.

According to the OECD (2015), overcoming the challenges of an arid climate and scarce natural water reserves has always been a vital necessity for the growth of Israel's population and economy since the founding of that state. This has led to continuous improvements in Israel's water sector, through innovations in water technology, practices and long-term plans. The OECD (2015) further suggests that, currently, Israel annually requires almost a billion cubic metres per year (BCM/year) more water than average natural replenishment provides. Nevertheless, average annual sustainable natural water consumption has been achieved, while providing for all of the country's water needs, via innovations that have involved overcoming extensive engineering, biological and logistic challenges.

These innovations include:

- A visionary, nationwide water conveyance system, constructed from 1955-64, to deliver water

throughout the country from the natural reserves in the north;

- Treatment and reuse of almost all of the nation's domestic waste water for irrigation in the agricultural sector;
- Highly advanced irrigation methods such as moisture-sensitive automated drip irrigation direct to the roots of the plant;
- Development of new crop strains that provide 10 times higher yield with the same amount of water;
- Pioneering work in drilling exceptionally deep wells, reaching 1,500 metres and pump settings as high as 500 metres;
- Large-scale desalination of seawater and brackish groundwater;
- Controls of algae blooms in reservoirs for reused water;
- Innovative, multi-tiered water safety methods, early warning systems and other technologies; innovative methods for minimizing non-revenue water loss.

2.11 Innovations in planning, policies and tariffs

Numerous governmental strategies and policies have been created throughout Israel's history to ensure a continuous supply of potable water for all citizens and to promote sustainable national water consumption. These include Israel's National Long-Term Master Plan for the Water Sector, from 2010-15, and innovations in both governmental and the private sector in key areas, particularly demand management, water use efficiency, creating supplementary potable water, and governmental support for innovations, notably in the NewTech Programme.

The Israel NewTech Programme promotes the country as a global water technology leader by investing in human capital, research and development, marketing, and start-up growth and international activity. This programme achieved great success in the local development and global export of Israel's innovative water technologies. Israel's agricultural sector has transformed into one of a world leader in water conservation, as was recognised by the OECD and FAO in 2012. Despite the drastic decline in agricultural water consumption over the past decades, agricultural production has continuously grown, and is sufficient to export approximately 80% of its products with the highest ratio globally in crop-yield/m3 of water.

Israel's successes to date speak for themselves. As of 2015, approximately half of Israel's water supply come from reused treated waste water, brackish water and desalinated water (see graph above), and the agricultural sector is a world leader in water use efficiency and conservation. Israel's successes as such arise from the continuous need for and support of innovative methods, technologies, holistic water resource management and strategies to provide for the nation's water needs sustainably.

2.12 Water technology innovations in Kavango East Region

The use of water technology innovations in the Kavango East Region is an issue that is of great concern. A study conducted by Mendelsohn and Obeid (2006), reveal that while the focus of Botswana's use of the Kavango has been on its tourism, Namibia viewed the river as a passing resource only to be exploited before it exits Namibia at Muhembo. Thus, the river is perceived as a source of water for irrigation and provides water for domestic and industrial needs in the Central Regions. A number of lodges and camp sites have been developed by private individuals

and companies, and one conservancy. However, leadership has paid little attention to the creation of wealth and jobs through the use of water in the Kavango River. Traditional Leaders (Headmen) should know about water technology innovations and its importance through awareness and training from the Regional leaders. This shows that water technology innovations is not utilised much in the Kavango East Region.

2.13 Opportunities and Challenges of water technology innovations in Kavango East

According to the Kavango Regional Council Operational Audit report (2013), referred to in chapter 1, the communities in Kavango East Region are not using water effectively neither are they using water technology innovations to create jobs for themselves due to a lack of leadership involvement. This has resulted in high unemployment and high poverty levels in that region. According to Mendelsohn and Obeid (2006), while the focus of Botswana's use of the Kavango has been on its tourism, Namibia views the river as a passing resource to be exploited before it exits Namibia at Muhembo. Thus, the river is perceived as a source of water for irrigation, domestic and industrial needs in the Central Regions. A number of lodges and camp sites have been developed by private individuals and companies, and one conservancy, but the leadership has paid little attention to the creation of wealth and jobs through the use of water in the Kavango River. Traditional Leaders (Headmen) should know about water technology innovations and its importance through awareness and training from the Regional leaders.

This means that there is a great opportunity for water technology innovations in the Kavango East Region. This is actually the key aspect which this study is looking into, the use of water

technology innovations in order to enhance job creation. In addition, Namibia has established green scheme projects. The aims of these projects are:

- to enhance socio-economic development and uplift rural communities in Namibia. The key towards achievement of such development was based on the facilitation of an efficient economic environment by the Namibian Government.
- creation of an enabling, commercially viable environment through an effective public-private sector partnership
- to stimulate and increase private sector investment in the irrigation subsector.

Mendelsohn and Obeid (2006), suggest that, in line with the above mission and guiding principles, the Green Scheme objectives constitute the Promotion of the objectives of the National Development Plan in terms of achievements towards:

- Enhance food security:
- Improvement nutrition at household level;
- Enhance food self-sufficiency;
- Create employment;
- Diversify the agricultural economic base as a drought proofing mechanism with attention paid to the development of agro-industrial ventures;
- Provide livelihood for the growing rural population;
- Reduce poverty levels;

- Encourage the use of cost-efficient irrigation methods that use low volumes of water, coupled with a water pricing policy based on the scarcity of water and the long- term environmental sustainability.

- Support the development of a sustainable and competitive agricultural sector.

- Encourage private sector involvement and stimulate public-private partnerships in terms of the following:

  (a) Infrastructure and physical development;

  (b) Effective, efficient and economic resource utilisation and management;

  (c) Establishment of a free market environment.

  (d) Through the development of an efficient economic environment enable the social upliftment of the rural community by:

    - Increasing the participation of women and the unemployed rural youth in the operations of irrigation schemes;

    - Providing research, training and extension services to irrigation farmers as well as every commercial establishment participating in the Green Scheme.

    - Minimizing adverse health consequences.

    - Enabling the training of planners and irrigation engineers to plan and implement irrigation projects to enhance additional development.

Maximizing the production of high value horticulture products to local and external markets.

- Providing small-scale irrigation farmers the opportunity to participate planning, financing, implementing, operating, and maintaining irrigation systems to create in Employment and foster sustainability.
- Promotion of the small, medium and micro enterprise sector within the country.
- Promote irrigation development in consideration of National Development, Resources and related Agricultural Policies Strengthening of the national capacity within the public and private sector in terms of planning, implementation and management of small-Scale irrigation farmers' irrigation farming projects.
- Facilitating the empowerment of small-scale irrigation farmers.

The Green Scheme was initiated by the Ministry of Agriculture, Water and Rural Development. As such, this Ministry will govern and guide the implementation and further development of the Green Scheme Policy on Irrigation Schemes in Namibia. The policy recommends the establishment of a Green Scheme Coordinating Commission sub-contracted by this Ministry to promote the facilitation of this process. This is called the Green Scheme Coordinating Commission" .

Background of existing projects

A range of individual irrigation projects have been established by the Ministry of Agriculture, Water and Rural Development, of which some are purely administered within the Ministry of Agriculture, Water and Rural Development, while others are combined initiatives between the Ministry of Agriculture, Water and Rural Development and the Namibia Development Corporation ("NDC").

These projects are managed by project managers, who are responsible for the service provision activities and overall co-ordination of the project to ensure the achievement of the set objectives guided by a ministerial "Steering Committee". Extension and support services are provided through the various departments at the Ministry of Agriculture, Water and Rural Development in terms of engineering, planning, water supply and human resource development.

Similar to the objectives of the Green Scheme, the majority of these projects aim at achieving effective agricultural, economic and socio-economic objectives and returns via the introduction of a resettlement program. However, initially small-scale irrigation farmer involvement demands substantial Government support in terms of pre-investment studies and relevant development arrangements, infrastructure set-up and maintenance, capacity building and development, as well as supporting service provisions within the value chain such as production input supply, storage, marketing and distribution.

The reality is that these green scheme projects have not benefited the grassroots communities in the areas in which the projects have been established. The Kavango East Region, has a lot of

green scheme projects namely: Vhungu-Vhungu, Ndonga Linena, Shankara, Shitemo and Shadikongoro respectively. However, the Kavango East Region remains the poorest region in Namibia. This is opposite to the aims and objectives upon which it was created.

In terms of the propositions under the Green Scheme and in line with the institutional and management model for state owned irrigation projects, the commercial irrigation farming enterprise will facilitate all the functions of the service provider. It will also support the Ministry of Agriculture, Water and Rural Development's effort in the facilitation of the human resource development functions, by supporting the small-scale irrigation farmers with skills transfer and mentorship programs.

According to Mendelsohn and Obeid (2006), the commercial irrigation farming enterprise and small-scale irrigation farmers in a joint enterprise will be the initiators of any irrigation project, rendering a proposition for the set-up and strategic development of the project and applying for the pre-determined Government development incentives in terms of their substantiated development plan. Directly attributable social obligations to the commercial irrigation farming enterprise under the Green Scheme will be the provision of services to the small-scale irrigation farmers at cost, the facilitation of skills transfer and mentorship programs to the small-scale irrigation farmers and the application of affirmative action principles in terms of the employment of human resources within its farming activities. In addition, it is recommended that the commercial irrigation farming enterprise offer an additional and measurable incentive to the local Traditional Authority to facilitate a direct plough-

back to them in terms of the project. Small-scale irrigation farmers always work hard to make sure that they produce more for sale.

The small-scale irrigation farmer will preferably be a representative of the local community, low-income household earners and previously disadvantaged group members, who will apply for the registration of an irrigation project under the Green Scheme in a joint initiative with the commercial irrigation farming enterprise under any form of association. They will be able to obtain the same Government funded development incentives as the commercial irrigation farming enterprise and will be subject to the rules and conditions of the irrigation projects as stipulated under the leasehold agreement which will bind them to adhere to the project's code of conduct, and ensure that they do not engage in some undesirable behaviour or farming practices. These obligations under the leasehold agreement will be enforceable by the Land Boards as the second party to the agreement.

Any financial agreement entered into by the irrigation project participants will be administered under the terms and conditions of the selected financial institution. The Green Scheme Coordinating Commission will act as the point of reference and recommending institution to support the loan applicants, but any financial agreement entered into by the irrigation project participants will be considered on an individual basis and according to the discretion and terms and conditions of the financial institution. In my opinion, if community members of Kavango East Region are supported, in the same way Green Scheme is supported, this will enhance job creation.

2.14 Why use water as a tool to enhance socio-economic development

The most recent literature dealing with this aspect deals with the Zambian context. The report of Mendelsohn and Obeid (2006), states that Water is the most common substance on earth. It covers more than 70 per cent of the earth's surface. It fills the oceans, rivers, and lakes, and is in the ground and in the air that we breathe. Water is everywhere. Regardless of language or culture, all human beings share this basic need that is essential for survival.

People drink water, cook with it, bathe in it, sprinkle our lawns with it, fill our backyard swimming pools with it - even create theme parks based on it. People, however, take its abundance for granted when much of the world, especially Sub-Saharan Africa, which includes Zambia, where access to clean water is a luxury. More than half of Africa's villages lack access to a clean water supply. In many of these villages, women and children walk up to ten miles every day carrying heavy buckets and containers to fetch a day's supply of water for their households. Those hours could be spent on other more profitable undertakings.

Without water, there can be no life. In fact, every living organism consists mostly of water. Scientists suggest that the human body is made up of about two-thirds water. A chicken is about three-fourths water, and a pineapple is about four-fifths water. Most scientists believe that life itself began in water, in the salty water of the sea.

Animals share the same water sources as human beings, doing neither any good. During the dry seasons, water supplies are inadequate or non-existent in many villages so that both people and cattle go thirsty while contaminated water is responsible for a myriad of health problems in the country including dysentery and malaria.

Ever since the world began, water has been shaping the earth. Rain hammers on the land and washes soil into rivers. The oceans pound against the shores, chiseling cliffs and carrying away soil. Rivers knife through rock, carve canyons, and build up land where they empty into the sea. Glaciers plow valleys and cut down mountains.

Water helps to keep the earth's climate from getting too hot or too cold. Land absorbs and releases heat from the sun quickly. But the ocean absorbs and releases the sun's heat slowly. So breezes from the ocean brings warmth to the land in winter and coolness in summer. Throughout history, water has been people's slave and master. Great civilisations have risen where water supplies were plentiful. They have fallen when these supplies dried up. People have killed one another for a muddy water hole.

These civilisations have worshiped rain gods and prayed for rain. Often, when rains have failed to come, crops have withered and starvation has spread across regions. Sometimes the rains have fallen too heavily and too suddenly. Then rivers have overflowed their banks, drowning large numbers of people and causing enormous destruction to property.

Today, more than ever, water is both slave and master to people. We use water in our homes for cleaning, cooking, bathing, and carrying away waste. We use water to irrigate dry farmlands so we can grow more food. Our factories use more water than any other materials. We use water in rushing rivers and thundering waterfalls to generate electricity.

Our need for water is constantly increasing. Every year, there are more people in the world. Factories turn out more and more products, and need more and more water. We live in a world of water. But almost all of it, about 97 per cent is in the oceans. This water is too salty to be used for drinking, farming, and manufacturing. Only about 3 per cent of the world's water is fresh

(unsalted). Most of this water is not easily available to people because it is locked in icecaps and other glaciers. By the year 2000, the world demand for fresh water may be double what it was in the 1980's. But there will still be enough to meet people's needs.

There is as much water on earth today as there ever was or ever will be. Almost every drop of water we use finds its way to the oceans. There, the sun evaporates it. It then falls back to the earth as rain. Water is used and reused over and over again, but it is not totally depleted.

Although the world as a whole has plenty of fresh water, some regions have a water shortage. Rain does not fall evenly over the earth. Some regions are always too dry, and others too wet. A region that usually gets enough rain may suddenly have a serious dry spell, and another region may be flooded with too much rain.

Some regions have a water shortage because the people have managed their supply poorly. People settle where water is plentiful, near lakes and rivers. Cities grow, and factories spring up. The cities and factories dump their waste into the lakes and rivers, polluting them. Then the people look for new sources of water.

Shortages also occur because some cities do not make full use of their supply. They have plenty of water but not enough storage tanks, treatment plants, and distribution pipes to meet the people's needs. As our demand for water grows and grows, we will have to make better use of our supply.

Water in our daily lives

Every plant, animal, and human being needs water to stay alive. This is because all living organisms process their food using water, that is from taking in food to getting rid of waste. But

people depend on water far more than just to stay alive. We also need it for our way of life. We need water in our homes, to brush our teeth, cook food, and wash dishes. We need water in our factories to manufacture almost everything from automobiles to zippers. We need water for irrigation, to raise crops in regions that do not get enough rain.

Water in living things

All living organisms need a lot of water to carry out their life processes. Plants, animals, and human beings must take in nutrients (food substances). Watery solutions help dissolve nutrients and carry them to all parts of an organism. Through chemical reactions, the organism turns nutrients into energy, or into materials it needs to grow or to repair itself. These chemical reactions can take place only in a watery solution. Finally, the organisms need water to carry away waste.

Every living thing must keep its water supply near normal, or it will die. Research has shown that human beings can live without food for more than two months without water for only about a week. If the body loses more than 20 per cent of its normal water content, a person will die. Human beings must take in about 2.4 litres of water daily. This intake can be in the form of beverages we drink, or water found in food.

Water in our homes

In our homes, we use far more water than the amount we need simply to stay alive. We require water for cleaning, cooking, bathing, and carrying away human waste. For many people, such water is a luxury. Millions of homes in Asia, Africa, and South America have no running water. The people must haul water up by hand from the village wells, or carry it in jars from pools and rivers far from their homes.

Water for irrigation/ agriculture

It is estimated that 70% of world-wide water use is for irrigation. In some parts of the world, irrigation is necessary to grow any crop at all, in other parts it permits more profitable crops to be grown or enhances crop yields. Various irrigation methods involve different trade-offs between crop yield, water consumption and capital cost of equipment and infrastructure.

Irrigation methods such as most furrow and overhead sprinkler irrigation are usually less expensive but also less efficient, because much of the water evaporates or runs off. More efficient irrigation methods include drip or trickle irrigation, surge irrigation, and some types of sprinkler systems where the sprinklers are operated near ground level. These types of systems, while more expensive, can minimize runoff and evaporation. Any system that is improperly managed can be wasteful.

In most countries including Zambia, people have had a rich heritage of managing and living with their environment including water since time immemorial and they have demonstrated to be effective custodians of water for agricultural purposes. Rainfall and water has been central to their lifestyles, and influencing their farming activities.

Most of the plants that people raise need great quantities of water. For example, it takes 115 gallons (435 liters) of water to grow enough wheat. People grow most of their crops in areas that have plenty of rain. But to produce enough food for their needs, people must also irrigate dry areas. The rainfall that crops use to grow is not considered a water use, because the water does not come from a country's supply. Irrigation, on the other hand, is a water use because the water is drawn from a nation's rivers, lakes, or wells.

The water a nation uses for irrigation is important to its water supply because none of the water remains for reuse. Plants take in water through their roots. They then pass it out through their leaves into the air through a scientific process called evaporation. Winds carry away the vapour, and the liquid water is gone. On the other hand, nearly all the water used in our homes is returned to the water supply. Sewer pipes drain the waste to treatment plants and return the water to rivers so that it can be used again.

Water for industry

It is estimated that 15% of the world-wide water use is in industrial. Major industrial users include power plants, which use water for cooling or as a source of power (i.e. hydroelectric plants), ore and oil refineries, which use water in chemical processes, and manufacturing plants, which use water as a solvent.

The rivers, dams and lakes of Zambia are a source of water, food, electricity and recreation providing the engine of economic growth in various sectors. Zambia has a very large number of dams, which generate hydro- electric power to various industries. The industry in turn uses water in many ways. It uses water for cleaning fruits and vegetables before canning and freezing them. It uses water as a raw material in soft drinks, canned foods, and many other products. It uses

water to air-condition and clean factories. But most of the water used by industry is for cooling. For example, water cools the steam used in producing electric power from fuel. It cools the hot gases produced in refining oil, and the hot steel made by steel mills.

Although industry uses a lot of water, only 6 per cent of it is consumed. Most of the water used for cooling is piped back to the rivers or lakes. The water consumed by industry is the water added to soft drinks and other products, and the small amount of water that turns to vapour in the cooling processes.

Fisheries

According to Mendelsohn and Obeid (2006), Southern Africa's inland water bodies also support a thriving inland fisheries industry. Fish catches vary from place to place, with the largest yields associated with major lakes and dams. The larger lakes, such as Victoria, Tanganyika and Malawi are quite productive in fish and provide almost the entire inland commercial and subsistence catches in the region, totalling 500,000 tonnes per year.

According to SADC (2015), about 200,000 people are directly employed in the SADC inland fisheries industry. About 600,000-800,000 more are indirectly dependent on this industry and fish is often a large part of the diet of people living in the region including some parts of Zambia.

Floodplains, for example, are a very productive aquatic environment. Several thousand tonnes of fish are harvested annually from the flood plains such as the Barotse plains, which are part of the Zambezi valley in the western province of Zambia and the Kafue plains in Zambia, which yield about 11,000 tonnes of fish per year.

Mining

Mining contributes over 50 percent of national economies of some member states in Southern African including Zambia, although it is a potential danger to the environment. Mining operations occur in a number of wetlands in the region, for example, the extraction of salt in Etosha (Namibia), gold panning along the Zambezi River and iron mining in the Kafue flats (Zambia).

The copper mines of Zambia for example, discharge waste in the Kafue River polluting the Lusaka swamps. However mining continues because it is the engine of the economy contributing more than 80 per cent of Zambia's foreign exchange earnings.

Water for transport/recreation

After people learned to build crude small boats, they began using rivers and lakes to transport themselves and their goods. Later, they built larger boats and sailed the ocean in search of new lands and new trade routes. Today, people still depend on water transportation to carry such heavy and bulky products as machinery, coal, grain, and oil.

People build most of their recreation areas along lakes, rivers, and seas. They enjoy water sports, such as swimming, fishing, and sailing. Many people also enjoy the beauty of a quiet lake, a thundering waterfall, or roaring surf.

Environment/ tourism

Explicit environmental water use is also a very small but growing percentage of total water use. Environmental water usage includes artificial wetlands, artificial lakes intended to create wildlife habitats, fish ladders around dams, and water releases from reservoirs timed to help fish spawn.

Like recreational usage, environmental usage is non-consumptive but may reduce the availability of water for other uses at specific times and places. For example, water release from a reservoir to help fish spawn may not be available to farms upstream.

Water flowing from the mighty Victoria Falls is a spectacular sight in southern Africa and provides an array of tourism activities. The Falls lies between Zambia and Zimbabwe, about halfway between the mouth and source of the Zambezi River.

The mist and spray created by the Falls can be seen from a great distance. This cloud and the constant roar caused the people of the area to name the Falls Mosi -oa -Tunya (smoke that thunders). British explorer David Livingstone saw Victoria Falls in 1855. He named it in honour of Queen Victoria of Britain.

There are similar waterfalls elsewhere and rivers which all provide a source of tourism, generating huge financial resources and entertainment for the country. The Ku-omboka ceremony of the Barotse people of Western province is another toursit attraction which is observed every year drawing huge numbers of tourists to witness the Lozi King being paddled from the flooded plains of the Zambezi River at Lealui to the high ground in Limulunga. The splash and flow of water in streams and fountains also soothes and inspires many people and they love to be near water to simply pass time and for leisure.

Sanitation

Sanitation is a field of public health. It involves various efforts to control the environment to prevent and control disease. Sanitation also includes personal cleanliness, which helps protect people against disease, as such the presence of water is critical.

In most countries various government agencies work together to protect the health of communities. Sanitary engineers work in designing and administering water treatment plants and sewage treatment plants. Government agencies establish and enforce laws that help promote a healthy environment. Sanitation activities include food processing and distribution, sewage treatment, solid waste disposal, water treatment, and numerous other measures, such as control of air pollution and rodents.

Food processing and distribution

Food and beverages can easily be contaminated by bacteria, viruses, worms, and other organisms and by chemical poisons. Many agencies are involved in food and beverage control. For example, the department of Agriculture in most countries usually inspects meat before and after an animal is slaughtered. It also checks the processing, labelling, packaging, and distribution of food. The public health service provides communities with model laws that recommend requirements for producing, processing, and handling food. Some laws deal with pasteurisation of milk and milk products.

In addition at SADC Level at a meeting held in Lilongwe, Malawi (2006), Governments in southern Africa have been asked to commit significant proportions of their budgets to planning and management of water related issues as a strategy to enhance economic development in the SADC region.

Social scientists, researchers, engineers and policy-makers should equally be engaged in collective action plans to fight poverty and avoid the fear of looking ignorant in implementing water plans in their respective countries. The meeting recommended that, National governments

should also take cognisance of their technical capacity and offer local technocrats competitive packages comparable to foreign experts to ensure equal output and equal pay in the water resources sector.

SADC also has a Regional Water Strategy that translates the policy further into implementable strategies. In addition, SADC is addressing the water management challenges in the region through a number of programmes and projects that form part of the Regional Strategic Action Plan for Integrated Water Resources Development and Management which is a component of the Regional Indicative Strategic Development Plan.

All these instruments do provide a framework for sustainable, integrated and coordinated development, utilisation, protection and control of national and trans-boundary water resources in the SADC region for the promotion of socio-economic development, regional integration and improvement of the quality of life to all people in the region.

SADC recognizes that water is the engine for economic growth and that member states have adopted Integrated Water Resources Management (IWRM) as the fundamental approach to water resources management to ensure that water is adequately contributing to poverty eradication, regional integration and socio-economic development in a sustainable manner.

The IWRM principles have been accepted by all SADC member states who are increasingly recognising that water resources in the SADC region are limited, demands are rising rapidly and the potential for disastrous water shortages is high unless these resources are managed with great care for the benefit of all.

2.15 Less water- more yield notion

According to a report compiled by the International Water Management Institute in September, 2010, Water governance is the set of processes through which decisions related to water management are made. Achieving good water governance requires knowledge about what actions work best in a particular physical and socio-economic context. In many developing countries, institutional and governance models in operation today were designed from a colonial context. At that time, the authorities favoured growing crops in large-scale monocultures and viewed water as an infinite resource. Accordingly, nations installed large, supply-driven surface irrigation schemes. Under today's conditions of a swelling global population, farmers producing a greater variety of crops, and increasing competition for water from cities and industry. These enduring systems of governance are out of sync with modernity. Poor water governance has been cited as being one reason behind today's water shortages.

As surface irrigation schemes have slowly stagnated, farmers have taken water management into their own hands. Unable to access water with enough flexibility to nurture the variety of fruits, cereals and vegetables they grow now, they have started pumping up ground water through boreholes. This trend has been wide-ranging, especially in South and East Asia where planned and regulated surface irrigation has now largely given way to 'anarchic' pump-based systems. The inability of governments to regulate water use under such conditions has resulted in some catastrophic environmental problems. For example, in India, there have been cases within North Gujarat, Tamil Nadu, Saurashtra and Southern Rajastan where agriculture has collapsed and drinking water supplies have become contaminated by polluted aquifers (IWMI-TATA Water Policy Program 2002).

A new form of governance is needed that acknowledges the value of water and ensures it is used efficiently. To date, governments have been reticent to implement reforms because they fear political repercussions. Generating support for reform requires recognition of the value of water. Although access to clean drinking water and sanitation must remain a fundamental right, water used by agriculture, industry and the environment will ultimately need to be priced. To ensure dwindling water resources are shared equitably, governments must introduce allocation policies, based on well-defined water rights, where water allocations can be reduced when supply becomes scarce or demand from different sectors increases.

Farmers will need incentives to encourage these sectors to use less water. A way to achieve this is to link agricultural practices to their impact on society. For example, municipal authorities might pay farmers who use less water, so there is more water available for cities. Models of successful water governance reforms are emerging. In Gujarat, decades of electricity subsidies left the authorities facing bankruptcy, electricity utilities and depleted groundwater stores. Scientists suggested that governments should introduce 'intelligent rationing' of power by separating cables carrying electricity to farmers from those supplying domestic users. They recommended providing farmers with a high-quality power supply for a set number of hours each day at a price they could afford. Gujarat implemented the scheme across its 18,000 villages. This move boosted the well-being of individuals by increasing the quality of power supply to rural households, schools and industries; halved the power subsidy to agriculture; reduced the groundwater overdraft; and encouraged the development of non-farm enterprises (Shah et al. 2008). In Australia's Murray-Darling River Basin, a successful system of governance is in operation based around separate land and water rights, water trading and water pricing.

2.16 Leadership as a catalyst to socio-economic development

Rural communities remain strategic in the socio-economic development of any nation. A lot of resources abound in the area to the extent that if they are harnessed, they will not only be a foundation but a springboard for the structural transformation for economic growth and development of the people and the nation at large. However, despite approaches adopted to tap the wealth in these rural communities, especially in the developing economies, it appears that not much has been done to harness the endowed resources of the rural areas.

Community development is reputed to be an indispensable component among the approaches adopted world-wide for the socio-economic transformation of any nation, especially developing nations like Nigeria. The rural communities are acknowledged to be endowed with abundant human and material resources that will accelerate the pace of development of any country. It is argued that in Nigeria for instance, the majority of the population dwell in these communities.

Regional autonomy enables regions to optimise their economic, geographic and socio-cultural potentials. This development paradigm has the potential to decrease the disparities that have developed between regions and which today threaten the state with disintegration. There are two

approaches towards dealing with regional autonomy: One is a federalist approach encouraging proactive regional government and the other is a unitarist approach with a proactive central government.

The first approach leaves it to regional government to identify strategies and handle all issues except those that impact on the integrity of the state and the nation. The second puts the onus of government and administration on the central government, except for certain defined issues that are to be handled by the regions.

Regional autonomy in Indonesia is determined by Laws No 22 and No 25 of 1999. These laws are just the same as the GRN established fourteen (14) Regional Councils under the Act of 1992. This law was a plan to bring the government closer to the people especially the previously disadvantaged. According to a practical Guide of Decentralization Enabling Act of Namibia, the main responsibility of regional councils is to draw up regional development plans and administer formal settlements (Regional Council's Act 22, 1992.). Additionally, they should also be responsible for delivering basic services, like rural water supply, primary healthcare and primary education, according to the Decentralization Policy for Regional Councils.

In addition to the powers conferred upon a regional council by Article 108 of the Namibian Constitution or any other provision of this Act, a Regional Council shall have the power:

(a) to undertake, with due regard to the powers, duties and functions of the National Planning Commission referred to in Article 129 of the Namibian Constitution and any other law relating to planning, the planning of the development of the region for which it has been established with a view to:

(i) the physical, social and economic characteristics of such region and, in so far as any neighbouring region has or is likely to have any effect on the physical development of that region, the physical, social and economic characteristics of any such neighbouring region;

(ii) The distribution, increase, movement and the urbanisation of the population in such a region;")

(iii) The natural and other resources and the economic development potential of such a

region;

(iv)The existing and the planned infrastructure, such as water, electricity, communication networks and transport systems, in such a region;

(v) The general land utilisation pattern;

(vi) The sensitivity of the natural environment;

(b) To exercise in connection with its region such powers, and to perform the duties and functions connected with such powers, as may be delegated by the President to the regional council in terms of section 29;

(c) Subject to the provisions of Part VII, to establish, manage and control settlement areas;

(d) To make recommendations to the Minister in relation to the exercise, in relation to a Local authority situated within its region, of any power conferred upon the Minister under the Local Authorities Act, 1992, or any other law;

(e) To advise the President or any Minister on any matter referred to the regional council by the President or such Minister;

(f) To assist any local authority council in the exercise or performance of its powers, duties and functions;

(g) To make, for purposes of the preparation of the estimate of expenditure to be presented to the National Assembly in terms of Article 126 of the Namibian Constitution, recommendations to the Minister of Finance in so far as it relates to matters concerning its region;

(h) To establish from time to time such committees as it may deem necessary to advise it in the exercise of any of its powers or the performance of any of its duties or functions and may appoint such members or such other persons as it may deem fit to be members of such committees;

(i) To acquire or hire, or hypothecate, let, sell or otherwise dispose of movable property; with the approval in writing of the Minister previously obtained in general or in every particular case and subject to such conditions, if any, as may be determined by him or her, To acquire or hire, or hypothecate, let, sell or otherwise dispose of immovable property or any right in respect of immovable property;

(ii) To borrow money from time to time by way of loans from any source within Namibia and against the security which the regional council may deem fit or the issue of debentures, bills of exchange and other negotiable instruments;

(k) To guarantee the due fulfillment of the contracts and obligations of any person, and enter into surety bonds or deeds of security;

To open banking accounts, including savings accounts with a building society as defined in section I of the Building Societies Act, 1986 (Act 2 of 1986), and the Post Office Savings Bank controlled and managed by the Namibia Post.

It seems as though many Regional Leaders including the Kavango East Regional Leaders have failed these tasks, which are the key aspect in job creation in their respective Regions, which this study is investigating.

Regional Council's Act 22, 1992 shows signs of supporting the federalist approach. This is reflected, for example, in Chapter Seven, Article One which states: "Regional authority covers authority in all governmental fields, except authority in foreign politics, security, defence, justice, monetary and fiscal affairs, religion, and "other areas of authority". However, these last words indicate that regional authority is given with reservations. Article Two from the same chapter defines "other areas of authority" as including policies relating to national planning and macro-level national development, balancing budgets, the state administration system and state economic institutions, empowering human resources, natural resources and strategic high technology, conservation and national standardisation.

The half-hearted dispensation of autonomy can also be seen from the essence of Law No 25/1999, which is not in tune with Law No 22. The provision of relatively wide authority under Law No 22, is not backed up by basic changes to strengthen regional capabilities in respect of finances. It is an absolute precondition of effective regional autonomy that these two laws have a shared direction and support each other. Before they were submitted to parliament, the parties involved in designing the laws should have had discussions to ensure a compatible vision, and put both laws in harmony with each other from their inception to support the common objective of regional empowerment.

The complexities of the problem are more obvious at the implementation level. Autonomy is devolved to the kabupaten (regency) and kota (incorporated city) as mentioned in Chapter 11, Article 11: "The kabupaten and kota authorities cover all authority in government besides the exceptional authority in Chapter Seven, detailed in Chapter Nine". The framework of decentralisation that is developed on the basis of Laws 22 and 25 does not fulfil demands for wider autonomy at the provincial level.

Regional autonomy was conceived of as opening the widest possible opportunities for regions to optimise their potential. It presumes that each region will have one or more pre-eminent features that gives it an advantage, which could come from location or natural endowments and resources. However, to realise the benefits of these endowments, it is necessary to prepare regions to become active participants in the global market. This requires putting in place structures and processes which include guarantees of free movement of all production factors, goods and services in Indonesia, regulatory frameworks to prevent corruption

at the regional level and political processes that guarantee autonomy to local inhabitants to determine their aspirations. In conclusion, Regional leaders should know that they have a responsibility to empower their communities that elected them.

2.17 Why leadership is needed in water technology innovations

Our water resources are limited and face mounting pressures from climate change, pollution, population growth, and ageing water infrastructure. Technology innovation can help address our water challenges and help put us on a more sustainable path while also supporting economic growth. EPA aims to be a catalyst to promote and support technology innovation to restore, protect and ensure the sustainability of our water resources.

There are many barriers to innovation that are often cited e.g, institutional, cultural, financial and regulatory. EPA will consider ways in which its regulatory activities can reduce barriers to, or encourage incentives for, technology innovation.

The following are examples of actions that EPA will take, in cooperation with our EPA region and state partners;

- According to EPA report (2014), updating the Effluent Limitations Guidelines and Standards Program to consider more explicitly, sustainable and innovative technologies when developing national standards for controlling water discharges, is needed by leadership. Stepping back and asking a broad set of questions about the best available technology might include the consideration of energy use, sludge generation and disposal, process changes or green chemistry alternatives, water conservation and reuse opportunities, and by-product and pollutant recovery prospects.

- The EPA report (2014), further suggests that, exploring ways in which National Pollutant Discharge Elimination System (NPDES) permits could be tailored to foster technology innovation within existing legal Promoting Technology Innovation for Clean and Safe Water and regulatory authorities is very useful. Examples of permitting innovation might include watershed-based permitting, opportunities to foster process optimisation or use of existing excess treatment capacity, derivation of long-term average limits for nutrients, opportunities to explore alternative technologies and performance testing of those technologies, or implementation of integrated planning. The report goes on to suggest that leadership in this case EPA office should do the followings:

- ✓ Provide technical support to overcome barriers and allow for the use of innovative technology (e.g., ways to advance "Utility of the Future" concepts). This might include considering energy, carbon sources, greenhouse gas generation, and water and bio solids reuse in a holistic, approach. Continue to foster and promote consideration and use of green and natural infrastructure to achieve a broad set of environmental, social and economic objectives.

- ✓ Participate and contribute to efforts by external parties such as the Water Environment Federation, American Water Works Association and others to explore regulatory and/or policy strategies to identify and overcome barriers to the acceptance of innovative and new technology.

- ✓ Continue to collaborate with the Department of Commerce under the Environment and Technology Working Group and Environmental Trade and Technology Advisory Committee in promoting technology-based policies internationally, as well as promoting the environmental technologies exporters.

- ✓ The Office of Water will examine ways to address the ongoing challenges expressed by technology developers for bringing new technologies to market. Technology providers face a complex system of state and local requirements that can discourage acceptance, adoption and use of new technologies. For example, by engaging and supporting independent third-party technology evaluation efforts, EPA aims to continue to help bridge the gap between technology development and implementation for water-related technologies. EPA's Office of Water will evaluate the opportunities to support the growing demand for

technology assessment and performance demonstration/verification of a spectrum of water related technologies (e.g., independent third party).

- ✓ Participate in development of the Water Environment Federation (WEF) and Water Environment Research Federation (WERF) Leaders Innovation Forum for Technology,(LIFT), WEF's Storm water Testing and Evaluation for Products and Practices(STEPP) workgroup, and other promising technology evaluation efforts.

- ✓ Coordinate with other domestic and international efforts, including: The Interstate Technology and Regulatory Council (ITRC), a state-led coalition working to advance the use of innovative environmental technologies and approaches. Leadership should find a way to accelerate the market uptake of emerging technologies by introducing them to potentially interested water utilities during the pre-commercial stages of development.

- ✓ Continue to support efforts such as the Confmuence Water Technology Innovation Cluster, where state regulators with Ohio, Kentucky and Indiana recently signed a ground breaking cooperative agreement that allows the Confmuence to work with companies to complete testing that can be approved by all three states at once dramatically speeding time to market.

- ✓ The Office of Water (which represents leadership of that given area) will support EPA's ongoing efforts and programs supporting the development and implementation of innovative water-related technologies, such as the Ageing

Water Infrastructure Research Program and STAR grants, fellowships and research contracts under the Small Business Innovative Research Program.

2.18 The History of Job Creation

2.18.1 Current trend of job creation in agriculture sector

According to the Agricultural Business Development (AGRIBUSDEV) annual report of 2015, the agricultural sector in Namibia employs a large number of people compared to other sectors. The majority of workers in this sector are rural based and unskilled. From Green Scheme perspective, the two Kavango regions are the top in terms of employment at Green Scheme Farms. See the table below;

Project Name	**Permanent Employment – Male**	**Permanent Employment – Female**	**Temporal Employment – Male**	**Temporal Employment – Female**
Etunda	35	33	52	152
Hardap	4	2	25	8
Kalimbeza	6	2	22	64
Mashare	5	0	27	61

Musese	28	3	28	57
Shadikongoro	37	3	12	10
Shitemo	49	73	15	2
Sikondo	24	4	480	960
Ndonga-linena	37	13	8	25
ORIP	58	11	48	123
Uvhungu-Vhungu	21	11	60	160

Table 2.1: Level of employment created by Green Scheme 2014/2015 in Namibia. Sources: AGRIBUSDEV

Although the AGRIBUSDEV Annual report says that the agricultural sector in Namibia employs a large number of people compared to other sectors. It is very sad to know that the above table shows the opposite. Table 2.1 above shows that the total permanent employment created for the Green Schemes located within the boundaries of the Kavango East Region, only adds up to 90 persons during the year 2015. While the temporary employment created only adds up to 729, for the same year in the Kavango East Region.

This makes one wonder especially when one considers that out of a population of just over 105,000 in the Kavango East Region, only a handful of people are able to be absorbed by the

Green Scheme as employees. It means that the Green Scheme projects are not the solution to job creation as it is stipulated in the Act. Therefore there is need for leadership to look into a mechanism to empower the rural community of Kavango East Region to produce food and expand their already existing small gardens which are currently being irrigated manually. In this way it will assist them to produce more for themselves as well as for sale.

This will enhance job creation and reduce poverty at the end of the day, and encourage self-reliance. Green scheme projects are not a solution to address poverty and inequalities faced by the rural community of the Kavango East Region in particular and Namibia in general. New policies are needed in order to come up with mechanisms aimed at filling the gap left by the Green Scheme projects. Leadership, through the Ministry of Agriculture, water and forestry needs to look into this matter as soon as possible to address this situation.

The community of Kavango East Region has demonstrated a willingness to produce food. One would think that it is the right time that policies are developed to support this region. Therefore leadership has a role in supporting the rural community of Kavango East Region to use water in an efficient and effective way to enhance job creation, and reduce poverty and inequalities that currently prevail in the lives of the rural communities of the Kavango East Region and Namibia in general.

Name of the Farm	Size (Ha)	Total Number of Farmers-SSF	Total Number of Farmers-MSF	Region
Etunda Green Irrigation farm	1200	64	10	Omusa
Hardap Green Scheme Irrigation Farm	965	0	14	Hardap
Kalimbeza Green Scheme Irrigation Farm	229	5	0	Zambezi
Mashare Green Scheme Irrigation Farm	130	0	0	Kavango East
Musese Green Scheme Irrigation Farm	1000	0	0	Kavango West
Ndonga Linena Green Scheme Irrigation Farm	1000	27	0	Kavango East
Orange River Green Scheme Irrigation Farm	600	9	0	//Kharas
Shadikongoro Green Scheme Irrigation Farm	590	13	0	Kavango East
Shitemo Green Scheme Irrigation Farm	1000	0	0	Kavango East
Sikondo Green Scheme Irrigation Farm	850	0	0	Kavango West
Uvhungu-Vhungu Irrigation Farm	825	10	0	Kavango West
Totals	7 521	128	33	

Table 2.2: List of Green Scheme Irrigation farms in Namibia. Source: AGRIBUSDEV

Green Schemes are also established to assist the government in facilitating training and skills transfer to Small Scale and Medium Scale farmers. Looking at table 2.2 above, which was obtained from the AGRIBUSDEV annual report of 2015, it is disappointing to note that only 40 Small Scale Farmers were trained in the year ending 2015, and no Medium Scale Farmers were trained. This means that in the next ten (10) years only 400 small scale farmers will be trained if policies and approaches do not change to address this situation. The Government, through the Green Scheme project is not doing much to change this situation. If this situation continues poverty will continue to prevail in the Kavango East Region.

The most recent literature on this subject is the study officiated by the International Fund for Agricultural Development (IFAD) in November 2012, in El Tambo, Ecuador. It's said that providing water effectively for a range of agricultural needs has been proven to reduce poverty. At an individual farm scale, access to a reliable water store can make the difference between a crop failing or thriving during dry spells, which in turn will determine whether or not a poor farmer has enough food to feed his or her family. At a global scale, achieving food security through effective water management can prevent the deaths of millions from starvation and malnourishment. While past efforts to develop irrigation infrastructure have had success in reducing poverty, the benefits have not been equitably shared and there are many regions where pockets of poverty still remain. With the increasing conditions that climate change brings there is now an even greater need to find the most appropriate solutions to address poverty and vulnerability, specifically in regions that have not yet been reached.

Women's varying roles in agriculture have also been overlooked when decisions about water use have been made. There is a perception that rural women are solely responsible for fetching and carrying water, and that men undertake the farming, but this is not necessarily the case. Often, women have different roles as compared to men. For example female villagers might manage fruit trees, while men manage crops in the fields. If a government or development organization comes to install an irrigation system and is guided by village men to cut down trees, they may inadvertently dispossess women of their livelihoods. Increasingly, poor families are seeking to escape poverty by sending men to cities to find alternative employment. This trend has been observed in many places where women are increasingly taking on full responsibility for running farms. Despite assuming chief decision-making roles in many farming systems, they often remain underrepresented in water users' groups because of community attitudes and neglect on the part of policymakers to improve the rights and access of women.

Many of today's smallholder farmers grow a range of crops, often on unproductive marginal lands such as uplands. They would benefit from access to a combination of small-scale water storage facilities, along with soil improvement technologies. These would help them to overcome issues of rainfall variability, which is likely to be exacerbated in the future due to climate change.

They may also provide them with opportunities to diversify, for example, by farming fish as well as crops. Providing a large number of smallholder farmers with access to artificial ponds or tanks, small reservoirs, wetlands, and groundwater or soil moisture, has the potential to lift individual families from poverty and underpin global food security. In southern Sri Lanka, the

construction and linking of a large storage reservoir to five small existing reservoirs resulted in a 400% increase in productivity (McCartney and Smakhtin 2010).

Decision-makers need to take into account the role of women much more if they are to effectively address poverty as well as food security issues. A project that included women in decision-making on irrigation in Jambar, South Gujarat, India, resulted in a higher social status for the women along with greater productivity from their crops (van Koppen et al. 2001). The project involved researchers educating the community's men as to why the women should be involved in making decisions. IWMI and the International Food Policy Research Institute (IFPRI) are presently developing a gender map of smallholder farming in Africa. This will be used to develop recommendations on how to target the main decision-makers of the farms with water management technologies.

Action 1: Empower the poor and women in water management

Women all over the world play an active role in agriculture, thus contributing to food security. In many countries, women are involved in rain fed agriculture as well as backyard or irrigated home gardening, while men are often responsible for rain fed commodities and land management aspects of irrigation. Depending on the traditions of the societies they live in, the prevailing norms and the migration patterns of men, women may play different roles in the production cycle. In some countries, for example, in sub-Saharan Africa, women are the main producers of staple food crops; in others, they work on their family farms or as paid labourers. Yet in other

countries, particularly countries in the Middle East, women are mostly involved in post-harvest activities and work as unpaid family labourers only during periods of shortages of labour.

They and often their children suffer the most from water shortages in crop and livestock production, as well as for domestic use. It is estimated that women in many developing countries walk for an average of about 6 kilometers each day to collect water (UNFPA 2002). Water collection for domestic purposes is generally the responsibility of women and girls in almost all developing countries. Thus, if water supplies become scarce or contaminated, women and girls are the ones who must look for alternative sources of water. In addition, they must also provide care if family members suffer from waterborne diseases. The availability of clean water close to home reduces women's workloads, and the time saved in fetching water may be spent on other activities to strengthen livelihood resilience, including productive activities such as crop production.

Therefore, women are often interested in using rainfall run-off or irrigation water for purposes other than irrigating field crops. Most of the water supply projects in the past were developed with a single dimension; they either focused on domestic water supply or provided water only for irrigation. Communities, on the other hand, have diverse uses of water such as for agriculture, fishing, livestock watering, small businesses, kitchen gardening and domestic tasks. In the past, agricultural water management projects have not generally been designed or retrofitted to take into account these multiple uses for water within water management schemes. This trend is changing, and water projects are becoming more multi-purpose, multi-use and multiuser. The

involvement of communities, both men and women, in the selection of and planning for such interventions is key to successful gender mainstreaming. Not addressing the multiple uses of water has been recognised as one of the causes of the lower participation of women in WUAs (IFAD 2001b). In some irrigation systems, the use of irrigation water supplies for domestic purposes is considered illegal. Some irrigation projects even have a negative impact on domestic water availability.

A study in Bangladesh has shown that the use of river water for irrigation caused many hand pumps used for drinking water, to run Impact of water-related projects, on women, dry (Sultana 2002). Similar observations have been made about some of the schemes in the Provincially Administered Tribal Areas such as the Integrated Agricultural Development Project in Pakistan. The installation of tube wells for irrigation has caused a significant decline in groundwater levels and thus reduced the availability of water in the wells dug by nearby households.

In cases where irrigation projects have tried to incorporate other uses of water, they have often ignored women's concerns. In a smallholder irrigation scheme in the Kano Plains in Kenya, men wanted to have watering places for cattle, while women wanted communal areas for washing clothes and dishes. Because women were underrepresented in the WUAs, the project did not take into account the different perspectives of women (FAO 2003a).

Women, like men, may also have clear opinions about how an irrigation system should be operated. Because of their workload at home and their relatively lower flexibility in terms of time, women may have different preferences for irrigation operations and the scheduling of water deliveries.

Although unavoidable in certain circumstances because of the rotation of water deliveries, women tend to avoid night irrigation because of their fear of gender based violence, sexual harassment and other hazards, as well as the difficulties associated with combining work at night with childcare (Zwarteveen 2006a).

Irrigation projects in many instances have also brought advantages to women. While they have provided the much-needed water for irrigation in drier areas, resulting in an improvement in the livelihoods of families in general, they have also reduced women's workload in terms of the number of hours women spend fetching water for domestic use. Irrigation has made it easier for women's animals to be watered in convenient places (IFAD 2006a). In particular, providing water for multiple uses reduce drudgery and provides women with more time to do other productive activities.

Action 2 : Access to irrigated land:

Understanding the links between land and water governance as well as natural resources is one of the foundations in the effort to overcome poverty among poor people in rural areas. Thus improvements in the management of these resources is the focus of many development initiatives and projects that seek poverty reduction by empowering poor people to improve their livelihoods.

Experience shows that many challenges remain in achieving these goals in an equitable and sustainable manner. One of the main obstacles to improving the livelihoods of the poor rural

people is the lack of attention given to gender issues and women's access to natural resources, in particular land and water. Although research offers evidence on women's multiple roles in agricultural production, their access to productive resources such as land, water, fertilizer, credit and other inputs remains limited.

In most developing countries, access to water for productive use in general and for irrigation in particular is intrinsically linked to access to land. In most parts of the world, relatively few women own land. However, women may still obtain access to land through their families or husbands, a practice that makes them vulnerable to any change in family dynamics. In some societies in sub Saharan Africa, a woman acquires land tenure rights for life; however, this right is transferred to the male members of the family after she dies. In some cases, a woman may lose access to land after the death of her husband or father. Without secure land tenure, women cannot obtain access to credit and membership in agricultural and WUAs.

According to one estimation, only 1 per cent of the total credit directed to agriculture goes to women in Kenya, Malawi, Sierra Leone, Zambia and Zimbabwe because financial institutions do not generally consider women creditworthy (FAO 2003a). The Grameen Bank in Bangladesh and other micro credit institutions are an exception because they give small loans to poor men and women. Access to these resources helps the women or men use their labour more effectively by enabling them to make decisions and adjustments in allocating resources under changing economic and climatic conditions.

Many irrigation and land reallocation projects have failed to incorporate appropriate gender strategies in design and implementation, which, in many cases, has exacerbated inequities in

resource allocation. In many cases, women's access to land and water has declined as a result of the introduction of irrigation schemes (Van Koppen 1998; Zwarteveen 2006a). The project improved family income and indirectly benefited women, but women lost their control over resources (land and money) and became dependent on their husbands. Gender-based farming systems where men and women cultivate separate fields is common in many parts of sub-Saharan Africa.

This reality has often been ignored in irrigation development projects and led to gender inequity with regards to access to productive resources. It has also resulted in the partial or total failure of irrigation schemes. Moreover, key decisions regarding site selection, beneficiaries, land (re)allocation and water rights are made during the planning phases of water-related investment projects and thus form the basis of gender inclusion or exclusion in the projects. The approach of agencies and projects towards as well as the local class and gender hierarchies, are some of the causes of gender-related inequities in connection with access to water resources in sub-Saharan Africa (Van Koppen 2002).

In the Jahaly and Pacharr Smallholder Project, an IFAD-supported irrigation project in The Gambia, swampland on which women used to cultivate rice, was reallocated as part of communal or household farms, often with men as the heads (IFAD 2001d; Whitehead 1998). Because men were obliged to grow two rice crops in a year, they expected women to continue providing their labour. This gave women some negotiating power over their labour if their demands were not met.

The World Bank-funded SEMRY (Sociétéd'Expansion et de Modernisation de la Riziculture de Yagoua) irrigation project in Cameroon introduced irrigated rice crops in an area where women traditionally grow sorghum as their staple crop. The project did not take into account this fact and redistributed the land cultivated by women to men or households headed by men and assumed that women would provide their labour on the land given to their husbands. The scheme failed to sustain itself because of the refusal of women to provide their labour as expected.

In a similar Irrigation project in Kenya, women lost control over land and became totally dependent on their husbands (Zwarteveen 1994). Some projects try to learn from experience and, during subsequent phases, correct their mistakes. For example, a State-sponsored development project in Burkina Faso reallocated land that was traditionally cultivated by women to men. The project managers did not consult the women. They only involved the male elites of the community and did not realise that women in the area had stronger land rights prior to the implementation of this project. As a result, the women had to provide their labour for cultivation, but the men controlled the harvest. The staff of the project recognised this reality and tried to address the issue in the second phase of the project by developing, together with the local community, improved procedures for land allocation. Based on their negative experiences during the first phase, women were better organised this time. Thus, all former plot owners were registered in time and got one new plot in return. This gradually became a formal project procedure (Van Koppen, 1998).

2.18.2 Reasons for job creation in water sector

Many countries in the developing world are now using water to empower their rural poor people. Most extant literature dealing with this issue is pitched at the international level. In this regard the story of Kenya is helpful. The Coastal Rural Support Programme (CRSP) in Kenya has been working in semi-arid, marginalised rural areas of the Coast Province since 1997. Over the last decade, the programme has grown from working with four village organisations comprising less than 300 community members to working with 195 village organisations comprising more than 30,000 members. The introduction of small farm reservoirs, which has provided the target population of 130,000 with critical access to water for both domestic and productive uses, has helped the majority of households to increase agricultural production and income, in spite of the increasing poverty in the Coast Province.

Many districts in the Coast Province of Kenya are amongst the poorest in the country, where up to 70-80 percent of residents live below the poverty datum line. Often living beyond the reach of government services, rural families are left without clean drinking water, weak village infrastructure and limited access to basic education and healthcare. In addition, geographical and climatic characteristics leave them to cope with drought, depending on degraded natural resources for survival. This has created living conditions that are particularly detrimental as the majority of residents are small scale farmers who depend on agriculture as their sole source of food and income.

When it was established, the Coastal Rural Support Programme (CRSP) was meant to complement an already existing project of the Aga Khan Development Network, the Mombasa Primary Health Care Programme (MPHC). To support MPHC, CRSP implemented interventions

that, by stimulating economic and social development, contributed to sustainable and equitable improvements in the livelihoods of poor households in the Coast Province. As a result of the support that CRSP offers, it is referred to by its beneficiaries as *sombeza* (Mijikenda for "to push up or give a helping hand to those who are already doing something to improve their situation"). This is because communities see CRSP as providing a hand up, not a hand out, in the process of improving their livelihoods.

The programme's overall aim is to improve the livelihoods of poor households in Kinango, Kilifi, and Kaloleni districts of the Coast Province. The objectives of the program are:

- To strengthen community level organisations/institutions to be effectively involved and engage in local/central government and non-public organisations in service delivery, democratisation and governance;
- To improve livelihoods through diversification of income sources and promotion of appropriate agricultural and natural resource management practices;
- To increase water availability and reliability for productive use, improved health status and livelihoods;
- To increase access to quality basic education for marginalised children;
- To enhance knowledge generation, management and dissemination resulting in wide adoption/replication of CRSP poverty alleviation approaches by other organisations.

CRSP's programming is deeply rooted in the idea that the community is the central unit from which equitable and sustainable development takes place. As a result, all of its work in each of its four sectors begins with the establishment of relationships and partnerships at the community level, with community based organisations called Village Development Organisations (VDOs). The VDOs provide community members with a forum and tools to discuss, chart and implement a plan for the future of their village. Although most villages have existing structures for making decisions, they are often not recognised by outsiders as formal organisations with the ability to collaborate with government. This lack of voice, coupled with the structure of government decision making, which gives priority to interests at the divisional rather than community level, means that individual villages are often unable to voice concerns about development in their areas.

CRSP provides VDOs with training on governance, organisational development, participatory monitoring and evaluation, and record keeping. Prepared with these skills, VDOs are then assisted to register as formal organisations with the government. Since 1997, CRSP has facilitated the establishment of 192 VDOs. CRSP also links together VDOs from the same districts, to form Supra Organisations, which collaborate and interact with government officials beyond the divisional level. These Supra Organisations are able to demonstrate competency in management, group leadership and project organisation. A key result of the social organisation process is the institutionalisation of a community based planning process in which villages prepare community development plans which they are then able to forward to government departments or other organisations for planning and funding support.

The development of appropriate technology can raise a farm's productivity. Successful technological developments that aid the rural poor are achieved through bottom-up policies that involve technological innovations that require few external inputs and little monetary investment. The most effective innovations are based on the active participation of small farmers, who are involved in both defining the problems and implementing and evaluating solutions. Smallholder technological developments have focused on processes such as nutrient recycling, integrated pest management, integration of crop and livestock agriculture, use of inland and marine water sources, soil conservation, and use of genetic engineering and biotechnology to reduce fertilizer requirements.

CRSP encourages the diversification of drought tolerant crops. These are promoted at the household and group level. Through field farm schools, farmers are trained on how to prepare the land, plant the crops, carry out weeding, pest and diseases control and harvesting and storage. CRSP also assists in vegetable production through kitchen gardens located at the household level and at small farm reservoir water sites. The main aim is to produce food for household consumption with surplus vegetables sold on the market.

After few years, the outcome of the areas that used water was as follows:

- V*illage organisation and influence*: One-third of households in 192 villages belong to Village Development Organisations and are employing interventions introduced by CRSP.

- *Soil and water conservation*: Three-quarters of households are now using soil and water conservation methods.

- *Livestock production*: Goat improvement has been successfully adopted by more than 40 percent of respondents, raising the income for two-thirds of them.
- *Water and sanitation*: Increased access to safe water during the dry season through pipeline extension.
- *Living standards*: More than half of the respondents' households say that their overall living standard has improved.

Leadership should consider using water to empower their communities; they should involve communities themselves in order to harness development in the rural areas.

2.18.3 Major types of job creation

2.18.3.1 Permanent job creation

Permanent employees, regular employees or the directly employed workers are paid directly by that employer. In addition to their wages, they often receive benefits like subsidised health care, paid vacations, holidays, sick leave, or contributions to a retirement plan. Permanent employees are often eligible to switch job positions within their companies. Even when employment is "at will", permanent employees of large companies are generally protected from abrupt job termination by severance policies, like advance notice in case of layoffs, or formal discipline procedures. They may be eligible to join a union, and may enjoy both social and financial benefits of their employment. Permanent employment therefore means employment of an

individual that is guaranteed throughout the employee's working life. In the private sector, such jobs are rare; permanent employment is far more common in the public sector, where profit and loss is not very important.

2.18.3.2 Temporal/seasonal job creation

Temporary work or temporary employment refers to an employment situation where the working arrangement is limited to a certain period of time based on the needs of the employing organization. Temporary employees are sometimes called "contractual", "seasonal", "interim", "casual staff", "outsourcing", "freelance"; or the word may be shortened to "temps". In some instances, temporary, highly skilled professionals (particularly in the white-collar jobs, such as law, engineering, and accounting) refer to themselves as "consultants."

Temporary workers may work full-time or part-time depending on the individual situation. In some instances, temporary workers receive benefits (such as health insurance), but usually benefits are only given to permanent employees as a cost-cutting measure by the employer. Not all temporary employees find jobs through a temporary employment agency. For example, a person can simply apply at a local park for a seasonal job.

A temporary work agency, temp agency or temporary staffing firm finds and retains workers. Other companies, in need of short-term workers, contract with the temporary work agency to send temporary workers, or temps on assignments to work at the other companies. Temporary employees are also used in work that has a cyclical nature, requiring frequent adjustments to staffing levels.

2.19 History of Job creation for Kavango East Region inhabitants

2.19.1 Labour Migration in Kavango East Region

According to Likuwa (2014), Contract labourers from Namibia came only from former Ovamboland and the Kavango area and although there were farm labourers from other Namibian ethnic groups, they were not contracted. Many of the farms where labourers got contracted were mainly owned by German settlers and Afrikaners who were engaged in livestock farming, raring animals such as sheep, goats and cattle. Labour migration from Kavango during the German colonial period was low and totalled only 122 men from 1910 to 1913. This is in contrast with Ovamboland, which recorded 9295 labourers in 1911, 6076 in 1912 and 12025 in 1913. The table below, while not a comprehensive statistical compilation, shows the extent of the differences in migration from the Kavango and Ovamboland during the colonization of Namibia covering the years 1920s, 1940s and 1950s.

Year	Kavangoland	Ovamboland
1924	346	3273
1925	243	3269
1926	355	4033
1941	639	4060
1942	351	3137
1943	539	6659
1959	1033	14960

Table 2.3: Labour migration from Kavango during the German occupation. Source: Likuwa (2014).

Likuwa (2014) continues to elaborate on the fact that, this trend continued for the whole period of the contract system and by 1971 it was reported that there were 43000 contract labourers in Namibia of which only 3000 were from the Kavango and the rest were from Ovamboland. The statistics for labour migration indicates that the response to labour migration in the Kavango was not the same as that in Ovamboland and there was never the same value attached to contract labour migration. However the table above indicates that recruitment by SWANLA (1943-1972) was better than its predecessor NLO (1925-1942). The number of contract workers in Namibia

provided to the farming sector exceeded the number of workers involved in the mines for the first time in 1934 and remained so during most of the 1940s.

This occurred because after 1948, SWANLA adopted a compelling strategy in order to meet the demands of farm labour by making it compulsory for all new recruits to spend at least one contract as a farm worker before they would be able to travel to the mines.

Likuwa's paper uses the recorded oral interviews of former contract labourers from the Kavango in northeast Namibia, supplemented by archival sources from the National Archives of Namibia (NAN) and written sources to reflect on the experiences of farm labourers under the contract labour system during Namibia's colonial period. The paper explores journeys to and from the farms, the living and farm work experiences and farm workers' perception of their experiences under the contract labour system.

The aim was to provide a historical basis to extract lessons in order to understand the current challenges faced by farm labour practices in postcolonial Namibia where the plight of farm workers remains a pertinent and persistent concern. The paper stipulates that the paradigm of exploitation, suppression and entrapment under the contract labour system remains dominant in the narratives of former farm labourers. Furthermore, many farm labourers still view their mistreatment under the contract labour system as colonial exploitation at its worst as the wages were too low. Although many of them renewed their contracts in the hope of accumulating more money in order to improve their social and economic conditions, this remained an everlasting hope that was never realized.

He further suggests that, the colonial administration aimed at maximizing profit from black Namibians' labour power and therefore put control measures and infrastructure in place to

ensure that contract labourers from the Kavango were delivered to their work stations in the police zone. In the early days of colonialism in Namibia, migration was under the escort of the visiting colonial officials and later through labour escorts and eventually through organised recruiting agencies.

The journey to the work stations was a tightly controlled process and an overt control over labourers. All their personal and family details, for example, were recorded at Rundu and reproduced and kept in the recruiting centre at Grootfontein. Apart from the D.P. disease control, the labourers were also inspected for security purposes at the police border posts of Nurugas and Tsintabis, which were entry points to the police zone from the Kavango. After 1936 when the office of the Native Commissioner operated from Rundu, all new labour recruits began to report at his office. The contract labourers slept at a labour compound that consisted of thatched roof houses and was situated near the river side but in the late 1950s another compound was constructed further away from the river with permanent brick structures. The grouping of contract labourers at Rundu ensured that the administration had an easily available pool of labour force from which to extract labourers who would have passed their medical testing process.

A contract labourer was first examined in Rundu and then in Grootfontein and this medical procedure degraded and embarrassed contract labourers. While in Rundu, labourers were stripped naked and taken to a hall surrounded by a short wall made of reeds near the SWANLA shop where they were medically examined. Afterwards they proceeded to the hospital to what they called the 'wahahesera' (don't breathe) machines to test if they had tuberculosis (TB). They called the x-ray machines the 'don't breathe' machines because labourers were usually asked to

breathe in and hold their breath for several seconds while an x-ray was taken. The medical testing process therefore displayed lack of respect for the dignity of the labourers. The tagging with a metal alphabetic tag around the hand ensured that labourers were aware of their job categories before they left Rundu.

The B symbol indicated that labourers were fit for heavy farm work such as extensive milking, dam building, herding of large flocks of sheep or goats while the C symbol was given to labourers who were fit for light farm work such as milking a few cows, herding small flocks of sheep, goats and other forms of light work.

The provision of symbols on labourers at Rundu was for classification purposes only and the labourers were still at a loss as to what employer they would be assigned to and to which work destination they would be sent to. Contract labourers were exposed to personal hardship and danger during the journey. For example, in the earlier stages, they carried their load of goods on their shoulders and had to provide for their own meals and were also exposed to Bushmen attacks, hunger and starvation.

Transport was introduced by NLO from Kavango to the south only in 1938 and Mr Gaerdes Kemp (locally known as Kemba) was appointed to transport contract labourers and to run the only NLO shop at Rundu. The Lorries that transported migrant labourers followed the road from Rundu via Karukuvisa–Tsintsabis to Grootfontein. This was a deep sandy road, which slowed down the speed of the Lorries and made the journey to the recruiting depot very long and tiring. A key image constructed by contract labourers about recruitment at the Grootfontein recruiting depot is that of sale or purchase. The needy white men (employers) placed an order for their

required number of people at SWANLA at a fee that went to the colonial administration's coffers and this practice was seen as a sale. As one labourer indicated:

Since labourers already knew what job category they had been assigned to in Rundu, their objection at Grootfontein was not against the type of employment but rather against the area of employment or a particular employer. After a labourer was given an employer or place of work, he was provided with a blanket, a long-sleeved shirt and a short-sleeved one (regardless of the size of the labourers), some bread and two cans of jam. The quantity of the goods labourers received depended on the length of the journey. As one interviewee said: 'The number of loaves of bread you were given depended on the distance one was to travel. For instance if you were going to Walvis Bay they got three loaves of bread with two tins of jam'.

Each labourer was provided with a train ticket attached to a permit of employment, which indicated their names, the name of the area where they were to work in and the name of the employer. Contract labourers travelled by coal trains, the 'kataghura' (the cutter/breaker), to their various work destinations but dreaded them because these were usually used to transport cattle and thus labourers felt degraded and dehumanised.

The taking away of the personal documents of contract labourers, which they received back from employers only after the contract period had expired, ensured that labourers could not travel elsewhere without the permission of their masters and could not change work (unless he broke the contract and left without his papers). Some pondoks were old with leaking roofs and cracked walls and were usually not fumigated and became the breeding ground for bugs 'ntjanya', which tormented the labourers during their sleep, a situation that got worse when it rained.

The labourers could also be assigned any available structure such as a storage room for accommodation. This was the case for Shindimba Shihungu during his first contract at Outjo farms in the 1950s. When a new labourer arrived on a farm, they familiarised themselves with their new places and determined how they would fit in by inquiring from other labourers about life on that farm.

Since Kavango labourers usually worked with labourers from other ethnic groups they established friendships across ethnic lines and usually learned Otjiherero, Damara and Oshikwanyama languages as the lingua franca. The Kavango labourers could easily learn these other Bantu languages as they could relate to them easily since most of the words existed in their own language as well.

Shindimba Shihungu recounts that "Damara came to me one day and said 'let us go and look for the cattle'. I said 'ok, let us go' but he spoke in Otjiherero. I understood the word 'let us go' and the word 'look for the cattle' sounded the same way as it does in my language. So then, we left and went on to look for the cattle".

At the farm, the farmer had the final say and allocated any work to the labourers, sometimes in contrast with the contract agreement. This meant that a labourer contracted to work in the kitchen could end up working as a herd boy. Since some labourers had preconceived ideas about what they would do on the farm, their new condition of work was therefore a shock to them. Matamu, who left for his first contract after 1936 and worked at a farm in Okahandja thought, for instance, that he would do light work because he was of a small stature.

Contract labourers' preconceived ideas about the nature of work turned out to be different from what they experienced at home. At home, for instance, a young man learned by imitation from the elders while on the farms he was commanded and at times compelled to work.

At home, the men visited neighbours with no limits as to what time to return home or else sat around 'shinyanga' (the social gathering place around the fire in the evening) to discuss their experiences of the day and plans for the next day. However, on farms, visiting days were only on Sundays and workers only visited friends at the various campsites situated within the same farm. Unlike at home where cooking was the women's responsibility, contract labourers on farms had to cook for themselves. Labourers on farms also had to work in the kitchen to help the mistress cook for their master.

The space of the kitchen on the farm, unlike at home, became central to labourers and those who worked there felt closer to the farm authorities in the sense that they developed a closer relationship with the mistress (this was the farmer's wife who was also referred to as the 'Missis'). Although working in the kitchen was regarded highly among the labourers, sometimes there were problems as labourers felt the authority more directly. Some of these former labourers point out that although some farmers were likely not to bring trouble on them; it was mostly their wives who incited them to do so. The 'Missis' usually reported every mistake of the labourer to her husband and expected him to deal with the respective labourer. The short temper of the 'Missis' lingers on in the memory of some of the contract labourers.

The prominence of this memory of the 'Missis' reflects on the gender roles in the Kavango region in which women were expected to be submissive to their men and follow instructions

from their husbands. Therefore, Kavango farm labourers might have found it more difficult and traumatic to be shouted at by a woman. The constant reporting of a laborer's mistakes by the 'Missis' left him open to acts of victimisation from his master. The central issue that usually made the 'Missis' angry in the kitchen was when a labourer broke a cup or a plate or spelt anything on the floor. Her anger was aggravated when the labourer dared to speak back. In their narrations regarding their experiences in the kitchen, some interviewees are careful to represent themselves differently in contrast with other labourers who got into trouble. For example, Shirengumuke recounts,

> "when I finally entered the kitchen I was never beaten. Even when she got angry, she would come and just stand there looking at me. At times when one was holding something and then it slipped from one's hands and broke down, hey! she would come with force and say 'you broke my cup I am going to beat you'. Then I would respond 'just beat me, have I not told you before that I did not come on contract to work in a kitchen? I came to milk cows but then you said, no, stop milking and come in here until such a time that we find someone for the kitchen, I was not the one who chose this".

Shirengumuke continued to say "After that then she would just stand there speechless until she gave up and went away. When she was standing in anger, I would be silent, busy doing my work. She would also just stand there until she turns and goes away. This was unlike the case with my friend who spoke back when she spoke to them. That was why they could not understand each other". His strategy was to be quiet while his friend spoke back and angered the 'Missis' further. Some labourers, therefore, developed a survival strategy by being silent whenever abusive words were thrust upon them. Remaining silent however could also be related to the earlier traditional

education that children received from their parents, never to respond negatively to an elder or anyone senior.

On the other hand labourers had to cover the cost of their utensils such as a plates, pots and a cups. It is crucial to note that the cost of these utensils, which they received from their master, were later deducted from their wages. At the end of each week the master also provided supplies of food. They usually received tobacco, salt, sugar and maize meal, beans and soup while meat was given occasionally.

Although there were exceptions, farm employers were generally regarded by labourers to be cruel. Oral interviews indicate examples of physical abuse of contract labourers who were beaten for failing to greet the 'baas' as he passed by and were kicked in the buttocks by the mistress as they pushed the car of their master to start the engine. They were also beaten for beating a calf during the milking process, for the death of livestock, for negligence, for not being able to operate water pump machines and for speaking out as the farmer was speaking. In some cases the farmer called the police to come and beat up his contract labourers for what he believed was a cheeky and disrespectful attitude of contract labourers towards him.

The worst that could happen to a farm contract labourer was to be killed and contract labourers believed that those labourers who disappeared under mysterious circumstances without trace, were in fact killed by the farmer. The farmer could get away with the crime by reporting to the police that his labourers had absconded from work. It was useless for labourers to lodge any complaints against the farmer's mistreatment as labourers were always sure to be found guilty and served with harsh punishments afterwards. The continued mistreatment of farm labourers with no legal recourse usually made some labourers wish they had never come on contract work

and this led to their desertions from the farms. This was, however, a dangerous decision as a labourer was legally breaking his contract and could be imprisoned once arrested.

The estimated number of desertions from farms within the Police Zone over a period of twelve months ending in 1947 was over 600. At the end of this period 297 arrests had been made within the Police Zone but 282 of those who had escaped remained free. About 28 labourers who were arrested while escaping were beaten up by the police before they were returned to their former masters. However, in cases where the old master was no longer interested in such labourers, they were usually deported back to the Kavango to be eligible for further contract work.

There were exceptional cases where farmers displayed kindness to some labourers but this selective favouritism usually created tensions, suspicions and conflicts among labourers. The tensions and conflicts were usually between the long-serving labourers and the newcomers. What created discontent at times was when a newcomer was put in charge over the long-serving labourers or was favoured over and above them in other aspects. Such discontent led to suspicions on the new labourer which put him in a vulnerable position, sometimes to a point where he felt his life threatened and the only solution was to leave that farm.

This was Tuhemwe's experience in 1970. He says

> "At that farm where I worked, I was the only person from Kavango and the only smaller in stature. The rest were from Ovamboland. Then the white madam liked me so much that whenever she went shopping, I was always taken along in her car. I use to be paid R6.00 a month while others got R.4.00 or R.5.00 and this is what made them question why I, the new comer was getting R6.00 as compared to them who had been there much longer. Since then tension began to build up between my friends and I. They were

> complaining why it was so when they were the first ones to work on the farm. The white madam did not take one of them to do the work that I was doing? They were also not happy that every time she went shopping she would only pick me to go with her? So, that was the way things continued to be and every time she went out she took me along until later I also began to notice that my friends were really not happy. It was then that I began to think that perhaps one day my friends would be tempted to do something bad to me. I began to panic. I got scared. Finally, my contract expired and when I wanted to return home, the master asked me not to go back but to renew my contract but I refused. I did not tell them the truth about the reason why I did not want to renew my contract".

It was an invitation of problems for a labourer to be loved and favoured over and above others as this usually led to suspicion and envy from fellow labourers and that would put the loved laborer's life at risk. The suspicion by other labourers towards a favoured labourer indicates their demand for equal treatment from the farmer.

Tuhemwe's account that contract labourers in Namibia got paid different salaries at different times could be true considering that the recommended wages, varied over time and within the various employment sectors given the rate of inflation. After the Second World War in 1945, the farm labour commission, for instance, recommended the following farm work wages:

- the first four months at 8/-per month,
- the second four months at 9/-per month,
- the third four months at 10/-per month,
- the fourth four months at 12/-per month,

- the fifth four months at 13/-per month and
- the last four months at 14/-per month.

By 1966, it was stated through an official publication that a contract worker with no previous experience working on commercial farms in central and southern Namibia started at R7.50 per month, raised to R8.25 per month after 12 months, then to R9.00 six months thereafter, and to R9.75 another six months later. What matters about the oral statements is not their factual truth or levels of falsehood but what meaning they provide regarding the levels of wages that the labourers received.

The labourers' narratives indicate that wages were not fixed and while some were paid monthly, wages others got their wages only at the end of their contract. Others complain of not having been given their full pay and dismissed unfairly afterwards, as was the case with Kativitji in 1929. Others got as low as R.0.90c per month for the first eight months and then got R1.00 per month for the remaining two months as was the case with Ndumba Shirengumuke in the mid-1930s during his first contract at a farm in Gobabis. Others got R6.00 per month, as was the case for Tuhemwe in 1970 at a farm in Grootfontein.

The end of a contract of work at a farm was usually referred to as 'kukutuka' (to be set free from) and it was indeed regarded by labourers as the temporary end of their bondage to contract work at least until their next contract. When the contract had expired, labourers were given back their pass permit to return to the Kavango and were eligible to reapply for another labour contract. In cases where the former employer still needed the services of a labourer, he had to go to the office of the commissioner or magistrate for re-contracting as a farm labourer and had to pay the recruitment fee but this only materialised if the labourer was interested and agreed to be

re-contracted to the same employer. Many contract farm labourers returned to contract work more than once although possibly to different employers or employment and some like Ludwig Kudumo Kamenye were engaged in contract labour for eight consecutive years.

The question of adding more months to a contract after the expiry of a previous contract was possible but Silvester shows that migrant farm workers seldom renewed their contract on a farm or returned to the same farm. Oral narratives indicate that although re-contracting with a cruel employer after the expiration of the initial contract was highly unlikely, it was not wise for a labourer to divulge the truth to his master regarding his unwillingness to return as this only put him into more trouble. Instead the labourer gave false reasons or simply falsely promised their employers that they would return after a break. Farm labourers believed that the contract farm labour system was an example of colonial exploitation at its worst because they suffered and were exposed and dehumanizing treatment. Kapinga Muhero, who went on his first contract in the 1960s, asserts that although contract labour system was the only means to acquire money, one received nothing good out of it. He goes on to compare engaging in contract labour system to a local parable of gathering wild fruits.

In conclusion, Likuwa says, the paradigm of exploitation, suppression and entrapment under the contract labour system remain dominant in the narratives of former farm labourers. Although there were benefits, these were small, short-termed and not worth the exploitations and the suffering they had to endure. Many farm labourers viewed their mistreatment under the contract labour system as colonial exploitation at its worst as the wages were too low. Although many of them extended their contracts in the hope to accumulate more and improve their social and economic conditions, this remained an everlasting hope and a permanent failure.

2.19.2 Inducements/stimuli for labour migration

Labour migration issues started before Independence, it was induced by the regulation of black labour which was inseparable from the objectives and operations of colonialism and apartheid with its system of influx control, passes, native reserves and job reservation. Black people served as a source of cheap labour for white farmers, mining companies and other white employers. The greatest supply of black labour came through the notorious contract labour system, in which all workers were temporary employees on fixed-term contracts, to be relegated to unemployment on native reserves at the end of their contracts. Their status as workers was akin to chattels. Breaching a contract was a crime. Those workers who were not on contract were subject to any kind of employment, where they could be fired with impunity for any reason or for no reason at all. Black workers did not enjoy the right to form trade unions and to bargain collectively with their employers.

2.20 Gender and job creation

2.20.1 Gender and empowerment, and water usage in General

Gender and empowerment is an issue of concern around the globe, very few countries have managed to use water to empower women. The most recent literature reflecting this effort is only found at international level, like in the case of Jambar in India, a study conducted by Gupta in 2013.

The support provided by the Aga Khan Rural Support Programme (India) to the Jambar Women Irrigation Group in Bharuch, Gujarat, and increased women's benefits from irrigation intervention and fundamentally challenged prevailing patterns of male ownership and management of irrigation equipment. The experience highlights the often-untapped potential for

gender-balanced irrigation intervention wherever women share in farm activities and decision-making.

Their report is based on various visits to the group during 1999 and the insightful discussions held with its 22 members, with some of their husbands, and with the staff of the Aga Khan Rural Support Programme (India) (AKRSP [I]) who also provided background material. Aga Khan Rural Support Programme (India) AKRSP (I) is a nongovernmental organization (NGO) working in Gujarat State since 1983. Its mission statement is "to enable the empowerment of rural communities and groups, particularly the underprivileged and women, to take control over their own lives and manage their environment, to create a better and more equitable society." Based on a participatory needs assessment and planning process in each community, a range of activities are undertaken, for example, agriculture, forestry, biogas, soil and water conservation, joint input supply and marketing, and water resource development, including canal irrigation, lift irrigation, groundwater recharge and provision of drinking water.

According to Gupta (2013), AKRSP (I) channels its support through formal and informal village institutions. At village level it organizes a Gram Vikas Mandalor GVM (Village Group). AKRSP (I) has found it more effective to reach certain communities—especially villages that consist of different communities divided by caste, class, religion, gender and occupation—to create separate institutions each of which focuses on one particular community, gender, or user group. To address the needs of women, they are organised into Mahila Vikas Mandalsor MVMs (Village Women's Groups). At the initial stage, activities like monthly saving and credit programs and training in bookkeeping are taken up. As groups mature, training on group

dynamics and leadership is provided. Depending on the needs that women express, further activities are initiated, such as income-generating activities, agricultural training and biogas promotion. Education and awareness raising with regard to the deeper roots of gender hierarchies are an integral part of the support. The AKRSP (I) encourages women to participate in all its programs to improve the management of natural resources, and at the same time to reduce the drudgery of women and bring recognition to their productive roles, considered to be essential for improving their status.

Jambar Village

Jambar is a village of 530 persons living in 84 households, in the Bharuch area in South Gujarat. The inhabitants belong to the Vasava tribe, a subgroup of the Bhils. They and other Bhils settled here, after they had been slowly pushed over the course of several generations into these most degraded hilly and deforested lands of the State. They gradually took up agriculture. Although annual rainfall (1,180 mm) is high, it falls within 4 months and allows for only one kharif (major monsoon season) of cultivation. Therefore, the potential for irrigation is high. In this area, AKRSP (I) supports especially plantations and irrigated agriculture. In Jambar, 136 hectares of rain-fed land are cultivated. The village also covers 187 hectares of forestlands. One-third of the households owns livestock. Seasonal emigration for employment in construction and road construction work abounds. Agricultural wage rates in Jambar are rather low pegged at Rs 20–25 per day.

The wages are the same for women and men. According to AKRSP (I)'s poverty classification based on people's own perceptions, 17 percent of Jambar's households are considered to be poor, 69 percent of the households have a medium welfare level, and 14 percent are classified as rich. The kharif crops that the respondents grow are cotton, paddy, groundnut, sorghum, maize, pigeon pea and black gram. Landholdings in Jambar, as elsewhere in Bharuch, are small. The average land size among the respondents is 1.6 hectares.

Leasing-in land is also practiced by the landless minority. According to Gupta (2013), most houses in the village have a wada (an open space around the house) that, depending on the size, is used for various purposes. It is commonly used for growing vegetables and some fruit trees, which give both produce and shade. If the land is larger, it is used for growing cereal crops, especially maize. Farming is the main source of income of 88 percent of the households interviewed. Out of these farmers, 17 percent have a second occupation besides agriculture. The other sources of income are agricultural wage labor (8%) and share cropping (4%). Forty-six percent of the women have one of the following main income sources: irrigated production (as elaborated below), farm wage labor, or other paid work. However, 54 percent of the women did not have any income that they considered their own.

Gender and Agriculture in Jambar

Rain-fed Agriculture

In rain-fed agriculture, the gender patterns of agricultural operations and decision making among those interviewed are that men make the decisions and implement the technology-intensive operations of ploughing, seed selection, fertilizer and pesticide application, and they do the

marketing as well. Marketing primarily concerns cotton, which is preferably done through the Village Group to the Cotton Corporation of India. Pulses are sometimes sold as well.

Women, on the other hand, provide most of the labor in labor-intensive operations such as weeding and harvesting. Women's say in family farming is limited. The first domain where women and men tend to decide jointly concerns the crop choice and size of the land to be planted under paddy or under cotton. Here the wife must indicate the family's needs for food grains, also taking into account the stock that is carried forward, the buffer they would like to keep, and the additional requirement for planned social occasions like weddings.

The second domain, in which decisions tend to be taken after consultation, is labor exchange. Hired labor is scarce and expensive. Therefore, people often enter into labor-exchange arrangements with relatives and neighbors, and work on the farms of one another during the critical times of sowing and harvesting. As women are the main laborers for these tasks, the arrangements for women to provide labor, to whom it is provided and when, are decided by both husband and wife.

The third domain in which men also generally consult the women concerns loans for agricultural inputs like fertilizer and pesticides. The decision as to how much to borrow is made after a careful assessment of the family's loan repayment capacity. In case of a crop failure, all household members risk having to work as wage laborers to repay the loan. From the three domains, women respondents still said that the ultimate decision is with their husbands, although "he seldom takes a decision contrary to the consensus reached previously."

Wada Cultivation

In wada cultivation, on the other hand, women have a much stronger say. Except for ploughing, which men do, women not only provide all the labor, but also make decisions, either alone or jointly with their husbands, especially when the size of the wada land is small. During kharif, maize is the major crop, which is invariably used for family consumption as maize flour for bread served for the evening meal. Some vegetables especially from the cucumber family (bottle gourd, bitter gourd, cow pea, bean and pumpkin) are also grown and any surplus is sold. This was the situation before the installation of the irrigation pumps.

Initiating the Irrigation Scheme

General Institution Building

In 1990, AKRSP (I) started its support to the people of Jambar. A GVM was formed, which undertook to expand forestry activities. Soil and water conservation measures were also implemented. For its cotton production, the GVM joined an initiative of collective input supply and marketing to the Cotton Corporation of India. This has helped them to introduce hybrid cotton and improve crop productivity.

Furthermore, members obtain better prices than when they sell the produce to private buyers in the neighboring markets. In 1999, the sales of cotton had a turnover of almost Rs 200,000. Today, 72 men and 12 women are members of the GVM. Individual savings amount to Rs 51,000, and the common fund of the GVM is Rs 23,000. In 1992, Jambar became one of the first villages in Bharuch with an MVM. While the MVM had only 8 members in the first years, it now has 41 members. However, 75 percent of the members are illiterate. The education of the chairperson and secretary is only up to 4 and 7 years, respectively. The chairperson of the MVM

is very bright and dynamic. She is also increasingly engaged in extension work in AKRSP (I) activities outside Jambar. To mitigate the problem of fuel wood, the women's group constructed biogas plants, besides setting up a small savings and a credit scheme. Together they have saved Rs 5,600, and the MVM has a fund of Rs 921. The training sessions organized for the Jambar MVM cover issues like membership and leadership awareness, secretarial duties, pump operation, agriculture, gender and general visits for purposes of exposure.

The Group Well

A well belonging to the Panchayat of Jambar fell into neglect some years ago after four hand pumps were installed in the village for domestic water needs. However, with a perennial flow close to the well, it could be exploited even for irrigation purposes. The option to deepen the well and use it for irrigation purposes by installing a mechanized pump was discussed independently in the (male-dominated) GVM and in the MVM. The GVM decided to approach the AKRSP (I) for financial assistance.

The AKRSP (I) suggested to the GVM that they should consider giving the responsibility of managing the group and pump to the MVM. Initially, the men were hesitant about the ability of the women to manage the irrigation scheme. However, the GVM felt that it might be easier to get funds from the AKRSP (I), if they agreed with their suggestion. The men also felt that, because they were already undertaking many activities with the support of AKRSP (I), the women should be allowed to benefit as well. A group of women of the MVM was thereafter offered a visit to Hazaribag in Bihar, so that they could see for themselves how uneducated women successfully manage a mechanized pump and scheme, with the support of the NGO Pradan. This boosted the

morale of the group. “If women of Bihar can do it, why can’t we?” The women returned to Jambar, determined to manage their scheme well.

The AKRSP (I) gave financial and technical support for the installation of a 7-HP diesel pump and the construction of a command area of 4.1 hectares. It also contributed Rs 95,000 to the capital costs, while 55 women contributed Rs 6,600. Underground pipes were installed through which the water is pumped to three reservoirs at a higher elevation. The steep topography does not allow a further extension of the command area. The scheme started in 1997, and has functioned for 2 years now.

The new command area covers the land belonging to 20 families from the same hamlet. Most plots are wada plots. The entire wada land is registered in the names of men, either the father-in-law or the husband, except in the case of one widow. Four out of these 20 families own two-thirds of the command area. Twenty-three members of the MVM were active in wada-cultivation during the last rabi (winter) crop. In 58 percent cases, women pay the water costs for irrigation while husbands or sons go and pay the water charges in the other 42 percent of the cases. Out of the 20 households that get water, all were satisfied with the water service, except two households with their plots at an elevated tail end.

Managing the Irrigation Scheme

Within the MVM of 41 members, a smaller subgroup was created to manage the group. Besides 16 women whose households have land in the command area, 8 other women joined the irrigation group, even though the pump water would never reach their own lands. One of them is also a member of the Management Committee for the group. Three of the 8 members leased land in the command area in the first year but when the landowner saw the benefits of irrigation he terminated the lease.

Four women form the Management Committee of the entire MVM. They are in charge of organizing the monthly meetings, informing the members about the meetings and the outcomes thereof. They are also in charge of operating the small savings scheme for the members, maintaining accounts, disbursing credit and following up on loan recoveries. With regard to the group, the management committee decides on the water charges, supervises water distribution, collects water fees from the pump operator, and deposits the funds in the bank.

The MVM charges Rs 40 per hour for watering. Wheat requires 4–5 watering at a rate of four hours per acre per watering. The MVM employs a male to operate the pump, distribute the water, and sale water coupons. The latter system ensures that water is paid for before it is delivered. The pump operator receives Rs 7 out of the Rs 40, which amounts to some Rs 750 per season. For small repairs, women consult male mechanics.

The net benefits, presented in table 1, are used to service loans and also for the future maintenance of the pump. There is no depreciation fund for the replacement of this pump.

Table 2.4 : Income (Rs) from water sale, 1997–1999.

Year	1997	1998	1999
Gross water income	2,692	4,522	8,181
Operational costs	2,055	3,097	6,262
Net benefits	636	1,425	1,919

Gains from the Irrigation Scheme

Members with Irrigated Wada Land

The women reported a range of gains in the 3 years in which they irrigated during the winter season. Irrigation enabled the 16 households with land in the command area to add a full new season of cultivation during rabi. Half of these women grew irrigated paddy and wheat on their wada plots. This was all used for home consumption. Higher-quality wheat bread now replaces the evening meal of sorghum. Virtually all the women started cultivating irrigated vegetables, part of which is consumed by their households. Every one of them appreciates the improved family consumption of fresh vegetables. Barely 2 years ago, they still had to rely on rare purchases of vegetables in nearby towns. Many women grew onions as they are not perishable. Women prefer to keep onions for home consumption throughout the year and only sell a part of the produce.

This differs from the other newly grown vegetables: eggplant, tomato, garlic, cluster bean and okra. Two-thirds of the women sell these vegetables. Women themselves sell small quantities of vegetables in the village, or send their sons to do so. Husbands also take vegetables to sell, especially in the nearby town. While some husbands pass on the full amount earned to their wives, others only give a part. There was one instance where the husband did not give any money he had earned. Two-thirds of the women who sold the irrigated vegetables now have additional income to meet even major expenses such as those incurred in buying clothing. This has also enabled them to save regularly under the MVM small-savings initiative. Before the irrigation, they could not even save Rs 5 a month. They feel proud and are satisfied that they are now creditworthy and can borrow in times of need. One third of the women also felt that their participation in the Group Well activity had resulted in their stronger participation in decision making in the cultivation of the wada.

All Members of the MVM

Gupta (2013), reports that, the irrigation activity also led to three sorts of gains for the MVM as a whole. First, the group benefited from the sale of water. This is kept aside in a special account for future maintenance. Secondly, the irrigation enterprise and the ownership of an asset render the MVM creditworthy in the eyes of commercial banks. This enables the group to take loans. Thus, the MVM intends to take a loan to buy cattle, which would benefit the illiterate members. For those who are literate, the purchase of sewing machines is being considered. The third benefit that many members have experienced as a general result of the MVM is that of the increased communication with outsiders, for example, feeling free and being able to answer

questions. Previously, some would hide in their homes when there was a stranger, but now, they say, “Are we not talking to you?”

Committee Members

According to Gupta (2013), committee members and two other more active members feel that they receive more attention now from people in the village. One committee member was invited as a chief guest at the local school on Independence Day, which was a new and great honor for her. Other gains that they cited varied from “mastering the courage to go and sit on a chair during a training when that was asked” to “learning about bookkeeping and accounts,” “learning about agriculture and marketing,” “exposure to other groups” and “learning to talk with government officials.” They conclude, “We want more new and challenging projects for women. We are now looking forward to having a woman operate the irrigation pump.” Even among the men who were hesitant at the beginning, there is now a unanimous agreement that the women are doing a good job. Nobody would think of transferring the management of the pump to the male group anymore. “We are managing a common asset and shall continue to do so. We have done a good job so far. If we can do a good job, why should the asset be given away to the men?”

The experience of AKRSP (I) in Jambar shows that putting irrigation technology into the hands of women in order to irrigate plots over which women share decision-making power is feasible and leads to multiple benefits. Women’s ownership and management of equipment bring the social status attached to serving the community and an income from water use for the group as a whole. It also allows its irrigating women members to intensify productive cultivation from which they reap the benefits for their families. No basic changes were needed in the irrigation

intervention approach. The approach used for men also worked when it targeted women. It is important to note that initially the organization of women into village groups (GVMs or MVMs) was necessary before the channeling of technical support to them. The only difference was that the agency spent some time with the male group to propose the involvement of women and negotiate that men should share benefits from NGO support more equitably than what was happening. Such a successful approach can be replicated elsewhere, wherever the agency, like AKRSP (I), sees fit.

2.20.2 Gender and employment opportunity in the Global Context

According to the study conducted by Bajracharya and Tuladhar (2001), One of the common assumptions regarding 23 irrigation farmers – specially in African and Asian countries – is that they are predominantly male, which leads to the assumption that farm household resources and labour are effectively controlled and allocated by males. Research has shown that failure to recognize gender issues affects the agricultural productivity of irrigated crops negatively, and that women's lack of independent access to and control of land and water, threatens household food security. In many cases water resource policies and programs have proven detrimental to the women's water rights and therefore, to sustainable management and use of water. Interventions such as irrigation habitually fail to take into consideration the existing imbalances between men and women's ownership rights, division of labour and income. Numerous studies led governments as well as international and local agencies to realize the important role played by women in water management. Women are increasingly being trained in various aspects of water supply and irrigation operation and maintenance.

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There has been increasing recognition that access to water in an equitable manner helps reduce poverty among the poor of the poorest communities. Bajracharya and Tuladhar, (2001) suggest that, academics, researchers, policy makers, development workers, national and international non-government organizations and bilateral and multilateral donors have realized that improved management of water is imperative for sustainable development, poverty alleviation and biodiversity preservation. Likewise, safe, adequate, equitable and sustainable water supplies for all is one of the main social goals enunciated at the global level in the past few years. Despite the high female involvement in irrigation agriculture, their participation in irrigation institutions is much lower. Despite numerous researches on gender and natural resources management, very little work has been done on linking gender with poverty. This study sought to fill this gap by looking at the linkages among gender, water and poverty in terms of gender participation in irrigation agriculture and irrigation institutions. It also analyses the impact of water projects on local communities from a gender perspective.

Key findings of this research revealed gender inequalities in terms of participation in irrigation schemes and institutions, primarily in South Asian and African nations. Despite the high female involvement in irrigation agriculture, their participation in irrigation institutions is much lower.

Furthermore, water projects with gender equality interventions enhanced both men and women's capabilities with relative upliftment in women's abilities to participate and realize the benefits thereof. Finally, the study presents a framework showing the linkages among gender, water and poverty and explores the possible constraints and opportunities for participation of women in irrigation management and water use associations. In South Asian countries, women are basically engaged in unskilled and labour intensive tasks.

Gender division of labour

According to Saini and Koppen, (2001) men are usually found performing highly technical functions. Similarly, African women play a crucial role in many aspects of irrigation crop production. In many parts of Africa, women are also responsible for fishing in shallow waters and in coastal lagoons, producing secondary crops, gathering food, and firewood, processing, storing, and preparing food, and fetching water for the family.

The introduction of irrigation schemes – either small or big, led to increased food security and surplus food for sale as. However, realizing the income and the potential of irrigation, depends crucially on the availability of family labour. This is why the availability of household labour is not a simple responsibility of adult household members, but is closely related to the intra-household division of rights and responsibilities based on gender.

Looking at natural resource management organizations in South Asian and the African contexts, from a gender perspective, it can be noted that the dynamics of resource management cannot be properly understood when one's attention is limited only to a single segment of the community. Considerable evidence suggest that the lack of visible participation of women in water management organisations cannot be interpreted as lack of their interest in the use and

management of the resource, nor does it imply that women do not influence what happens within an organisation.

2.20.3 Gender and employment opportunity in Southern Africa

Bajracharya and Tuladhar (2001), suggest that gender inequalities in terms of participation in irrigation institutions is high in South Asian and African countries. Women's participation is limited despite their high involvement in irrigation agriculture. Men are the main decision makers and are responsible for technology intensive tasks, while women are unpaid family labourers. In the end, this practice leads women to contribute labour voluntarily and work as unpaid workers.

This kind of imbalance does not help women take a greater role in decision-making. There is need for a sound gender approach and analysis to address such disparities. Thus, the fundamental causes of such an imbalance needs to be investigated. The need to create equitable water user groups or provide equal access to water for both sexes is to empower women who are disenfranchised to demand their rights. Women's low participation in irrigation institutions does not only hamper the effectiveness of the organisations but also increases the tendency of using connections to access water through male relatives and officials, which further leads to increased women's dependence on others. Gender inequalities bring costs on the health and welfare of families and affect their ability to improve their living conditions. Moreover, gender inequalities also reduce farm productivity and thus lower prospects of reducing poverty and ensuring economic progress.

Gupta (2013), said that, women's effective roles and responsibilities in water management will boost agriculture and small industry output. Effective and efficient uses of water by women will improve both food security and cash crop production. Thus, income growth has the largest impact on gender equality, ensuring the enhancement of the economic status of households – welfare of families and future generations – thereby reducing poverty. Bestowing de jure and de facto, heads of households and poor women with water rights, is an effective way to reduce poverty.

However, these recompenses can be fully realized only if the strategies adopted for improving women' s equitable access to irrigation resources are put in practice. Policy makers need to know about the distribution of water rights; economic and cultural impediments that limit women's effective and secure access to irrigation resources and, benefits that can accrue by improving women's access to water.

2.20.4 Gender and employment opportunity in the Namibia Context

Gender balance and employment has been a top priority issue to the government of Namibia. However, gender has not been a priority on the agendas of irrigation policy makers, interventionists, irrigation leaders and researchers, the gap between positive intentions and concrete action is still considerable. An important but hitherto ignored cause for this gap lies in the lack of adequate conceptualization and methodological tools that provide insights that policy

makers and change agents need. The challenges to improve the current body of knowledge on gender and irrigation are fourfold.

- Firstly, in order to accommodate the huge variation in the gendered organisation of farming across the globe, policy makers and change agents need generic analytical tools that capture relevant and site-specific issues in any irrigation context, including the role of irrigation agencies themselves.
- Secondly, concepts need to be accurate and valid. Water gets its value only as an input in an encompassing farm enterprise. The significance of water for women farm decision makers, who mobilize inputs themselves, differs fundamentally from its importance for women who are family laborers in farm households managed by their male counterparts. This needs to be taken into account in conceptualizing water in the gendered organisation of farming, quantitatively.
- Thirdly, analytical tools for gender analysis should be easy to apply in an intervention context.
- Finally, the meaning and merits of "gender inclusiveness" need to be clear, widely endorsed and well corroborated by evidence in order to serve as a generic yardstick for measuring "good gender performance."

The consensus that women farm decision makers perform as well as men farm decision makers, provided women have equal access to resources, is widely accepted. In this context, irrigation institutions that provide water resources equally to women farm decision-makers as to men farm decision-makers have a "good gender performance." Such performance boosts the productivity

of schemes and increases income for both genders. These four challenges pushed the Poverty, Gender and Water Project of the International Water Management Institute (IWMI) to develop a Gender Performance Indicator for Irrigation (GPII).

The Indicator was tested in nine case studies in Burkina Faso, South Africa, India, Nepal and Sri Lanka. This generic analytical tool answers the question whether irrigation institutions in a particular irrigation scheme are gender-inclusive and, if not, what irrigation agencies themselves can do to effect change. The tool also identifies gender issues that are rooted in a society's agrarian structure—beyond a strict mandate of irrigation water provision alone. The tool is meant for policy and intervention purposes at all levels and for academic use worldwide.

This report presents the underlying concepts of the GPII and methodological guidelines for its application. In addition, salient findings of selected applications of the GPII in Asia and Africa are presented to highlight how the tool captures policy-relevant variation. The GPII seeks to answer two questions for empirical analysis in any particular scheme. The first question is whether the farm decision-makers in a scheme are predominantly male (a male farming system), female (a female farming system) or mixed (a dual farming system). The second question addresses inclusion and exclusion processes of women farm decision makers, who are the majority in a female farming system and the minority in a male farming system.

Irrigation institutions are defined as the collective arrangements at scheme level for water control and use. Three inter-related levels of irrigation institutions are distinguished namely, farm, forum, and leadership levels. This distinction gives analytical clarity and specifies action—if needed. The main "performer" in shaping inclusion or exclusion at any of these levels is either

the irrigation agency (a factor that irrigation agencies can change) or locally prevailing production and institutional arrangements (which cannot be changed by irrigation agencies alone). Gender performance is assessed by identifying the absence or presence of gender based differences. Good gender performance means that gender based differences are absent (+). If mild gender-based differences exist, it is categorised as moderate performance (+/–). If there is categorical gender-based exclusion, it is identified as a low gender performance (–). This classification is done for:

- Equal farm-level access to water and related obligations (water rights are connected to obligations that individual farmers have to carry out to earn their rights), which is directly related to equal access to resources for both genders for higher productivity and higher income.
- Equal participation in forums or networks for collective water management arrangements—generally required for strengthening access to water at farm level.
- Equality at leadership-level in the sense that the gender composition of leaders should reflect the gender composition of the farmers in the scheme. Also, women leaders should be able to function just like men.

From the selected applications of the GPII in female and dual farming systems and from other literature on the subject, it appears that irrigation agencies themselves tend to be the sole cause of exclusion and inclusion of women farm decision-makers. Where female or dual farming systems exist, agencies exclude women from irrigation institutions by completely ignoring the local gendered organisation of farming while vesting far-reaching powers and resource rights in the local (male) elite only. On the other hand, once agencies purposively include both male and

female farm decision-makers in a bottom-up way into accountable irrigation institutions, they smoothly establish inclusiveness, higher productivity and the improvement of income for both genders.

The applications of the GPII in male farming systems yield different results. In the majority of farms, women are unpaid family farm workers. These local arrangements exclude the majority of women from being prioritized in irrigation institutions. Local male dominance also leads to the exclusion of the minority of women who manage their own farms, especially at forum and leadership levels.

Therefore, within a strict mandate of water provision, the role of irrigation agencies is limited to supporting the minority of women farm decision makers. For the majority of women, the issue is changing local production relations, where water is just one factor out of a range of factors. In such cases, agrarian societies and change agents, including irrigation agencies, need to promote women's farming opportunities in general. Where female and dual farming systems exist, efforts by agencies to include women systematically in irrigation institutions are definitely required in order to reach productivity goals. However, blanket measures to include all women in irrigation institutions are unrealistic, if not counterproductive, in male farming systems.

For any effective irrigation intervention, it is imperative that the variation in gendered local production arrangements is well understood. Applications of the GPII confirm that gender

always needs to be taken into account and they also answer the question on 'how'. During the past four decades, critical case studies and successful innovations led to a growing consensus among many irrigation policy makers, interventionists, local irrigation leaders, and researchers worldwide that gender is an important variable in irrigation (cf. Merrey and Baviskar 1998; Cosgrove and Rijsberman 2000). Increasing recognition within the irrigation sector was part of a broader movement of gender mainstreaming in agricultural and rural development, and indeed in global society, taken up by a wide array of people from grassroots women's organizations to international development and financing agencies (Grameen Bank 1998; SEWA 2000; World Bank 2000; UNDP 2000; IFPRI 2001).

Today, gender is a priority issue on policy agendas yet in the field of irrigation, there is still a considerable gap between positive policy intentions and the conversion of these intentions into concrete action. An important but hitherto fully ignored reason for the slow conversion of gender policies into practice, in the irrigation sector, is the lack of generic concepts and analytical tools that can diagnose gender issues in any particular local irrigation context. Barbara van Koppen indicates that action under similar conditions, demonstrably led to higher agricultural output and improved wellbeing of women, men and their dependents. The accumulated body of knowledge from case studies and other experiences in the past failed to give insight that could effectively guide policy and intervention. These previous shortfalls poses a major challenge for the coming decades.

Scattered case studies rarely give generic insights (Merrey 1997). Without a common conceptual framework that considers all relevant conditions, it becomes impossible to compare and distinguish generic features from site-specific ones. Thus, it remains unclear whether the widely documented negative impact of women's exclusion from irrigation institutions, on both scheme

productivity and women's and families, are equally negative under other conditions and if so under which other conditions.

2.21 Gender, Policy and the Namibian policy on affirmative action

2.21.1 Gender and policy

Although there are many policies, which advocate for a balance between male and female in employment opportunities in the country, there is no gender related policy on the use of water, to create jobs. However, it is on record that most agricultural activities are dominated by females as opposed to males especially in the Kavango East Region.

2.20.2 Affirmative Action

In the Namibian context, affirmative action is defined under Article 17 of the Affirmative Action (Employment) Act of 1998 as: "a set of measures designed to ensure that persons in designated groups enjoy equal employment opportunities at all levels of employment and are equitably represented in the workforce of a relevant employer" (p. 18).

After independence in 1990, the Namibian government's attempts to transform the country into a just society increased, with issues on equality and social justice appearing more frequently on the national agenda. The government of the Republic of Namibia realized the need for a legislation that can guide organisations to promote justice in the workplace. The Namibian Constitution of 1990 was therefore used as a primary source of any legislation pertaining to people's fundamental rights to equality. Article 23 of the Namibian Constitution empowered the Parliament to enact legislation aimed at redressing the imbalance in the Namibian society

resulting from past discriminatory laws and practices. Provision was also made for a balanced restructuring of the civil service.

The Public Service Commission of Namibia was therefore established and given the task of ensuring that the past imbalances were redressed through some government initiatives. Preference was given to black people (including coloureds) and women whenever appointments, promotions and transfers took place in the civil service by relaxing the requirement for experience (LaRRI, 2005). Relevant employers were also required to put measures in place to retain and develop employees from the designated groups (blacks, women and people with disabilities). Appropriate training courses had to be identified for existing employees in order to empower them with skills to compete for higher positions. Furthermore, the government's commitment towards redressing the imbalances in the civil service has been demonstrated through various policies and initiatives including the *Labour Act of* 2007, which provides an enabling environment for Affirmative Action.

Other government initiatives include the ratification of the *International Convention on the Elimination of all forms of Discrimination against Women* (CEDAW), adoption of the *National Gender Policy* in 1997 aimed at redressing the inequalities between men and women, launching of the *National Gender Plan of Action* in 1998, the *implementation of the Affirmative Action Act of* 1998, the establishment of a fully-fledged Ministry of Women and Child Welfare in 2000, now known as the Ministry of Gender Equality and Child Welfare since 2005 and finally, the signing of the *SADC Declaration on Gender and Development*, which sets a minimum target of 30 per cent representation of women in decision making positions at all levels by 2005.

According to a study titled "*The impact of Namibia's Affirmative Action policy on employment of the designated groups*" by Sifani (2009), the envisaged affirmative action has not yet been realised in Namibia. The objective of the study was to determine the impact of affirmative action policy on the employment of the designated groups at management level, for the period 2001 to 2006.The study uses panel data on 35 public and private institutions, selected randomly using the data provided by the Employment Equity Commission (EEC). The study uses the Fixed Effects Model (FEM) and Random Effects Model (REM) to determine whether employment of the designated groups at management level has an impact on the employment ratio of those institutions.

The study established that, the full potential of affirmative action as envisaged in the Namibian constitution has not yet been realized. Despite the government's efforts to redress the imbalances of the past, very little progress has been made so far in terms of increasing the representation of the designated groups at management level of various institutions. Ten years after the implementation of affirmative action policy in Namibia, the workforce profiles of some relevant employers still reflect the dominance of advantaged persons in management positions as compared to people from the previously disadvantaged groups. The representation of people with disabilities at management level is relatively insignificant.

The main objective of the study was to analyze the impact of affirmative action policy on employment of the designated groups at management level for the period 2001 - 2006. In pursuance of the above objective, the study employed econometric techniques to estimate the effects of the employment of the designated groups in management positions on the employment

ratio of the designated groups for 35 selected institutions. Two panel data regression models, namely the fixed and the random effects model were used. Secondary data from the affirmative action reports of the 35 institutions randomly selected from the 16 sectors of the economy were also used.

The employment ratio of the designated groups in management positions is regressed on the number of the designated groups in management positions, the number of people trained and the dummy variable for compliance. The regression results for both the FEM and REM show that employment of the designated groups has a positive impact on the employment ratio. This means that an increase in the number of the designated 35 groups leads to an increase in the employment ratio of the designated groups out of the total employment of the selected institutions. The study also found that training at management level has an insignificant positive impact on the employment ratio.

The insignificant positive impact of training could be attributed to the fact that employees at management level might need training in their initial period (in the short run). As they gain experience at that level, training offered might be reduced. The dummy variable for compliance with the submission of annual reports to the EEC show a significant positive impact on the employment ratio of those institutions that comply. This is an indication that if institutions comply with the provisions of the Affirmation Action (Employment) Act of 1998, by submitting their annual affirmative action reports, they are likely to increase the ratio of the designated groups on total employment.

My observation agrees with the study conducted by Sifani (2009), the Affirmative action has failed to balance the workforce. Job creation is still needed for the rural poor people especially women.

2.21.3 Women empowerment

Women in Namibia have traditionally suffered discrimination and exclusion from full participation in the political, socio-economic and cultural life of the nation. The root cause for this gender inequality has been the low status of women and girls and the negative cultural perceptions of gender roles. Some of the main issues cited are inequitable access to resources, the low participation of women at all levels of decision making and the lack of women's socio-economic empowerment as some of the critical challenges.

Namibia, being a signatory to the Millennium Declaration of 2000, is participating in the process of achieving the United Nations Millennium Development Goals (MDGs), particularly MDG 3, which promotes equal rights and intends to strengthen the rights of women. The Namibian Constitution guarantees the equal treatment of women. However, the Constitution also states that both common law and customary law in force on the date of independence remain valid until they are amended or abolished by Parliament. Hence, discriminating laws still exist de facto. This affects women in rural areas in particular, by way of having limited control over property, or access to estates or small loans.

Namibia is not defined as a least-developed country but as a lower-middle-income country, and has not developed the Poverty Reduction Strategy Paper (PRSP). Instead, its Third National

Development Plan (NDP3) presents an agenda, which contains macroeconomic and structural reforms, in which Namibia commits itself to the principles of sustainable development and concern for the poor (a 'pro-poor' approach) and gender equality. Moreover, Namibia has ratified all the major international and regional legal instruments such as the Convention on the Elimination of All Forms of Discrimination Against Women *(*CEDAW), the Protocol of the African Charter about women's rights in Africa, as well as the Southern African Development Community's various undertakings as regards enhancing the status of women.

Gender equality – as enshrined in the Namibian Constitution, as well as the prohibition of gender discrimination and the aim to ensure equal participation by women not only in politics, but also in the economy and society at large, as expressed in NDP3 and Vision 2030, still pose a major challenge in Namibia.

At present, most of the world's 1.2 billion poor people, two thirds of whom are women, live in water scarce countries and do not have access to safe and reliable supplies of water for productive and domestic use (IFAD 2001a). The bulk of these rural poor are dependent on agriculture for their livelihoods and live in sub-Saharan Africa and South Asia, the regions which are also home to most of the world's water poor (Molden, 2007).

One third of the world's population is currently experiencing some kind of physical or economic water scarcity. A growing competition for water from different sectors, including industry, agriculture, power generation, domestic use, and the environment, is making it difficult for poor people to access this scarce resource for productive, consumptive and social uses. In water-

scarce regions and countries, inequity in access to water resources is increasing because of competition for limited resources, and this particularly affects poor rural people, especially women. The International Fund for Agricultural Development (IFAD) recognizes the linkages between poverty and gender issues and places great importance on women's empowerment as a means to reduce poverty and food insecurity.

IFAD supports the notion that women's secure access to water and land is central to achieving the Millennium Development Goals, in particular Goal 1 (reduction by half the proportion of people living in extreme poverty and hunger by 2015) and Goal 3 (promoting gender equality and empowering women). This is also reflected in the IFAD Strategic Framework 2007-2010, which highlights gender concerns as central to enabling the poor people living in rural areas to overcome poverty.

Water development was the focus of 34 per cent of the IFAD programmes and projects that were approved during 2000-2004. Moreover, IFAD's 2000-2004 investment portfolio shows that there was a good balance between productive and social water investments, with some US$880 million (21 per cent of the total) going to agricultural water operations, and some US$562 million (13 per cent of the total) to social water development. Most of the agricultural water management programmes and projects addressed the need to strengthen water users associations (WUAs), thus achieving one of IFAD's fundamental objectives of increasing the participation of beneficiaries in the design and implementation of programmes and projects (IFAD 2001b).

This review examines the impact of water-related projects on women, women's role in managing water resources and the constraints women face in gaining access to water. It presents lessons learned in promoting women's participation in decision-making for water management using experiences from several IFAD-supported water programmes and projects. It highlights the innovative activities and catalysts that have helped to address gender issues in water programmes and projects. It also offers recommendations on how to improve women's access to water resources through equitable development and gender mainstreaming.

Although international policymakers are increasingly recognizing women's roles in agriculture, in general and irrigated agriculture in particular, many women farmers remain poor, vulnerable to food insecurity and marginalized. Already in 1992, the central role of women in water management was recognized in the Dublin Principles (adopted at the International Conference on Water and the Environment, Dublin). Since then, policymakers' have made attempts to incorporate gender issues in water development projects, including the resolution declaring 2005-2015, the International Water for Life Decade. However, these policies have not been adequately translated into practice, and attempts in some projects to involve women in water management initiatives have met with only modest success.

The reasons for these disappointing results range from a lack of understanding of gender issues by policy makers and project staff, to a lack of will and commitment at the project design and implementation phases. It also ranges from a lack of capacity among project staff in skills and the use of relevant tools, to the unavailability of gender-disaggregated data. As well as prevailing

cultural norms in the societies. In fact, generally women have limited influence, do not exert political pressure, or are simply not heard or seen.

Women manage water resources not only for productive uses, but also for domestic purposes. Sanitation and hygiene for good health are their responsibility, and they often play an active role in the construction and preventive maintenance and repair of sanitation facilities. Women and girls also walk for hours to fetch drinking water. On the one hand, this fosters social and group cohesion and provides women with an opportunity to communicate with other women and people outside their homes. On the other hand, it exposes them to threats of violence and to health hazards. It also takes time away that might be used for more productive activities.

Securing water for both productive and domestic use is critical in achieving food security and improved rural livelihoods in most parts of the world especially in arid and semi-arid areas. However, despite the role that women play in reducing food insecurity through their knowledge of crop production, local biodiversity, soils and local water resources, they are often excluded from decision-making processes in new agricultural water management approaches and other projects and initiatives on natural resource allocation. This means that women have no choice in the kind or location of services they receive.

Women's limited access to water is also often coupled with their limited access to land. The two are often linked (IFAD 2001c). Securing access to land among poor farmers, particularly women, can lead to secure water rights. It can then lead to access to other resources such as financial services and investment in farms, offering the potential to improve livelihoods and reduce water

wastage. However, the international debate continues to address land and water issues, women as water users, women as water and livelihood managers separately (IFAD 2004a), and, in many countries, these issues are increasingly being separated.

Local (customary) governance arrangements, national governments and international development programmes continue to consider women as if they were easily disposable family labourers rather than livelihood managers, farmers, or individuals with decision-making abilities. The lack of recognition of the role women play as decision makers, is one of the major reasons for women's poor access to productive resources. As a result, most of the agriculture and water initiatives that aim at enabling poor and vulnerable farmers to improve their livelihoods and provide access to productive resources fail to take into account women's concerns about the multiple uses of water. Women use water for agriculture, domestic tasks, health and sanitation, while men's water use priorities mainly revolve around agriculture or livestock.

In addition, women all over the world play an active role in agriculture, thus contributing to food security. In many countries, women are involved in rain fed agriculture as well as backyard or irrigated home gardening, while men are often responsible for rain fed commodities and land management aspects of irrigation. Depending on the traditions of the societies in which they live, the prevailing norms and the migration patterns of men, women may play different roles in the production cycle. In some countries, for example, in sub-Saharan Africa, women are the main producers of food crops whilst in other places, they work on their family farms or as paid labourers. In yet other countries, particularly countries in the Middle East, women are mostly involved in post-harvest activities and work as unpaid family labourers only during periods of

shortage of labour. They and often their children suffer the most from water shortages in crop and livestock production, as well as for domestic uses.

It is estimated that women in many developing countries walk for an average of about 6 kilometers each day to collect water (UNFPA 2002). Water collection for domestic purposes is generally the responsibility of women and girls in almost all developing countries. Thus, if water supplies become scarce or contaminated, women and girls are the ones who must look for alternative sources of water. In addition, they must also provide care if family members suffer from waterborne diseases. The availability of clean water close to people reduces women's workloads, and the time saved in fetching water may be spent on other activities to strengthen livelihoods including productive activities such as crop production. Therefore, women are often interested in using rainfall run-off or irrigation water for purposes other than irrigating field crops.

Most of the water supply projects in the past were developed with a single dimension; they either focused on domestic water supply or provided water only for irrigation. Communities, on the other hand, have diverse uses for water such as for agriculture, fishing, livestock watering, small businesses, small scale gardening and domestic tasks. In the past, agricultural water management projects have not generally been designed or retrofitted to take into account these multiple uses for water within water management schemes. This trend is changing, and water projects are becoming more multi-purpose, multi-use and multiuser. The involvement of communities, both men and women, in the selection of and planning for such interventions is the key to successful

gender mainstreaming. Not addressing the multiple uses of water has been recognized as one of the causes of the lower participation of women in WUAs (IFAD 2001b).

In some irrigation systems, the use of irrigation water supplies for domestic purposes is considered illegal. Some irrigation projects even have a negative impact on domestic water availability. A study in Bangladesh has shown that the use of groundwater for irrigation caused many hand pumps used for drinking water to run impact of water-related projects on women dry (Sultana 2002). Similar observations have been made about some of the schemes in the Provincially Administered Tribal Areas such as the Integrated Agricultural Development Project in Pakistan. The installation of tube wells for irrigation has caused a significant decline in ground water levels and thus reduced availability of water in the dug wells of nearby households.

In cases where irrigation projects have tried to incorporate other uses of water, they have often ignored women's concerns. In a smallholder irrigation scheme in the Kano Plains in Kenya, men wanted to have watering places for cattle, while women wanted communal areas for washing clothes and dishes. Because women were underrepresented in the WUAs, the project did not take the different perspectives of women into account (FAO 2003a). Women, like men, may also have clear opinions about how an irrigation system should be operated. Because of their workloads at home and their relatively less flexibility in terms of time, women may have different preferences for irrigation operations and the scheduling of water deliveries.

Although unavoidable in certain circumstances because of the rotation of water deliveries, women tend to avoid night irrigation because of their fear of gender based violence, sexual

harassment and other hazards, as well as the difficulties in combining work at night with childcare (Zwarteveen 2006a). Irrigation projects in many instances has also brought advantages to women. While they have provided the much-needed water for irrigation in drier areas, resulting in an improvement in the livelihoods of families in general, they have also reduced women's workload in terms of the number of hours women spend fetching water for domestic use. Irrigation has made it easier for women's animals to be watered in convenient places (IFAD 2006a). In particular, providing water for multiple uses reduces drudgery and provides women with more time for other, more productive or livelihoods activities.

Access to irrigated land, understanding the link between land and water governance as well as Natural resources is crucial in an effort to overcome poverty among poor people in rural areas. Thus, improvements in the management of these resources is the focus of many development initiatives and projects that seek poverty reduction by empowering poor people to improve their livelihoods. Experience shows that many challenges remain in achieving these goals in an equitable and sustainable manner. One of the main obstacles to improving the livelihoods of poor rural people is the lack of attention given to gender issues and women's access to natural resources such as land and water. Although research offers evidence on women's multiple roles in agricultural production, their access to productive resources such as land, water, fertilizer, loans and other inputs remains limited. In most developing countries, access to water for productive use in general and for irrigation in particular is intrinsically linked to access to land.

In most parts of the world, relatively few women own land. However, women may still obtain access to land through their families or husbands, a practice that makes them vulnerable to any

change in family dynamics. In some societies especially in sub-Saharan Africa, a woman acquires land tenure rights for life; however, this right is transferred to the male members of the family after she dies. In some cases, a woman may lose access to land after the death of her husband or father. Without secure land tenure, women cannot obtain access to credit and membership in agricultural and WUAs.

According to one estimation, only 1 per cent of the total credit directed to agriculture goes to women in Kenya, Malawi, Sierra Leone, Zambia and Zimbabwe because financial institutions do not generally consider women creditworthy (FAO 2003a). The Grameen Bank in Bangladesh and other microcredit institutions are an exception because they give small loans to poor men and women. Access to these resources helps the women or men use their labour more effectively by enabling them to make decisions and adjustments in allocating resources under changing economic and climate conditions.

Many irrigation and land reallocation projects have failed to incorporate appropriate gender strategies in design and implementation, which, in many cases, has exacerbated inequities in resource allocation. In many cases, women's access to land and water has declined because of the introduction of irrigation schemes (Van Koppen 1998; Zwarteveen 2006a). The project improved family income and indirectly benefited women, but women lost their control over resources (land and money) and became dependent on their husbands.

Gender-based farming systems where men and women cultivate separate fields are common in many parts of sub-Saharan Africa. This reality has often been ignored in irrigation development

projects and led to gender inequity in access to productive resources. It has also resulted in the partial or total failure of irrigation schemes. Moreover, key decisions regarding site selection, beneficiaries, land (re)allocation and water rights are made during the planning phases of water-related investment projects and thus form the basis of gender inclusion or exclusion in the projects. The gender approach of agencies and projects, as well as the local class and gender hierarchies, is also one of the causes of gender-related inequities in access to water resources in sub-Saharan Africa (Van Koppen 2002).

In the Jahaly and Pacharr Smallholder Project, an IFAD-supported irrigation project in The Gambia, swampland on which women used to cultivate rice was reallocated as part of communal or household farms, often with men as the heads (IFAD 2001d; Whitehead 1998). Because men were obliged to grow two rice crops in a year, they expected women to continue providing their labour. This gave women some negotiating power over their labour if their demands were not met. The World Bank-funded SEMRY (Société d'Expansion et de Modernisation de la Riziculture de Yagoua) irrigation project in Cameroon introduced irrigated rice crops in an area where women traditionally grow sorghum, their staple crop. The project did not take into account this fact and redistributed the land cultivated by women to men or households headed by men and assumed that women would provide their labour on the land of their husbands. The scheme failed to sustain itself because of the refusal of women to provide their labour as expected.

In a similar irrigation project in Kenya, women lost control over land and became totally dependent on their husbands (Zwarteveen 1994). Some projects try to learn from experience and, during subsequent phases, correct their mistakes. For example, a State-sponsored

development project in Burkina Faso reallocated land to men that was traditionally cultivated by women. The project managers did not consult the women. They only involved the male elites of the community and did not realize that women in the area had stronger land rights prior to the implementation of this project. As a result, the women had to provide the labour for cultivation, but the men controlled the harvest. The project staff recognized this reality and tried to address the issue in the second phase of the project by developing, together with the local community, improved procedures for land allocation. Based on their negative experiences during the first phase, women were better organized this time. Thus, all former plot owners were registered in time and got one new plot in return. This gradually became the formal project procedure (Van Koppen 1998).

Evidence shows that significant achievements have been made in improving food security and livelihoods in projects that put in place mechanisms to provide women with access to productive resources, particularly land, water, financial services and capacity-building. In Nepal, for example, a Food and Agriculture Organization of the United Nations project funded by the United Nations Population Fund focused on improving nutrition among women through increased access to irrigation water. The project worked with newly established communities of ex-bonded labourers freed under a law enforced by the Government and resettled in an area that had no access to water. People living in the new resettlement had no sense of community because they had never been part of one and had no social capital. They also had no access to productive resources except a small piece of land that was allocated to them. The project helped them establish a revolving fund, provided them with treadle pumps and trained them in

livestock-raising, poultry-raising and vegetable production. As a result, women were able to grow vegetables for domestic use and sell the surplus to their neighbours.

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A good scenario is a Land against labour agreement: Improving women's access to fertile land for rice cultivation in The Gambia The IFAD-supported Lowlands Agricultural Development Projects (LADEP) (1997-2005) in The Gambia addressed the landlessness of women, who are traditional rice growers. In The Gambia, rice land ownership is vested on a traditional system, whereby men who are first settlers control and allocate rice land to their wives and daughters. The remaining sector of women rice farmers (later settlers) depend on borrowing rice land on an

annual basis with no assurance of availability because the renting or sharecropping of farmland is not common in Gambia.

To address the growing need for rice, women's access to fertile land for rice cultivation was needed. Because of the shortage of fertile land with access to freshwater, the managers of the project decided to reclaim tidal swampland under perennial freshwater conditions. While the owners of the swampland lacked the labour to undertake reclamation activities, women and other landless farmers needed incentives to provide labour for land reclamation. The project recognized the need among women farmers to have access to land leaseholds if they were to invest their labour in swamp reclamation. Thus, the ownership of an equal piece of land from traditional landowners was transferred mostly to women in the communities that participated in the reclamation efforts. These land against labour agreements between landless individuals, mainly women, and founder settlers (landowners) were made in the presence of the entire community, conferring a traditional legal status to the agreement.

The project improved women's access to fertile swampland for rice production. About 22,216 landless women farmers, who comprised 90 per cent of the total beneficiaries, became land owners, more farming areas were opened and yields increased in project areas. Through women's access to land, the project enabled communities to have food security. Food security has also increased because of the increased availability of land through land reclamation, for rice production and improved yields. The LADEP experience resulted in an additional three months per year of rice self-sufficiency at country level.

Giving women a voice in decision-making for water management Institutional reforms in the irrigation sector has been promoted worldwide since the early 1990s in response to the disappointing performance of irrigation systems, increasing competition for water among different sectors (agriculture, industrial, domestic, environment) and increasing pressure on governments to reduce their budgets as a result of changes in economic policies. The involvement of water users in the management of irrigation schemes and in operation and maintenance is a precondition to improving the performance of these schemes, as well as reducing the financial burden on governments. Greater farmer involvement in the management of irrigation schemes through irrigation management transfers and participatory irrigation management was expected to result in increased ownership of and responsibility for the systems by water users. As a consequence of the involvement of users in decision-making at the lowest level, water governance was improved. Tens of thousands of WUAs have been created worldwide as a result of reforms to improve the management of irrigation systems, at least at the tertiary level. These WUAs are democratic bodies accountable to the stakeholders who elect the representatives.

However, WUAs reflect the prevailing political and social systems of which they are a part and in which they operate. WUAs play a role in the management of local water resources and influence social dynamics and the access of poor people to productive resources, particularly land and water, but sometimes also credit. Moreover, internal power dependencies and dynamics play a significant role in the distribution of benefits among WUA members. One of the important challenges in the organizational design of the WUAs is the identification of ways to involve women and landless people. Evidence from many countries, such as India, the Lao People's

Democratic Republic, Nepal, Pakistan and Sri Lanka, show that women's participation in WUAs is much lower than that of men. The pretext often used for excluding the participation of women in WUAs is that women do not physically irrigate fields because irrigation, by strict definition (opening and closing farm gates or field gates), is considered a man's job. However, several studies indicate a greater participation of women in irrigation activities than is often assumed (Zwarteveen 2006a).

Other reasons for the absence of women in WUAs include:

- Restrictions on the membership of WUAs
- Women's hesitation to be part of organizations dominated by men
- Lack of information available to women
- Lack of gender awareness by the project staff involved in establishing WUAs.

Most by-laws restrict WUA membership to the registered landowners in a hydraulic unit who are engaged on a full time basis in farming. The registered landowners are very often men (for example, in the Near East and some parts of South Asia); even if agricultural land is registered under the women's names, women are often either represented in the WUAs by their men relatives or are not represented at all. The same applies with households headed by women. In other countries (such as Bhutan, the Lao People's Democratic Republic and the United Republic of Tanzania), the membership criteria of newly established WUAs are based on labour contributions during the construction of irrigation systems or in the operation and maintenance activities. When it comes to WUA membership, male relatives replace the women who take part in these activities.

An exception is Bolivia, where customary arrangements allow water rights to be registered in a woman's name if she is a widower or single. Women and men may have different priorities for water use in an area or in an irrigation scheme. While men prefer to use water to irrigate cash crops or livestock, most women prefer to use water to grow staple crops, food crops, vegetables, and small scale gardens or for domestic use (drinking, washing). If irrigation projects are to address the concerns of both women and men, WUAs need to play an active role in local water management by recognizing the multiple uses of water in and around households. Greater participation by women in WUAs has been achieved in cases where membership is open to multiple users of water (not only irrigators, but also livestock owners and fishers). This is the case, for example, in the IFAD-supported small-scale dam project, the Upper East Region Land Conservation and Smallholder Rehabilitation Project in Ghana (IFAD 2006b).

More recently, policy makers have undertaken efforts to encourage women's participation in WUAs. However, women seldom join WUAs despite policy statements favouring their active membership. This may be due to women's lack of confidence in speaking up for their rights and illiteracy as well as social norms preventing women from taking up any public role. Where WUAs are required by law to establish a minimum quota for women, the membership is given to the local elite women (in Nepal, for example, where WUAs are obliged to have a minimum of 20 per cent women members). These women are often wives of influential farmers and are unfamiliar with the problems faced by poor women.

2.21 Conclusion

This chapter compared the overriding perspectives on leadership involvement in water technology innovations to enhance job creation in the Kavango East Region. The focus on water technology innovations was informed by factors such as the fact that it is a key natural resource that is not scarce in the Kavango East Region and it can be used to enhance job creation among the inhabitants of that region. This is expected to strengthen socio-economic development. The chapter looked into the types of leadership and models of leadership that fit the use of water technology innovations to enhance job creation in the Kavango East Region. Linking leadership to water technology innovations was the way to understand how community can be empowered by using water to be self-reliant. The chapter used an illustration through a study conducted by Ozor and Nwankwo (2008), in Nigeria, the overall purpose of the study was to ascertain the role of local leaders in community development programmes in Idea to Local Government Area (LGA) of Imo State. This study aimed to:

(1) Ascertain the various roles played by local leaders in community development programmes in the study area;

(2) Identify the sources of information on community development;

(3) Describe gender issues in local leadership as it relates to community development;

(4) Identify the constraints that hinder local leaders from achieving results in community development in the area; and

(5) Draw implications for extension policy and practice.

The above researchers discovered that it is generally accepted that self-sustained rural community development is vital to the economic and social progress of any developing nation like Nigeria.

The chapter reviewed the literature on what other authors have argued regarding the role of leadership in water technology innovations in enhancing regional development. In the literature, technological innovation is generally understood as bringing a new product, process, or service successfully to the market, meaning that it can be sold for a profit. Technological innovation thus go beyond invention, which depicts the elaboration and prototyping of a new technological principle; it is related to diffusion, which refers to the spread of new technology into the wider society.

This chapter also link leadership involvement in water technology innovations to job creation. In this regard it tested the impact which leadership can cause if they consider using water as a tool to create jobs for the local communities of Kavango East Region. The chapter looked into leadership in general, the main theories of leadership and types of leadership. It critically analysed regional leadership of the Kavango East Region. It also looked into the link between leadership and rural development. The study also highlighted the importance of leader-community relations and leadership accountability.

This chapter considered literature that deal with the topic under research from an international perspective. This literature investigates the history and different research previously conducted in Africa especially in countries such as Egypt and around the world. This was with the intention to understand why moving from the normal way of irrigation to the adoption of water technology innovations may bring positive development in the Kavango East Region. The chapter therefore

delineated the history of water technology innovations around the globe. It went on to highlight the major aspects of water technology innovations such as challenges and opportunities facing water technology innovations around the globe, Africa, Namibia and Kavango East Region in particular. The chapter also looked into the water situation in Africa, Namibia and Kavango East Region in particular.

The chapter also dealt with the origin of water technology innovations in Africa, and why it started. The chapter also analysed the background realities of water technology innovations in Kavango East Region. The chapter pondered around the need for using water as a tool to enhance socio-economic development. It continued and dealt with a less water –more yield notion. The chapter picked up leadership as being a catalyst in socio-economic development; it explains the functions of the Kavango East Regional Leaders as per the Regional Council Act of 1992. Towards the end, the chapter looked into the reasons why leadership is needed in water technology innovation. The Chapter concludes with an illustration showing the reason why leadership is needed in water technology innovations.

The chapter also dealt with the impact of leadership in water technology innovations in job creation, in the Kavango East Region. In this regard it dealt with the history of job creation, and looked at the current trend of job creation in the agricultural sector. It looked into the reasons for job creation in water, and presented major types of jobs that can be created. The Chapter also considered the Namibian context of affirmative action as defined under Article 17 of the Affirmative Action (Employment) Act of 1998. It presented the history of Job creation and labour migration in Kavango East Region.

The chapter also touched on the stimulus of labour migration in the Kavango East Region by focusing on gender and job creation and policies. The chapter also looked at women in Namibia, who have traditionally suffered discrimination and exclusion from full participation in the political, socio-economic and cultural life of the nation. The root cause for this gender inequality has been the low status of women and girls and the negative cultural perceptions of gender roles. The chapter ends with a discussion on affirmative action.

CHAPTER 3: METHODOLOGY

3.1 Introductions

The previous two chapters looked at the theoretical and conceptual part of this dissertation. This chapter presents the empirical findings of the study and attempts to link theoretical concerns to the practical situation in the Kavango East Region. It therefore, presents the research design and methodology followed during the fieldwork. It maps the research strategy employed to investigate the problem as formulated in Chapter 1 of this study.

Kidder and Judd (1986:434) has this to say on the importance of the chapters, "readers need to know in considerable detail how the study was carried out, what was the basic design? If the data were collected by means of questionnaires or focus group interviews, exactly what questions were asked?" This chapter briefly outlines the research design based on the case study of life experiences of the grassroots communities in the Kavango East Region in the light of the role of leadership in water technology innovations in enhancing job creation. This means that the research design is informed by empirical exploratory questions addressing real life problems of the rural communities living along the Kavango River, in the Kavango East Region.

This study adopts a constructivism approach, because it contains a definite normative dimension and its research objectives for a transformative outcome, and thus, it is not interested in "knowledge for knowledge's sake". Apart from the research design, this chapter also presents a comprehensive research methodology. The methodology section focuses on the research process and the tools used to collect data. This includes the data collection procedures in terms of the research population as well as the sampling methods and procedures. The chapter ends with a

summary of the sampling strategy analysis. Finally, an integrated conclusion provides a summary of the whole chapter.

3.2 Research design

As briefly stated in chapter 1, the research design of this study is a case study. A case study of the role of leadership in water technology innovations to enhance job creation in the Kavango East Region. This research design is used because as Fouche (2004) explains, the exploration and description of the case take place through detailed, in-depth data collection methods, involving multiple sources that are rich in context. This research design is more appropriate since the study seeks to uncover detailed information on the role of leadership in water technology innovations to enhance job creation at grassroots level.

These methods of collecting data include focus group interviews, documents and observation. In other words, since the primary goal of this dissertation is descriptive rather than causal inference, this case study design can also be understood as a pre-experimental research design. This was very useful because it was relatively easy to implement and permit the researcher to gather data from grassroots communities in their natural setting, in this case, the villages within the Kavango East Region. Information was collected regarding the distribution of variables such as the grassroots community's understanding and experience towards the role of leadership in water technology innovations to enhance job creation in the Kavango East Region.

The other important variables that support the investigation techniques are gender and the years the respondents have been living at a particular village. These are crucially significant in

determining which gender regularly use water to create jobs for themselves, i.e. men or women, new people or old residents of the village. This also helps in finding out the extent of these respondents' understanding, knowledge and experience towards the role of leadership in water technology innovations to enhance job creation in the rural grassroots community of the Kavango East Region. Based on this empirical approach, this study is classified as a survey research.

3.3 Methodology

The research design of this study is a case study. David and Sutton, (2004:111) define case studies as "in-depth studies of a specific 'unit', which may be individuals, organisations, events, programmes or communities". Directed by this definition, this research selected a case study to investigate a specific case of the role of leadership in water technology innovations in enhancing job creation.

A case study design is selected for this study because it draws upon a range of methods, such as interviews and questionnaires, focus group interviews by village communities, observation and document artifact collection and analysis. In this regard, the researcher enters the subjects' world or life-setting in the Kavango East Region to understand and interpret the meaning that subjects give to their everyday life in the use of water in their villages. In this case, the experiences of the people living in the Kavango East Region in terms of economic, social and cultural ties as well as water usage, were a major denominator of the results of this study.

The study utilises an applied research aimed at solving both policy and real problems regarding regional leadership involvement in water technology innovations to enhance job creation in the

Kavango East Region and Namibia in particular. As stated in the statement of the problem above, this study was geared towards exploring answers to the research question, 'To what degree may the full regional leadership involvement in water technology innovations enhance job creation in the communities of Kavango East Region?"

The objective of the methodology used in this study is an amalgam of exploratory and descriptive approaches. The researcher selected this method because this study arose out of lack of basic information concerning perspectives and understanding by the communities at grassroots level in the Kavango East Region on the role of regional leadership in water technology innovations to enhance job creation phenomena. Bless & Higson-Smith (1995), indicate that exploratory research is conducted to gain insight into a situation, phenomenon, community and/or individuals.

In qualitative studies such as this one, Rubin & Babbie (2001:125), suggest that description is more likely to refer to a more intensive examination of phenomena and their deer meanings, thus leading to thicker description, hence a research strategy such as a case study can be used.

Furthermore, the purpose of this study is to provide qualitative and quantitative information on various factors, which are hypothesised as being related to leadership involvement in water technology innovations to enhance job creation in Kavango East Region.

This mixed method of study made use of the case study design to assess the role of Regional Leadership involvement in water technology innovations in enhancing development in the Kavango East Region. The study shows a detailed and intensive analysis of a single case. It will be a single location (one Region) study. A case study research involves the study of a case within a real life contemporary context or setting (Yin, 2009).

Since the study involved both exploratory and descriptive approaches it used both qualitative and quantitative data presentation and interpretation in Chapter 6. As stated above, this study is focused within the Kavango East Region of Namibia. Interviews with the communities were conducted in the villages of the Kavango East Region.

Twenty one villages were randomly selected, for the purpose of the focus group interviews conducted among the communities in that area. At this phase, the researcher only presents a primary indication of the design and methodology of the research.

This study is analytically descriptive, using a mixed-method approach. It exploits inductive generalised reasoning, since it uses statistical inferences in which the researcher generalises from a non-probability sample (see sub-section 5.6.2 below) to the research population of the Kavango East Region. The data was collected by means of observations, while the primary data of the study was obtained through focus group interviews. This means that the focus group interviews constituted support for the non-probability results. Focus group interviews were used for this purpose. Observations, interviews and open-ended questionnaires are qualitative methods of collecting data.

The researcher prepared a focus group interview schedule in the form of a meeting organised amongst the grassroots community villages of the Kavango East Region as discussed above. The structured research questions have been prepared in English, but could be administered in vernacular such as RuSambyu, Rumanyo and Thimbukushu where necessary. To contextualise this research into the Kavango East Region, the researcher included current information regarding leadership involvement in water technology innovations to enhance job creation issues in reports, books, journals and periodicals. This section on methodology consists of the following

concepts: data collection procedures and techniques; the team of researchers, study area, population, sampling methods and strategy.

3.4 Population

According to Kidder and Judd (1986: 145), 'population' is the aggregate of all the cases that conform to some designated set of specifications. Hence, by the specifications of people residing in the villages of Kavango East Region, this sub-section defines a population consisting of all the people residing in the villages of Kavango East Region. As alluded to above, the sampling selection for research is rooted in the 2011 Population and Housing Census conducted by the National Planning Commission (NPC). However, there are strong assumptions that uncontrollable movements of people within the Constituencies and villages of the Kavango East Region, as well as to other Regions would affect the area population. Therefore, this research includes a probability technique to obtain more information from people living in the grassroots villages of Kavango East Region.

This is done because, it is not always easy to obtain statistics of people moving from one village to another, or from one constituency to another on a daily basis by means of probability techniques. The problem is based on the complexity of recording the movement of people daily.

According to the NPC Population and Housing Census (2011), supported by the delimitation commission report of 2013, the Kavango East Region has a total population of 115 447 people, with 343 villages (excluding Rundu town and Divundu Village Council), with an average household size 6.7 and an area of 25 576 square Kilometres. Based on this, for the sake of this study, the unit of analysis is a village. A sample of 21 villages were identified within a radius of 15-222 kilometres along the Kavango River, eastern side of Rundu town.

3.5 Sample

Kidder and Judd (1986: 145), maintains that, sampling is refers to the group of elements selected with the aim of investigating something about the population from which they are taken.

Two sampling techniques were used in this study. The probability sampling in the way of random sampling technique was used to select representative villages from the total of 343 villages in the Kavango East Region. The non-probability sampling technique was used by way of a purposive sampling to select the headmen/headwomen of the village and their community representative to elicit both qualitative and quantitative data on the role of leadership in water technology innovations to enhance job creation in the Kavango East Region. This was done based on the experience of the grassroots communities in the villages. Below is how the number of villages was selected:

The sample of this study will consist of 19 randomly selected villages out of 343 villages. For each village there were 8 members (1 headman and 7 advisors) x 19 villages = 152 members, which were interviewed in focus groups. Each village had 1 headman who was automatically part of the 8 members. The 19 villages were randomly selected by using research randomizer, a computer program.

The sample size was calculated using the 95% interval formula shown below:

$$n = \frac{N}{1 + N(e)^2}$$

Where:

N= Population

n= Sample size

e= $(0.05)^2$

$$n = \frac{343}{1 + 343(0.0025)}$$

n= 343/1+0.8575 =1.8575

Sample Size=19 villages

In this regard, twenty one (21) villages, with a total of 777 grassroots community members were interviewed at their villages where the headmen/headwomen helped to facilitate this research project in order to obtain information without any restrictions on people. All people who come to the headmen/headwomen tree where interviewed, since turning some away could cause embarrassment, which could cause the remaining respondents to avoid giving information to the researcher.

In addition, Six hundred and eight (608) females and one hundred and sixty nine (169) males participated in the focus group interviews; three hundred and seventy four (374) were between twenty three (23) and thirty five (35) years of age, while the rest were above thirty five (35) years of age. About forty six (46) participants were disabled from albinism and dwarfism.

3.5.1 Sampling strategy

Kavango East Region is a region that shares a border with Kavango West to the western side, to the northern side along the Kavango River it shares a border with Angola, to the eastern side it shares the border with Zambezi Region, and to the southern side, it shares the border with Otjizondjupa Region respectively. The Kavango East Region has a history of using water to produce food for domestic consumption. Given this very short background, the questionnaire was structured with a view to reflect demographic patterns in the Kavango East Region. The questionnaire was also based on the assumption that the grassroots community in the villages of Kavango East Region use water for various purposes such as domestic/ household use as well as the production of food such as vegetables. One type of questionnaire was prepared for all focus group interviews in the villages of Kavango East Region The questionnaire in Appendix B reflect the probability side of the purposive sampling technique since the researcher selected villages randomly and purposively selected the respondents who participated in the focus group interviews.

However, this technique is a random probability in the selection of villages to be interviewed and it is combined with purposive selection of the respondents. The purpose of the questionnaire was to probe the respondents' experience and understanding regarding leadership involvement in

water technology innovations to enhance job creations in the grassroots rural community of Kavango East Region.

3.5.2 Sampling summary

The sample of this study consisted of randomly selected 19 villages of the 343 villages. For each village there were 8 members (1 headman and 7 advisors) x 19 villages = 152 members, which were interviewed in focus groups. Each village had a single headman who was an automatic part of the 8 members. The 19 villages were randomly selected by using a computer program.

The sample size was calculated using a 95% interval formula shown below:

$$n = \frac{N}{1 + N(e)^2}$$

Where:

N= Population

n= Sample size

e= $(0.05)^2$

$$n = \frac{343}{1 + 343(0.0025)}$$

n= 343/1+0.8575 =1.8575

Sample Size=19 villages

In this regard, twenty one (21) villages, with a total of 777 grassroots community members were interviewed, at their villages with the headmen/headwomen, facilitating this research project in

obtaining information without any restriction on participants. All people who come to the headmen/headwomen tree where interviewed, since turning some away could cause embarrassment, which could cause the remaining respondents avoid giving information to the researcher. In addition, Six hundred and eight (608) female and one hundred sixty nine (169) males participated in the focus group interviews; three hundred and seventy four (374) were between twenty three (23) and thirty five (35) years of age, while the rest were above thirty five (35) years of age. About forty six (46) participants were disabled from albinism and dwarfism.

3.6 Research Instruments

The study used focus group discussions for collecting data. During the focus group interviews open ended and closed ended questionnaires were administered to the village participants.

3.7 Procedure for data collection

3.7.1 Pilot study on the focus group interview

Eight villages (1Headman and 7 Senior Advisors in the Kavango East Region) were selected to pilot the study. The researcher conducted focus group interviews by using a standardised, open-ended questionnaire approach where the same open-ended questions were asked to all participants. A standardised, open-ended questionnaire facilitates discussions that can be more easily analysed and compared. Interviews enabled participants to elaborate on the responses they provided. The purpose of piloting the focus group interview was to check that each question

measures what it was supposed to measure and if the questions on the questionnaires obtain consistent and similar responses. The researcher used a field note in taking notes on the responses from each focus group. The pilot study participants and respondents were not allowed to take part in the actual survey of this study.

3.7.2 Focus Group Interviews

The researcher sought approval from Kavango Regional Governor, informing Regional Leaders that he will be in the Region to conduct research. After that, the researcher meet with the village headmen/headwomen to explain to them about the research and its processes, and then make appointments with randomly selected villages on different dates and time. Twenty one (21) villages (the headmen and senior advisors) were asked to participate in focus groups interviews; participants were asked questions concerning the role of leadership in water technology innovations to enhance job creation. The standardised open-ended questions had 31 sub questions to cover the two research objectives namely:

(1) to investigate successes and limitations surrounding leadership involvement in water technology innovations to enhance job creation and;

(2) to investigate the relationship between leadership, water technology innovations and job creation.

3.8 Data analysis

After the focus group interviews had been conducted at all the sampled villages, the qualitative data was coded, on which a data dictionary was created to explain the meaning of each code. Then the data entry process started, using Statistical Packages for Social Scientist (SPSS). Univariate analysis has been tested for categorical variables, and bivariate analyses were tested

to test for any correlations. Multivariate analyses was conducted to test multiple linear regression analysis. This was followed by data display, which went a step beyond data reduction to provide an organized, compressed assembly of information that allows one to draw a conclusion. The research established patterns of interrelationships that suggest why the success or limitations in leadership involvement in water technology innovations to enhance job creation and how leadership involvement in water technology innovations contribute to job creation. After all this was done then the data was interpreted, in the form of a report.

3.8.1 Village interviews

After all 21 focus group interviews had been interviewed, the researcher used content analysis to summarise and categorise the interview field notes and recordings of data according to their typicality/ common themes. The researcher organised data, breaking it into manageable units, synthesising data, discerning patterns of situations, and discovering what is important and what is to be learned. Individual themes were used as the coding sampling units for analysis. After all the focus group interviews, the notes on the responses were processed for the phenomena to speak for itself. A coding system to code all the responses was developed, by creating abbreviations of the themes from the questionnaire which was used. The research results are presented below in graphs and charts.

3.9 Data collection procedures and techniques

The nature of the research design is that of a case study. The data was collected by means of direct, systematic observation and focus group interviews. In the execution of these methods, the research participants (interviewers and interviewees) had to be obtained to carry out the research

in terms of the case study research strategy discussed above. The following sub-sections sketch the research techniques used during the fieldwork of Kavango East Region.

3.9.1 Direct, Systematic Observations

This research focused on one target group at each village. The focus group comprised of Headman/headwoman and at least 7 advisors to the Headman/headwomen. The direct observation technique was used in respect of water technology innovations and water usage at each village. The researcher observed directly and systematically the efforts and initiatives of water usage and the implementation of any water technology innovations at the grassroots community villages in the Kavango East Region. The observation was systematically carried out for a week before the focus group interviews.

Another reason for using the observation method in the Kavango East Region was to cross check, with what the community would say during the interviews concerning their visible efforts on water usage at their particular village. Normal people of Kavango East Region, respect their leaders so much, that they may not speak the truth of how their leaders have assisted them in using water to create jobs for them. This method was limited to observable efforts, such as the visibility of vegetable gardens at the villages and the proportion in terms of gender who are involved in the manual gardening at each village. These methods were also used to observe, what the other usage of water at each village are, apart from the targeted ones (gardening).

3.9.2 Focus group Interview

As Huysamen (1997), argues, when data is to be collected by means of focus group interviews, the interviewer should visit the respondents at their home or workplaces. In this study, since the respondents were from different homesteads, interviews took place at the headman/woman meeting tree for each village. All focus group interviews were structured.

Interviewers put a collection of questions from the questionnaire, (interview schedule) to the respondents and recorded the respondents' responses. The interviewers were restricted to the questions as they appeared in the schedule (questionnaire) with relatively little freedom to deviate from it. This technique was used at all focus group interviews in the Kavango East Region. Respondents were asked to remain active during the interviews and avoid unnecessary movement. The following sub-section explains in detail how the structured questionnaire was administered as an interview schedule.

3.9.3 The questionnaire

The research instrument used was an eight-page questionnaire developed for interviews with focus group interviewees in the grassroots community villages of the Kavango East Region, using a random sampling technique. The questionnaire was written in English, but it was administered in the vernacular (RuSambyu, Rumanyo and Thimbukushu respectively) in order to make it easy for the interviewees. The inclusion of open-ended questions in the questionnaire enabled the researcher to elicit the respondents' unique views on particular issues of concern. The questionnaire consisted of 22 questions and was organised into three sections namely:

Section A: Demographic information

This section contained items that identified details about the respondents in relation to their gender and number of respondents.

Section B: What are the roles of leadership in water technology innovations to enhance job creation?

This section probed the Regional Leaders' visits to the villages in the last five years, and how many times Regional Leaders visited the particular villages. The section also probed if the visitations took place, if so, how many times were they engaged in discussions between community and Regional Leader and why such discussions? It also probed the number of times the community had come together with their Regional Leaders to discuss issues concerning water technology innovations at their villages. The section sought to know if Regional Leaders ever suggested the allocation of resources for water technology innovation, and how much that was. It also sought to confirm if the Regional Leaders really allocated financial resources for water technology innovations and how much that was.

The section further probed if the Regional Leaders had not visited their respective villages, what the village leaders did to seek audience/engagement with the Regional leaders concerning water technology innovations at their village and what were the reactions of their Regional Leaders on the matter.

The section also sought to understand if the respective villages were geared for using water technology innovations to create jobs for themselves. It therefore, asked if there was a technical group/committee at the respective villages, which was responsible for speaking to Regional Leaders concerning the need to use water technology innovations to enhance job creation at their

respective villages. If their technical group is in place has it managed to speak to the Regional Leaders on the need to use water technology innovations to enhance job creation. The section furthermore, sought to understand from the community point of view, how they viewed leadership involvement or lack thereof, in water technology innovations and how this will influence job creation at their respective villages. The section concluded by probing how many jobs had been created at the respective villages through the use of water technology innovations and the reasons behind the number of jobs created.

Section C: How does leadership involvement in water technology innovations contribute to job creation?

This section started to probe the community on how they want their Regional Leadership to be involved in water technology innovations in order to contribute to the economic development of their respective villages and their region in particular. It also sought to establish how many times the local community met with their regional leaders to discuss the role of leadership in water technology innovations to enhance job creation.

The section further probed the community's views on whether they thought their regional leadership has a role in water technology innovations to enhance job creation at their villages. It continued and probe the community on whether they thought water technology innovation use at their respective villages would contribute to wealth creation and a reduction of inequalities. The section further probed the community, if their regional leadership was involved in water technology innovations to enhance job creation at their villages. The section also sought to understand from the community how their regional leadership was involved in water technology innovations to enhance job creation.

3.10 Team of Researchers

Given some financial limitations, time and effort, two (2) research assistants,(one (1) male and one (1) female aged 35 and 42 years of age respectively, were employed to assist the principal researcher in the data collection process. The research assistance were selected from two different best Secondary Schools in the Kavango East Region and they are both Social Science teachers. They administered seven (7) focus group interviews each, after observing the first seven (7) focus group interviews lead by the principal researcher as a refresher training. During the pilot study of this dissertation research assistants went through a practical training as well. The two (2) research assistants were also conversant in all three (3) vernacular languages (Rusambyu, Rumanyo and Thimbukushu), since they are all born in the Kavango East Region.

In addition, they also had an excellent command of English. On the average, each research assistant interacted with 259 community members, at those 7 villages, plus the 259 community members who were engaged by the principal researcher. This made up 777 respondents at twenty one (21) grassroots community villages. Six hundred and eight (608) females and one hundred sixty-nine (169) males participated in the focus group interview; three hundred and seventy four (374) were between twenty three (23) and thirty five (35) years of age, while the rest were above thirty five (35) years of age. About forty six (46) participants were disabled from albinism and dwarfism.

3.10.1 Selection of the research area

The selection of the study area was made to narrow down the research scope in an attempt to enhance the internal validity of the research results. Namibia is a large, sparsely populated and heterogeneous country, although some Regions like Kavango East Region has a smaller population. Namibia, as vast as it is has many geographical areas and sectors that would equally provide a rich source of information on the role of water technology in enhancing job creation issues for this research. This, however, would require sufficient funding, time and researchers to draw on enough samples from the vast population of the country.

These factors entail significant obstacles to conduct a countrywide representative research project. As indicated in the limitations of the study, these factors made it impossible for this study to be on a national scale. Hence, trade-offs had to be made between a regionally representative sample and the selection of important areas, were water could be used to create jobs, and is available at no cost. This is how the Kavango East Region was chosen.

Kavango East Region was selected for its strategic location in terms of the availability water which is good for crop production (refer to chapter 1). Based on this reality, a method of deciding which places to conduct focus group interviews became especially important. Not all places in the Kavango East Region were considered for focus group interviews. Towns and Growth Points were deliberately left out. In this regard, this study conducted focus group interviews at least 15 Kilometers out of Rundu town. This goes to show that this research was not confined to respondents who does not understand the rural setup, but only for those that have

been living in the rural areas of Kavango East Region who participated in the focus group interviews.

Statistical data from the 2011 census conducted by the National Planning Commission (NPC) helped in the sample selection. However there were some problems with a demarcated map of Kavango East Region, which reflected the area and population of the political constituency, which was changed by the Delimitation Commission in 2013. The community of Kavango East Region still does not understand the new border. They are still confused about the difference between the new and old constituency borders.

Given this fact, Kavango East Region firstly has traditional authorities which stretches between more than one constituency, and secondly one constituency may also stretch in more than one traditional authority areas. In the light of this fact, the geographical area of Kavango East Region should be interpreted at two levels i.e politically and traditionally. Politically, Kavango East Region has seven (7) electoral constituencies, traditionally; it has three (3) traditional authorities. The demarcation of the constituencies and the traditional authority areas do not coincide. The Kavango East Region contains many villages, with Rundu being a town and Divundu Village council, falling in the category of urban areas. There is a settlement of Ndiyona as well. Even so, this does not affect the outcomes of this dissertation.

3.10.2 Study area

The research was carried out among grassroots communities around the 15 kilometer to 222 kilometer radius away from Rundu Town in the Kavango East Region. The Sambyu tribe occupy an area from Rundu town until 60 kilometers east of Rundu, then followed by the Gciriku tribe from 60 Kilometers to 140 kilometers away from Rundu town, the last tribe is the

Hambukushu, which occupy the area from 140 kilometers to 270 kilometers away from Rundu town. This traditional area also host the Divundu Village Council.

At some points, residents from different traditional authority areas are mixed with residents from different constituencies. It is important to note that there are no documents showing which area they belong to. The housing pattern is also a mix of the Kavango East Region's traditional homesteads (traditional huts). Dwellings contain people of the Kavango East Region. Therefore, focus group interviews with the community from each selected village was conducted. Another major source of qualitative data was observations made based on the following questions:

(a) Does the village have gardens?

(b) How many gardens are there at each village?

(c) Who is mostly involved in the gardening in terms of gender?

(d) Who is mostly involved in terms of age?

(e) Is there any visible water technology innovations usage in gardens at the village?

(f) Are there any modern equipments used in the gardens?

(g) Is there proper fencing of the garden?

(h) Are there water storage tanks?

(i) Are there any water pumps?

4. Research ethics

Permission to conduct the study was sought from the Kavango Regional Governor, in writing. The researcher ensured that all focus group interviews started by explaining a statement of intent where the researcher assured the respondents that the information and data collected will be used solely for the research and that the respondents would have open access to the results once they were published. Informed consent from the respondents was also sought before the necessary information was collected. During the entire investigation, anonymity and confidentiality was maintained by not recording any names and not disclosing any information between focus groups. Data was stored in a locked cabinet and will be destroyed by shredding and burning after 5 years.

5. Conclusion

This chapter discussed the research design and methodology used in this dissertation. A mixed method approach was adopted, whereby both qualitative and quantitative research methods were used in data collection and the general research strategy reflects a hybrid of exploratory and descriptive approach. This is ideal when probing the real-life experience of the grassroots rural village communities of the Kavango East Region on leadership involvement in water technology innovations to enhance job creation. It is noted that the data collection procedures, which included observations and focus group interviews were effective. Another justification of the effectiveness of this method is that the focus group interviews were conducted using a survey form. There were 777 respondents who included elders of the villages and that was enough to justify the validity of the results. The research design applied is a case study. Hence, the

following chapter uses this case study to determine the role of leadership in water technology innovations in enhancing job creation in the Kavango East Region, and how it could be interpreted in the Namibian context.

CHAPTER 4: RESULTS AND DISCUSSION

4.1 Introduction

The previous chapter delt with the research design and methodology used in empirical fieldwork. This chapter's aim is to integrate the empirical data with conceptual and theoretical material. It intends, among other things, to examine whether or not there is a direct role of Leadership in water technology innovations and job creation in Kavango East Region.

The chapter also investigates the level of preparedness of grassroots communities of Kavango East Region to embrace the use of water technology innovations to enhance job creation among themselves. The research questions are constructed to probe the communities' understanding and participation in the use of water to enhance job creation and promote socio-economic development in the Kavango East Region. The variables are probed to establish issues surrounding of the role of leadership in water technology innovations to enhance job creation in the Kavango East Region. The chapter probes benchmarking issues of leadership, constituencies, traditional authorities, and the history of water usage in the Kavango East Region, water shortage issues and job creation issues.

This chapter also examines the political, economic, social and cultural dimensions of the interaction between leaders and grassroots communities in the rural villages of Kavango East Region. It also speaks about the profile of the Kavango East Region, and then concludes with data presentations from the focus group interviews.

4.1.1 Leadership issues in the Kavango East Region

The Kavango East Region has seven (7) Constituencies, namely: Rundu Urban, Rundu Rural, Mashare, Ndonga linena, Ndiyona and Mukwe. Each constituency has one elected leader called Regional Councilor, who has a 5 year term of office. The Regional Councilors are firstly nominated through political party structures and then they are brought forth as eligible candidates for election as Regional Leaders to community. In most cases, grassroots communities have no choice but to vote for the candidate already nominated through the political party's structures. Therefore, after election most Regional Leaders become more loyal to the political party which nominated them in order for them to secure the next term of office. They pay little or no attention in most cases to the grassroots community that elected them because the community has less power concerning their stay or removal from office.

A political party has power to recall a particular candidate if the candidate fails to respect any orders of the political party and its structures, but it is very difficult for any particular community to recall a Regional Councillor who fails to deliver service to the grassroots community or who does not pay attention to the needs of the community. In other words, the Regional Councillor is accountable to the political party, which he/she belongs to, but not to the community that voted for him or her. One can say that grassroots communities are just used to accomplish the desires of the party structures. At some point the grassroots communities does not feel the impact of their Regional Leaders in terms of socio-economic developmental efforts. Therefore, poverty, inequality unemployment and many other social ills still prevail in the lives of the grassroots communities of Kavango East Region.

4.1.2 Constituencies and Traditional Authority

The Kavango East Region have got two lines of authority, political authority and traditional authority. Political authorities are the elected Regional Councillors, who are in office for five (5) years. Their area of jurisdiction is the constituency. Sometimes a constituency covers more than one (1) traditional authority. There are six (6) constituencies in the Kavango East Region, with each constituency having one (1) councilor. A constituency cannot have more than one (1) councilor at the same time, unless one dies and is replaced by another through a democratic election. Regional councilors are governed by the Regional Council's Act of 1992, which states the functions and powers of the Regional councilors.

The second line of authority is the traditional authority; this authority is not elected. It is inherited if the incumbent hompa or fumu passes on then the next in line takes over. This is in accordance with the Kavango customs. Their time of serving is based on the lifetime of the particular hompa or fumu. There is no given specific period. For each traditional authority there is only one (1) hompa or fumu. The area of jurisdiction of a hompa or fumu is a traditional authority. The traditional authority is still governed following national laws. The Traditional Authority Act, directs how the traditional authority should run their affairs. This act also guides the Council of the traditional authority on succession plans, as well as the functions and powers of traditional authorities The Kavango East Region has three (3) traditional authority areas namely; Sambyu, Gciriku and Hambukushu. It is very important to note that Regional councilors and traditional authorities have different functions and powers.

4.1.3 History of water usage in Kavango East Region

Mendelson (2009), suggests that, the early and continued settlement of people along the Kavango River resulted in an extremely uneven distribution of people. The densest rural populations are concentrated in a swathe about 10 kilometres wide along the Kavango River. About 70% of all rural residents live here.

Historically, people settled where water and soils were most suitable for farming. That created a pattern of unevenly distributed settlements within the region. A ribbon along the river, approximately 10 kilometres wide, is densely populated, and approximately 70% of the whole population live within this 10-kilometre zone. The Kavango East Region has abundant water. The region does not have water shortage at all. According to the United Nations, water scarcity is the lack of sufficient available water resources to meet water needs within a region. It affects every continent and around 2.8 billion people around the world at least one month out of every year. More than 1.2 billion people lack access to clean drinking water.

Water scarcity involves water stress, water shortage or deficits, and water crisis. While the concept of water stress is relatively new, it is the difficulty of obtaining sources of fresh water for use during a period of time and may result in further depletion and deterioration of available water resources. Water shortages may be caused by climate change, such as altered weather patterns including droughts or floods, increased pollution, and increased human demand and overuse of water. A water crisis is a situation where the available potable, unpolluted water within a region is less than that region's demand. Water scarcity is being driven by two converging phenomena: growing freshwater use and depletion of usable freshwater resources.

Water scarcity can be a result of two mechanisms: physical (absolute) water scarcity and economic water scarcity, where physical water scarcity is a result of inadequate natural water resources to supply a region's demand, and economic water scarcity is a result of poor management of the sufficient available water resources. According to the United Nations Development Programme, the latter is found more often to be the cause of countries or regions experiencing water scarcity, as most countries or regions have enough water to meet household, industrial, agricultural, and environmental needs, but lack the means to provide it in an accessible manner.

The reduction of water scarcity is a goal for many countries and governments. The UN recognizes the importance of reducing the number of people without sustainable access to clean water and sanitation. The Millennium Development Goals within the United Nations Millennium Declaration state that by 2015 they resolve to "halve the proportion of people who are unable to reach or to afford safe drinking water." The United Nations (2015), estimates that, of 1.4 billion cubic kilometers (1 quadrillion acre-feet) of water on Earth, just 200,000 cubic kilometers (162.1 billion acre-feet) represent fresh water available for human consumption.

More than one in every six people in the world is water stressed, meaning that they do not have access to potable water. Those that are water stressed make up 1.1 billion people in the world and are living in developing countries. According to the Falkenmark Water Stress Indicator, a country or region is said to experience "water stress" when annual water supplies drop below 1,700 cubic metres per person per year. At levels between 1,700 and 1,000 cubic metres per

person per year, periodic or limited water shortages can be expected. When a country is below 1,000 cubic metres per person per year, the country then faces water scarcity.

According to the United Nations (2015), In 2006, about 700 million people in 43 countries were living below the 1,700 cubic metres per person threshold. Water stress is ever intensifying in regions such as China, India, and Sub-Saharan Africa, which contains the largest number of water stressed countries with almost one fourth of the population living in a water stressed country. The world's most water stressed region is the Middle East with averages of 1,200 cubic metres of water per person. In China, more than 538 million people are living in a water-stressed region. Much of the water stressed population currently live in river basins where the usage of water resources greatly exceeds the renewal of the water source.

The United Nations (2015), says, around one fifth of the world's population currently live in regions affected by physical water scarcity, where there is inadequate water resources to meet a country's or regional demand, including the water needed to fulfill the demand of ecosystems to function effectively. Arid regions frequently suffer from physical water scarcity. It also occurs where water seems abundant but where resources are over-committed, such as when there is over development of hydraulic infrastructure for irrigation. Symptoms of physical water scarcity include environmental degradation and declining groundwater as well as other forms of exploitation or overuse.

Figure 6.1: In Meatu district, Shinyanga region, Tanzania (Africa), water most often comes from open holes dug in the sand of dry riverbeds, and it is invariably contaminated. This is Physical Water crisis this country is facing. Sources: https://upload.wikimedia.org/wikipedia/commons/f/f4/Mwamongu_water_source.jpg.

Economic water scarcity is caused by a lack of investment in infrastructure or technology to draw water from rivers, aquifers or other water sources, or insufficient human capacity to satisfy the demand for water. One quarter of the world's population is affected by economic water scarcity. Symptoms of economic water scarcity include a lack of infrastructure, causing the people without reliable access to water to travel long distances in order to fetch water, that is often contaminated from rivers for domestic and agricultural use. Large parts of Africa suffer from economic water scarcity; developing water infrastructure in those areas could therefore help to reduce poverty. Critical conditions often arise for economically poor and politically weak communities living in environments that are already dry.

It is worth to note that, Namibia does not face physical water scarcity at all, however one can say that limited investment is seen in water technology and infrastructure to draw water from rivers and aquifers such as the newly discovered aquifer in Ohangwena region. This makes Namibia qualify for economic water scarcity. Although, Namibia qualifies to face economic water scarcity, it does not face water crisis. Water crisis is when there is not enough potable water for a given population, the threat of a water crisis is realized. The United Nations and other world organizations consider a variety of regions to have water crises of global concern. Other organizations, such as the Food and Agriculture Organization, argue that there is no water crises in such places, but steps must still be taken to avoid one. There are several principal manifestations of the water crisis which are as follows;.

- Inadequate access to safe drinking water for about 884 million people
- Inadequate access to sanitation for 2.5 billion people, which often leads to water pollution.
- Groundwater overdrafting (excessive use) leading to diminished agricultural yields
- Overuse and pollution of water resources harming biodiversity
- Regional conflicts over scarce water resources sometimes resulting in warfare.

According to UN, there are many other countries of the world that are severely impacted with regard to human health and inadequate drinking water. The following is a partial list of some of the countries with significant populations (numerical population of affected population listed) whose only consume contaminated water:

- Sudan 12.3 million

- Venezuela 5.0 million
- Ethiopia 2.7 million
- Tunisia 2.1 million
- Cuba 1.3 million

See the map below, indicating the level of water scarcity. Namibia is approaching physical water scarcity, but it is facing economic water crisis.

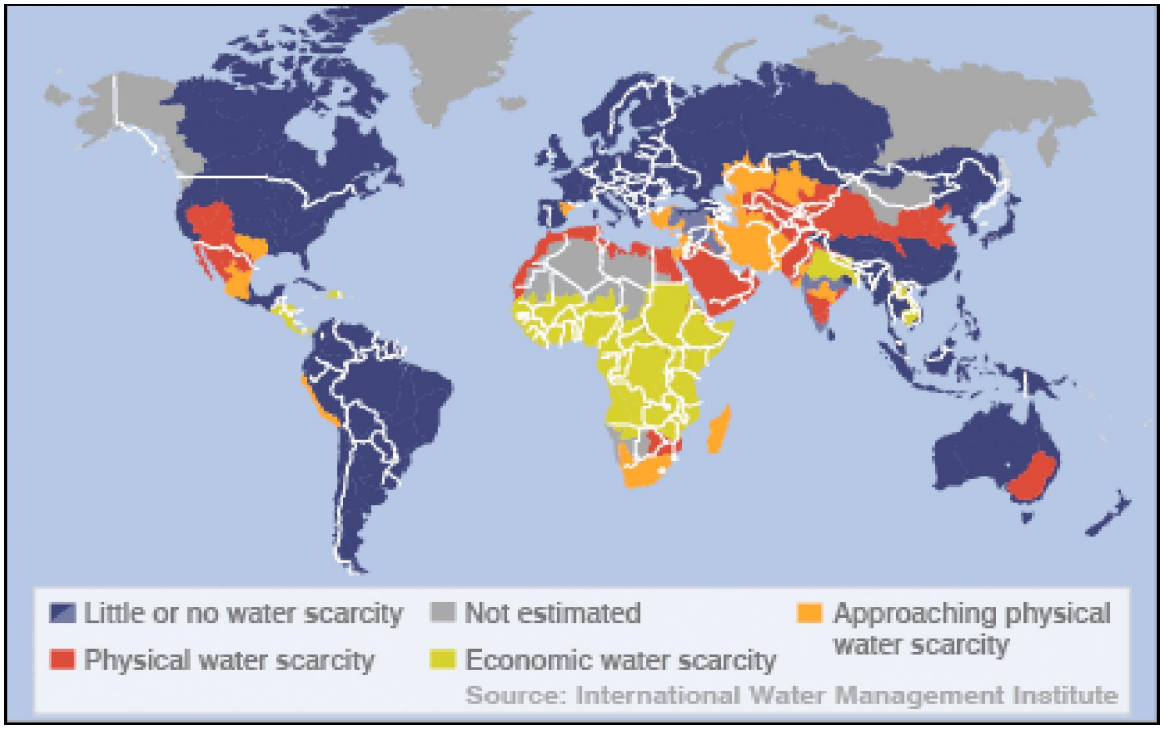


Figure 6.1 Map showing the water scarcity regions. Source: International Water Management Institute.

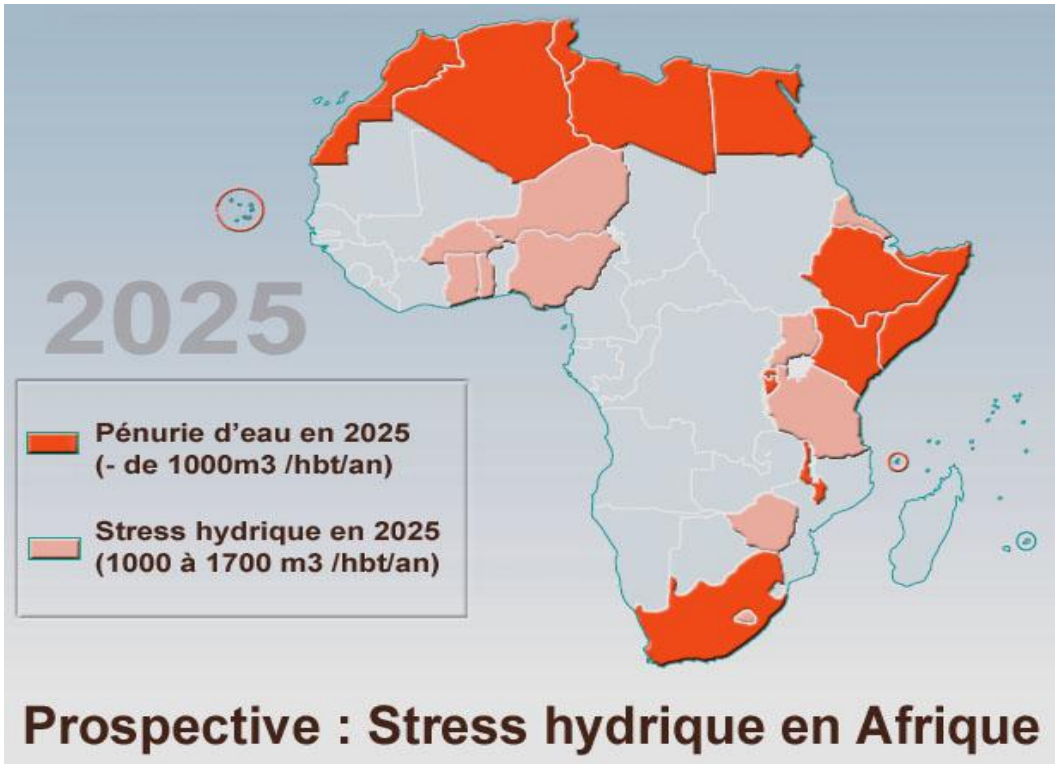


Figure 6.2: Prospective water stress Regions by 2025 around Africa. Namibia and Kavango East Regions are not likely to go through water stress by 2025. Source: International Water Management Institute.

Mendelsohn further stipulates that, while the focus of Botswana's use of the Okavango has been on its tourism economy, Namibia has viewed the river more as a passing resource to be exploited before it exits Kavango at Muhembo. Thus, the river is perceived as a source of water for irrigation and to provide water for domestic and industrial needs in the central regions. Other uses include supplying water to Rundu, fisheries and potential hydropower at Popa Falls. A number of lodges and camp sites have been developed by private individuals and companies, and by one conservancy, but the government has paid little attention to the creation of wealth and jobs through tourism to the Okavango River.

Given the above the following challenging questions emerge:

1. What can Namibia do to contribute to the overall value of this unique river basin?
2. What are the best economic uses that Namibia can make of the river as it flows past from Angola to Botswana?
3. Should Namibia be concerned that good flows of clean water continue to reach Botswana?
4. Should Namibia be concerned about exploitation of the river's water by Angola?
5. Is there a way, and a will, for Angola, Namibia and Botswana to develop the whole Okavango River Basin into the world's largest river tourist attraction?

The development of more larger, irrigated farms – such as those at Vhungu Vhungu, Shitemo, and Shadikongoro – is often perceived as a solution to Namibia's food requirements. However, these farms may have significant detrimental effects on the environment, and they are uneconomical for purposes of producing cereals, such as maize and wheat. An alternative might be to develop and use smaller irrigation projects that belong to individual people in the Kavango East Region to produce high-value crops commercially.

Water scarcity is a function of cultural activities. The demand for water has spiraled over the past years and the people's needs have often exceeded the water available. The transition from hunter-gathering to settled farming signaled a major change in water usage as irrigation canals transported water beyond its natural setting. As cities emerged, the need to supply them with water increased as they become more crowded and bigger. Industry not only created more

demands for water but also began to modify and pollute water resources in an unprecedented way. The means for dealing with the relative scarcity of water created by increasing demands relative to water available when and where it is needed has included;

(1) technical innovations,

(2) social transformations, and

(3) normative and ethical formulations.

Our current situation, which involves local scarcities to certain users, cannot be resolved solely by technical fixes or economic measures (e.g., pricing) without implanting social institutional changes and a common vision based on transcultural ethical considerations.

4.1.4 Job creation issues in Kavango East Region

According to the Central Bureau of Statistics (2015), the agricultural sector is the main source of employment, accounting for 60 percent of the employment in the region. Unemployment is higher in Rundu Rural East, Mashare, Ndonga Linena and Ndiyona constituencies. Subsistence farming is the main source of income, involving 43 percent of the households in the region. The only exception to this is Rundu Urban constituency where 39 percent of the population cited salary and wages as the main source of income.

4.1.5 Poverty profile of Kavango East

Kavango East is the fourth most populous region in the country with a population of 115 447,

accounting for 11 percent of the total national population. Between 2001 and 2011, the regional population grew by 1 percent per annum, which was slower than the national rate. The region has a population density of 4.6 people per km2.

The main hydrological feature of the Kavango region is the Okavango River, which presents a huge potential for irrigation and artisanal fishing. The past decade has witnessed an increase in investment in green scheme projects, mainly along the Okavango River, leading to increased agricultural production and productivity in the region. An estimated 71 percent of the population lives in the rural areas. The region recorded a net outflow of migrants between 1996 and 2001 and 2001 and 2011.

In 2011, of all regions Kavango East region had the highest incidence of poverty. A total of 53 percent (118 823 people), representing a decline of 5 percentage from the 2001 figure of 58 percent was recorded. With the exception of Rundu Urban Constituency, all constituencies in Kavango region have poverty incidence above the national average of 27 percent. The highest percentage of poverty was reported in Kapako constituency (63 percent or 16 891 people), while the lowest incidence was reported in Rundu Urban (19 percent). Kahenge, Kapako, Mashare and Mpungu constituencies all have 60 percent or more of their population classified as poor. In terms of changes in the incidence of poverty over time, the greatest decline was reported in Mashare, Ndiyona and Rundu Urban constituencies which recorded reductions of 14.7, 12.8 and 11.8 percent, respectively between 2001 and 2011.

Over the period 2001 to 2011, the poverty headcount rate declined in all of the constituencies, with the exception of Kahenge and Kapako constituencies respectively. Kapako recorded an increase of about 7 percent in poverty headcount.

Table 4.1 below shows the Namibia Index of Multiple Deprivations 29: Kavango Region Poverty Headcount Rate, 2001 - 2011 (upper bound poverty line). (The National Planning Commission)

Kavango Region	**2001 Rank**	**2011 Rank**	**Change**
Kahenge	60.36	60.62	0.3
Kapako	55.87	62.61	6.8
Mashare	75.31	60.53	-14.8
Mpungu	60.85	60.34	-0.6
Mukwe	65.23	58.25	-7.0
Ndiyona	69.32	56.66	-12.7
Rundu Rural West	46.88	45.18	-1.7
Rundu Urban	30.39	18.69	-11.8
Rundu Rural East	61.54	56.37	-5.2

Regional rate	57.9	53.2	-4.8

Mendelsohn (2006), suggests that Kavango is one of the poorest regions in Namibia. This is clearly reflected in a report by the United Nations Development Programme on trends in human development and human poverty (UNDP, 2007) which presents data on the Human Development Index (HDI) and the Human Poverty Index (HPI) for Namibia's 14 regions. The HDI provides a quantitative representation of three main dimensions of human development which are:

- a long and healthy life,
- knowledge and
- a decent standard of living.

Each of these dimensions is assigned corresponding quantitative indicators. The HDI is then the simple average of the three indices (UNDP 2007). Among the 14 regions, Kavango East Region has the second worst life expectancy at birth, third worse literacy rate, sixth worse gross school enrolment ratio and the second lowest annual average per capita income.

The Human Poverty Index also concentrates on three essential dimensions of human life; longevity, knowledge, and a decent standard of living. However, whereas the HDI provides a measure for the capabilities of individuals, the HPI focuses on deprivation in the same three dimensions (UNDP, 2007). Thus the first deprivation relates to survival or vulnerability to death at a relatively early age. The second relates to knowledge or being excluded from the world of reading and communication and the third relates to a decent living standard in terms of overall

econoic provisioning or poverty as measured by income. People in Kavango have the fourth highest probability at birth of not surviving to the age 40, the third highest illiteracy rate and the second highest share of the population in households that spend more than 60% of total income on food. These indices result in Kavango, along with Omusati and Oshikoto, having the highest Human Poverty Index (45) in Namibia.

4.2 Presentations and Analysis of findings

4.2.1 Demographic profile

Kavango East is the fourth most populous region in the country with a population of 115 447, accounting for 7 percent of the total national population. Between 2001 and 2011, the regional population grew by 1 percent per annum, that is, more slowly than the national rate. The region has a population density of 4.6 people per km2. The main hydrological feature of the Kavango East region is the Okavango River, which presents a huge potential for irrigation and artisanal fishing. The past decade has witnessed an increase in investment in green scheme projects, mainly along the Okavango River, leading increased agricultural production and productivity in the region. An estimated 71 percent of the population lives in the rural areas.

In 2011, of all regions in Namibia, Kavango East region had the highest incidence of poverty. A total of 53 percent (118 823 people), representing a decline of 5 percent from the 2001 figure of 58 percent was recorded. With the exception of Rundu Urban Constituency, all constituencies in Kavango region have poverty incidence above the national average of 27 percent. This highest poverty was reported in Mashare Constituency having 60 percent or more of their population classified as poor.

4.2.2. Demographic Profile of the Interviewees

A Focused group interview guide (Appendix B) was used to collect data from 21 individual villages. The responses were then coded and the codes were collated and analyzed using SPSS v.22 and MS Excel. The focused group discussion targeted eight participants from each of the 21 villages (out of 343 villages in Kavango East), giving a total sample size of 168. However, the research had a 463% response rate giving a total of 777 participants from the 21 villages. This is attributed to the importance given to water technology innovation issues and leadership by the inhabitants of the Kavango East Region. Where, the researcher had requested to meet only eight participants, he was met with a minimum of 18 participants, a maximum of 63 participants and a mean of 37 participants per village. Table 4.2 below shows the demographic profile of the village focused group interviews.

Table 4.2: Demographic Profile of the Village Focused Groups Interviews

Constituency (Strata)	Village Interviewed	**Number of people in the focused group**	**Number of females in the group**
Rundu Rural (4 Villages)	Vhungu-Vhungu	32	20
	Ngone	23	19
	Muhopi	40	32
	Katimba	18	13
	Total	**113**	**84**
Mashare (4 Villages)	Gove	21	19
	Tjeye	48	40
	Muroro	27	21
	Mashare	31	27
	Total	**127**	**107**
Ndonga Linena (4 Villages)	Shighuru 2	60	46
	Shikenge	28	24
	Ndonga linena	18	16
	Shankara	34	28
	Total	**140**	**114**
Ndiyona (4 Villages)	Kaduva	24	14
	Karukuta	41	28
	Guma	36	28
	Katere	39	30

	Total	**140**	**100**
Mukwe (5 Villages)	Kangongo	29	22
	Tjova	48	41
	Kake	63	55
	Popa	63	40
	Bagani	54	45
	Total	**257**	**203**
Total (21 Villages)		**777**	**608**

There were more female responses compared to male. This is attributed to the fact that Kavango East Region has more females than males.

Table 4.3 Correlation of leadership and distance from Urban Centre

Constituency	Village Codes	Range Rundu Town in Kilometers
Rundu Rural	1 – 4	15 - 25 Km
Mashare	5 – 8	26 -70 Km
Ndonga Linena	9 – 12	71 - 80 Km
Ndiyona	13 – 16	81 - 140 Km
Mukwe	17 – 21	141 - 222 Km

Table 4.4, Mean and Standard Deviation of jobs created, number of people in the focus group and number of female in the group

	N	Minimum	Maximum	Sum	Mean	Std. Deviation
Q1.13 How many jobs have been created	21	.00	101.00	458.00	21.8095	22.07627
Number of people in the focused group	21	18.00	63.00	777.00	37.0000	14.31782
Number of females in the group	21	13.00	55.00	608.00	28.9524	11.60378
Valid N (listwise)	21					

The Interviews started from the villages closer to Rundu Town (15 Kilometre at Vhungu vhungu) and then proceeded to those in remote areas and ended at Bagani village (222 km away from Rundu Town). The research found that there is a strong correlation between the village distances and the number of time Regional Leaders were engaged in discussion with community members at those villages (r = 0.576, p=0.06). The same applies to the number of times Regional Leaders were engaged in discussions on water technology innovations (r =0.484, p= 0.026). (See Table 4.5 below).

The closer the village is to the urban area, the less the number of times, the Regional Leaders visit that particular village. This can attribute to the fact that Regional Leaders in a radius of 80 kilometers and below reside in Rundu Town. Most of the time they are just in urban areas. If they want to go to the villages, they will always commute, and if regional leaders attempt to visit their community they mostly visit the nearby villages in their constituencies first. This is the case

with the regional leader for Rundu Rural East who mostly visits the closest village from the town (Vhungu Vhungu village). (See table 4.3 above).

Regional leaders from the radius of 81-222 kilometres reside within their community. This gives them more opportunities to meet their community from time to time. Therefore, Regional Leadership impact on development is felt stronger in the villages which are situated far away from Rundu Town ($r = 0.74$, $p = 0.00$). (See table 4.5 below).

This can also be linked to support the fact that the 56 percent of poverty level in the Kavango East Region reported by Namibia Statistics agency can be true because much of the population of the Kavango East Region live in villages near Rundu Town. In addition to that regional leaders do not attend to those villages, that is why the poverty level is higher in the that Region.

The Kavango East Region concurred that leadership involvement in water technology innovations will impact on poverty eradication, job creation, improved economic activities and sustainable development. From the spearman correlation of the research findings (Table 4.5 below), on village distance from Rundu Town, we see that at least 54.76% $(r = 0.74)^2$ of the predictability of regional leadership impact on development is the result of distance from the urban centre (Rundu Town).

The spearman correlation of the research findings also indicates that there is a strong negative correlation between having a committee to discuss development (water) problems in villages and

the impact of Regional Leadership on development, especially, when communities try to seek an audience with the regional leaders and the leaders do not accord them such a chance ($r = 0.439$, $p = 0.05$).

2. The role of leadership in water technology innovations

Table 4.5 Spearman's Correlations of variables

Spearman's rho	Village Code	Q 1.1 - 1.2 Number of times the Regional Leaders visited the village in the last 5 years	Q1.3 Number of times the Regional Leaders were engaged in discussion	Q.1.4 Number of times the Regional Leaders were engaged on water technology innovations	Q 1.5 - 1.8 How much has been allocated to Water in the Regional Budget	Q 1.9a -1.10 How do you seek an audience with the Regional Leaders	Q 1.9b How did the regional leaders respond to your requests for meeting	Q1.11 Do you have committees to discuss problems in the village	Q1.12 Impact of leadership on development	Q.1.13b Types of jobs created
Q1.3 Number of times the Regional Leaders were engaged in discussion	.576**	.706**								
	,01	,00								
Q.1.4 Number of times the Regional Leaders were engaged on water technology innovations	.484*	.607**	.695**							
	,03	,00	,00							
Q 1.5 - 1.8 How much has been allocated to Water in the Regional Budget				.487*						
				,03						
Q 1.9b How did the regional leaders respond to your requests for meeting						.496*				
						,02				
Q1.11 Do you have committees to discuss problems in the village							-.440*			
							.05			
Q1.12 Impact of leadership on development	.740**						.497*	-.439*		
	.00						.02	.05		
Q2.1 Factors affecting economic development in your village					.482*					.594**
					.03					.00
Q.2.4 Impact of Water Innovation in wealth creation										.548*
										.01
Kavango Regional Constituency	.980**		.581**	.544*					.731**	
			.01	.01					.00	

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Table 4.6 Role of Leadership in Water Technology Innovations

Variable	Description	Frequency	Percentage
Number of times the Regional Leaders visited the village in the last 5 years	None	7	33.3%
	Once	3	14.3%
	Twice	2	9.5%
	Three	1	4.8%
	Four Time	0	0.0%
	Five Or More	8	38.1%
Number of times the Regional Leaders were engaged in discussion	None	7	33.3%
	Once	5	23.8%
	Twice	2	9.5%
	Three	1	4.8%
	four time	0	0.0%
	five or more	6	28.6%
Number of times the Regional Leaders were engaged on water technology innovations	None	12	57.1%
	Once	2	9.5%
	Twice	2	9.5%
	Three	1	4.8%
	four time	0	0.0%
	five or more	4	19.0%
How much has been allocated to Water in the Regional Budget	None	9	42.9%
	Proposed but no allocation	12	57.1%
	Proposed and allocated	0	0.0%
	Allocated without proposing	0	0.0%

Table 4.7 Leadership Communication in Water Technology Innovations

Variable	Description	Frequency	Percentage
How do you seek an audience with the Regional Leaders	Sent a letter	3	14.3%
	Went physically to the offices	13	61.9%
	Did not contact the leaders	5	23.8%
How did the regional leaders respond to your requests for meeting	Ignored our request	2	9.5%
	leader listened but did not provide resources	16	76.2%
	leader listened and provided resources	0	0.0%
	not applicable	3	14.3%
Do you have committees to discuss problems in the village	Not in place	7	33.3%
	No, but we would like to have them	1	4.8%
	No, we cannot afford to pay them	7	33.3%
	Yes it is in place and organised	6	28.6%
Impact of leadership on development	Poverty eradication	0	0.0%
	Job creation	0	0.0%
	improved economic activities	0	0.0%
	sustainable development	0	0.0%
	all of the above	11	52.4%
	not aware	10	47.6%

A total of 61.9% of respondents indicated that communities seek audience with regional leaders, mostly by going physically to their offices. On the question whether their regional leaders respond to their (communities) request for a meeting, 76.2% of the respondents indicated that their regional leaders listened to their concerns but did not provide resources. The rationale behind this is that there is no dedicated budget given to regional leaders which caters for community development, and this is hampering development in the rural areas of Kavango East Region. It might be that regional leaders are willing to allocate resources, but they do not have the resources at their disposal.

A total of 28% of the respondents indicated that they have a committee that discusses problems in the villages. On the same question 33.3% of the respondents said they do not have one, because they can't afford to pay them, since government does not pay them. While the other 33.3%, also indicated that the committee is not in place without any reason. (See table 4.7 above).

On the impact of regional leadership on development, 52.4% indicated that proper leadership will contribute to poverty eradication, job creation, improved economic activities, and sustainable development. Sadly, 47.6% of respondents indicated that they are not aware of anything. This may be attributed to a lack of education in the community to enable the community to know what is expected from their elected regional leaders (also see table 4.7 above for more).

Table 4.8 Jobs Created

	N	Minimum	Maximum	Sum	Mean	Std. Deviation
Q1.13 How many jobs have been created	21	0	101.00	458.00	21.8095	22.07627

The mean of jobs created is 21.8095, with standard deviation of 22.07627, the maximum jobs created is 101 at Shighuru village. Results from the research findings indicate that 85.7% of jobs created were mainly in gardening and manual irrigation (see table 4.8 above). This indicates that the community of Kavango East Region is committed to strive and improve their lives with gardening and manual irrigation (using water). All they need is support with water technology innovations to produce at a large scale.

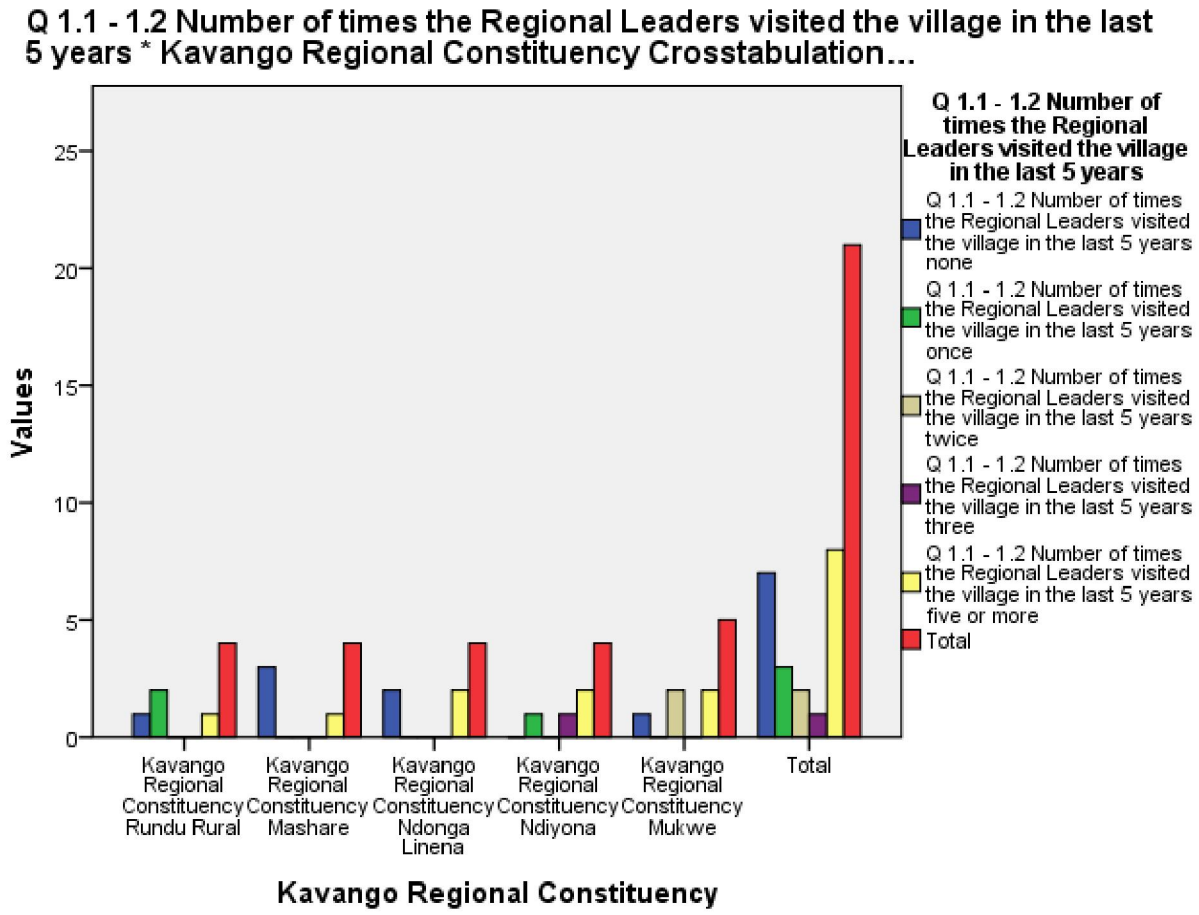
Table 4.9 Types of jobs created and factors affecting economic development

Variable	Description	Frequency	Percentage
Types of jobs created	No initiatives	3	14.3%
	Gardening & manual irrigation	18	85.7%
Factors affecting economic development in your village	Water pumps/pipes and tanks (innovations)	1	4.8%
	Water innovations and related training	1	4.8%
	Water innovation technologies (WIT), training and fencing	1	4.8%
	water innovation technologies, training, fencing, information on development opportunities	6	28.6%
	WIT, training, marketing, information on development opportunities	12	57.1%
Do Regional leaders have a role to play in job creation and water innovations	Yes	21	100.0%
	No	0	0.0%
Impact Of Water Innovation In Wealth Creation	Job Creation	1	4.8%
	Improve Self Reliance	0	0.0%
	Reduce Poverty	0	0.0%
	Reduce Inequality	0	0.0%
	All Of The Above	20	95.2%

The research findings revealed that 57.1% (see table 4.9 above) of the respondents said that lack of Water Technology Innovations, Training, Marketing and Information on development opportunities is factors affecting economic development at their respective villages. Therefore, it means that water technology innovations can be a key to economic development of some villages of Kavango East Region. It also indicates that the poverty level of 53% for the Kavango East Region, can actually be solved if leadership show a willingness to assist the community, in their efforts to use water to create jobs for themselves. Because there is no support from the leaders on aspect/ factors affecting the economic development of their villages poverty, unemployment, inequalities and all other social ills have been prevailing in the Kavango East Region and they will continue to worsen.

The research shows that 100% of respondents indicated that Regional Leaders have a role to play in job creation and water technology innovations (see table 4.8 above). This means that Regional Leaders are not playing that role at present, which is the reason why the poverty level is high (56%, NSA). Until they begin to play that role the Kavango East Region will remain poor or the situation might even get worse.

The research also shows that 95% of respondents indicated that water technology innovations will impact on wealth creation, job creation, improve self-reliance, reduce poverty and reduce inequality.



Bar graph: 4.1 : Number of regional leadership visitation to the community

The bar graph above shows the number of regional leadership visitation to the community. As one moves from Mukwe constituency towards Rundu Rural East constituency the number of visitation declines. This is also linked to the impact of regional leaders on development, as one moves from Mukwe towards Rundu Rural Constituency. The impact of regional leadership on development also declines. The Absence of regional leadership visitations to the grassroots communities, indicates a lack of commitment from the regional leadership towards development of the rural poor communities of Kavango East Region. It is only through leadership visitation to

the communities that leader-community relation can be enhanced, and foster common vision and understanding towards what needs to be done at the grassroots level in order to empower them and promote self-reliance, and reduce poverty.

4.2.3 Summary of the findings from the focus group interviews

The overall results obtained from the focus group interviews from the grassroots villages of the Kavango East Region, show that the leadership is not playing its role in water technology innovations to enhance job creation. Moreover, the grassroots communities also revealed that regional leaders from the radius of 81-222 kilometres reside within their communities since there is a long distance from town. This gives them more opportunities to meet their community from time to time.

As a result, Regional Leadership impact on development is felt stronger at villages which are situated far away from Rundu Town ($r = 0.74$, $p = 0.00$). This can also be linked to support the 56% poverty level in the Kavango East Region reported by Namibia Statistics agency. This is true because more people of the Kavango East Region live at villages near Rundu Town and regional leaders do not attend to those villages. That is why the poverty level is higher in that Region.

The grassroots communities of Kavango Region view leadership involvement in water technology innovations as something that will influence poverty eradication, job creation,

improved economic activities and sustainable development. From the spearman correlation of the research findings (Table 4.4 below), on village distance from Rundu Town, we see that at least 54.76% (r =0.74)2 of the predictability of Regional leadership impact on development is the result of distance from the urban centre (Rundu Town).

The spearman correlation of the research findings also indicates that there is a strong negative correlation between having a committee to discuss development (water) problems in villages and the impact of regional leadership on development , especially, when communities try to seek audience with the regional leaders and the leaders don't accord them such a chance (r =0.439, p=0.05).

About 61.9% of respondents indicated that Grassroots Communities seek audience with Regional Leaders, mostly by going physically to the regional leader's offices. Regional leaders respond to their (communities) requests for a meeting. However 76.2% of the respondents indicated that the regional leaders listened to their challenges but did not provide resources. The rationale behind this is that there is no dedicated budget given to Regional Leaders on community development at present, and this is hampering development in the rural areas of Kavango East Region. It might be that Regional Leaders are willing to allocate resources, but they do not have the resources at their disposal.

The results also revealed that, 28% of the respondents indicated that they have a committee that discusses problems in the villages and 33.3% of the respondents said, the committee is not in

place, because they can't afford to pay them, since government does not pay them. On the other hand 33.3%, also indicated that the committee is not in place without any reason.

On the impact of Regional leadership on development, 52.4% indicated that proper leadership will contribute to poverty eradication, job creation, improved economic activities, and sustainable development. Sadly, 47.6% of the respondents indicated that they are not aware of anything. This may be attributed to a lack of education on the part of community to know what is expected from their elected regional leaders.

The mean of jobs created is 21.8095, with standard deviation of 22.07627, the maximum jobs created is 101 at Shighuru village. The result from the research findings indicate that 85.7% of jobs created were in gardening and manual irrigation. This actually indicates that the community of Kavango East Region is committed to strive and improve their lives with gardening and manual irrigation (using water). All they need is support in water technology innovations to produce at a large scale.

Table 4.10 Types of jobs created and factors affecting economic development

Variable	Description	Frequency	Percentage
Types of jobs created	No initiatives	3	14.3%
	Gardening & manual irrigation	18	85.7%
Factors affecting economic development in your village	Water pumps/pipes and tanks (innovations)	1	4.8%
	Water innovations and related training	1	4.8%
	Water innovation technologies (WIT), training and fencing	1	4.8%
	water innovation technologies, training, fencing, information on development opportunities	6	28.6%
	WIT, training, marketing, information on development opportunities	12	57.1%
Do Regional leaders have a role to play in job creation and water innovations	Yes	21	100.0%
	No	0	0.0%
Impact Of Water Innovation In Wealth Creation	Job Creation	1	4.8%
	Improve Self Reliance	0	0.0%
	Reduce Poverty	0	0.0%
	Reduce Inequality	0	0.0%
	All Of The Above	20	95.2%

The research findings revealed that 57.1% (see table 4.8 above) of the respondents said that Water Technology Innovations, Training, Marketing and Information on development opportunities are factors affecting economic development at their respective villages. Therefore, it means that water technology innovations can be a key to economic development of some villages of Kavango East Region. This also indicates that the poverty level of 53% for the Kavango East Region, can be reduced if leadership show a willingness to assist the community in their efforts to use water to create jobs for themselves. Because there is no support from the leaders on aspect/ factors affecting the economic development of their villages, poverty, unemployment, inequalities and all other ills that have been prevailing in the Kavango East Region will continue to worsen.

The research also shows that 100% of respondents indicated that Regional Leaders have a role to play in job creation and water technology innovations (see table 4.8 above). This means that Regional Leaders are not playing that role at present. Which explains why the poverty level is high (56%, NSA). Until they begin to play that role the Kavango East Region will remain poor or the situation might even get worse.

Furthermore, 95% of the respondents indicated that water technology innovations will impact on wealth creation, job creation, improve self-reliance, reduce poverty and reduce inequality. The research results also revealed that the number of regional leadership visitation to the community, as you move from Mukwe constituency towards Rundu Rural East constituency, declines. This is also linked to the impact of regional leaders on development, as you move from Mukwe towards

Rundu Rural Constituency where the impact of regional leadership on development also decline. The Absence of regional leadership visitation to the grassroots communities, indicates a lack of commitment from the regional leadership towards the development of the rural poor communities of Kavango East Region. It is only through leadership visitation to the communities that leader-community relation can be enhanced, and foster common vision and understanding towards what needs to be done at the grassroots level in order to empower them and promote self-reliance, and reduce poverty.

CHAPTER 5: CONCLUSTIONS AND RECOMMENDATIONS

5.1 Introductions

As stated in chapter 1, the main purpose of this study was to establish the role of leadership in water technology innovations in enhancing job creation in the Kavango East Region with special emphasis on how it affects development of the grassroots communities in the rural areas. A case study of Kavango East Region has therefore yielded empirical data. In particular, the study has examined the real situation regarding the role of leadership in water technology innovations to enhance job creation in the Kavango East Region, a region that has abundant water. Furthermore, the study set off to discover how leadership involvement in water technology innovations contributes to socio-economic development in the region.

With specific reference to a study conducted by Mendelsohn and Obeid (2006), they found that while the focus of Botswana's use of the Kavango has been on its tourism, Namibia viewed the river as a passing resource to be exploited before it exits at Muhembo. Thus, the river is perceived as a source of water for irrigation and provide water for domestic and industrial needs in the Central Regions. A number of lodges and campsites have been developed by private individuals and companies. The leadership has paid little attention to the creation of wealth and jobs through the use of water in the Kavango River.

In addition to the Mendelson study, the problem identified by the Kavango Regional Council's Operational Audit Report (2013), also support that, and it's said that the communities are not using water technology innovations to create jobs for themselves and to use water effectively,

due to a lack of leadership involvement. This has resulted in high unemployment and high poverty levels.

In order to examine the role of leadership in water technology innovations in enhancing job creation issues in Namibia by using the Kavango East Region as a case study, the research has investigated the following objectives:

- The current situation of poverty, unemployment and inequalities in the Kavango East Region. The information was obtained from government statistics reports and poverty profiles.
- The history of water usage in Kavango East Region. This information was obtained from literature on the history of water usage in Namibia and Kavango East Region, by using Kavango River as a sole source of water.
- History of water technology innovations in the world. This information was obtained from World Archeology, through literature review.
- Theoretical perspectives on leadership and its role in sustainable development, this information was obtained by reviewing literature on leadership theories and political influence on leadership including the impact of the colonial and apartheid leadership on development and job creation.
- The role and impact of regional leadership of Kavango East Region in water technology innovations in enhancing job creation. The researcher consulted the grassroots people in

the villages of Kavango East Region for focus group interviews to obtain this information.

- Community effort in the use of water to create jobs for themselves, the information was obtained during focus group interviews with the communities.

It could be said that the constructivism approach, which obviously informs some theoretical assumptions for this study, shares an interesting point of commonalities with the conclusions of this study. Therefore, informed by the problem and objectives stated above, and based on the Kavango East Region case study this study arrived at the following conclusions as indicated below.

5.2 CONCLUSIONS

In contextualizing this very important study in Chapter 1, it was very difficult to identify another study conducted in the Kavango East Region investigating aspects of the role of leadership in water technology innovations to enhance job creation, as well as the impact of leadership involvement in water technology innovations on socio-economic development.

As indicated in chapter 1, it come to light that there is a problem concerning the role of leadership in water technology innovations to enhance job creation in the Kavango East Region, as well as a lack of leadership involvement in water technology innovations. This contributes to socio-economic development in the region. It was found that while the focus of Botswana's use of the Kavango has been on its tourism, Namibia viewed the river as a passing resource to be exploited before it exits at Muhembo. Thus, the river is perceived as a source of water for

irrigation and provides water for domestic and industrial needs in the Central Regions. Private individuals and companies have developed a number of lodges and campsites. A single conservancy has also been established. However, the leadership has paid little attention to the creation of wealth and jobs using water in the Kavango River.

Supported by several reports, the problem identified by the Kavango Regional Council's Operational Audit Report (2013), is that the communities are not using water technology innovations to create jobs for themselves, due to the lack of leadership involvement. This has resulted in high unemployment and high poverty levels. According to the report developed by Mendelsohn and Obeid (2006), while the focus of Botswana's use of the Kavango has been on its tourism, Namibia viewed the river as a passing resource to be exploited before it exits at Muhembo. Thus, the river is perceived as a source of water for irrigation and provides water for domestic and industrial needs in the Central Regions. Private individuals and companies have developed a number of lodges and camp sites including one conservancy. However the leadership has paid little attention to the creation of wealth and jobs through the use of water in the Kavango River. Traditional Leaders (Headmen) should know about water technology innovations and its importance through awareness and training from their regional leaders.

According to Molenki (2012), the relationship between leadership and sustainable development is very important, because there is no development without leadership especially in the social, human and cultural dimension. It is clear that leadership plays an important role in the administration and in highlighting the human side than in other aspects (Molenki, 2012). The role of leadership in the development and growth of such regions is paramount, with the

understanding that leadership is one of the most creative elements of the regional economic development process (Florida, 2002).

This study found that according to the UN-World Economic Forum (WEF), (2013), which ranked 144 countries on different performance areas, Namibia has been ranked 93 on water provision and 103 on innovation and sophistication factors. To make matters worse, Namibia has been falling since 2002 by nine (9) ranks overall. This is worrisome statistics, giving the impression that the Kavango East Region is the poorest in Namibia (National Census, 2001 & 2011). The situation might be worse for the Region after the National Census of 2011. This study also found that the Ministry of Agriculture, Water and Forestry and the Kavango East Regional Leadership find it difficult to understand the importance of water technology innovation in enhancing development. This has resulted in water technology innovation not being given attention as part of its priorities, which can be used to develop the Kavango East Region through the creation of better living conditions for all.

The study also found that, the previous study conducted by Mendelsohn (2006) focused mainly on land and water usage in the Kavango East Region, while this dissertation goes beyond water and land to include the role of leadership in water technology innovations to enhance job creation in the Kavango East Region. The previous research was conducted 9 years ago, thus the context might have changed since then.

Another important implication of the role of leadership in water technology innovations to enhance job creation in Namibia and Kavango East Region in particular was the aspect of resource allocation, communication and support. Within this implication, and in line with constructivism approach, this study concluded that the grassroots communities depend heavily on leadership if they are to use water technology innovations to create jobs aimed at poverty reduction, and reduction of inequalities. This can enhance the living standards of the rural poor.

It was stated in Chapter 2, that Leadership can best be defined as a process whereby an individual influences a group of individuals to achieve a common goal (Skidmore, 1990). Defining leadership as a process means that it is not treated as a trait or characteristic residing in the leader alone, but as a transactional event that occurs between the leader and his or her followers. It is a process which implies that a leader affects and is also affected by employees. It emphasizes that leadership is not a linear, one-way event, but rather an interactive event. However, it is important to note that it is the leader, who often initiates the relationship, creates the communication linkages, and carries the burden of maintaining the relationship.

Defining leadership as a process also emphasizes the significance of relationships, which is very important in rural areas. The type of leadership effective in rural areas must value relationships, individual differences and the important characteristics of rural communities (Avant, 2006). Therefore, to be an effective leader in rural areas, a special type of leadership style should be present in the leader. Leadership style may be defined as a pattern of specific behaviors or attitudes that a leader places on different leadership functions (Casimir, 2001). Although leadership is viewed as a process, leadership style is the glue that holds the process together.

Approaches to studying leadership have resulted in a focus on leadership styles prevalent in the 1990s and in the first decade of the 21st century. Available literature reveals a number of schools of thought on leadership styles. It suggests that leadership styles have developed through at least four main generations of theories namely: trait theories, behavioral theories, situational theories and transformational theories. The literature also points out that the four theories are not mutually exclusive or time bound. In other words, although it is true that the progression of thinking tends to follow a sequential path, it is very evident in the literature that elements of the four generations of leadership theories have experienced cross-fertilization (Bass, 1998; Yukl, 2006). The first of the four generation of theories are the trait theories, where a universal set of effectiveness characteristics is identified. Some of the earliest studies of leadership in the United States are based on the assumption that good leadership is synonymous with the possession of certain traits (Stogdill, 1948).

It was established that, leadership is the quality or the behavior of individuals whereby they guide people or their activities in an organized effort. Despite the multiple definitions of leadership, the following components can be identified as central to the phenomenon of leadership:

(a) leadership is a process;

(b) leadership involves influence;

(c) leadership occurs within a group context; and

(d) leadership involves attainment of s goal.

The transformational leadership theory is an example of the development of leadership theories that has surpassed the traditional bureaucratic organizational models of leadership.

Transformational leadership is a model that includes a structure that stresses leadership styles that allows for flexibility and individualization. It encourages input in decision making and stresses the importance of teamwork and social relationships. A transformational leader is very important to the community. The leader has a clear perception of her/his followers and is aware of his/her own values, needs and vision, and acts in a manner that promotes the needs of both. This leadership model recognizes the importance of connectedness of the individual, the work group, and the community. It calls for individual input while working for the overall benefit of the community.

This type of leadership is ideal for the situation in the Kavango East Region, since there seem to be a challenge for leader- community relation. As a result, individuals feel included and they are prone to want to spend more time and energy in meeting the needs of the community. Transformational leadership creates an atmosphere in which all individuals feel included and appreciated, which motivates them to enhance their own satisfaction while working to promote the good of the community (Barling, Weber & Kelloway, 1996).

Transformational leadership is empowering and participatory because it promotes decision-making and fosters local leadership. Teamwork is emphasised and the community is viewed as a system of people working together with common dreams. This leadership style creates a culture based on openness, trust, and respect, and inspires a team spirit. In addition transformational leadership has several implications for addressing the problem of leadership in

rural areas. It has been well established in the literature that rural areas are in need of leaders. Transformational leadership is a model that provides the type of leadership necessary to deal with the complexity of issues facing rural communities. It has the elements of trust and respect that facilitates the cooperation needed for effective teamwork. Furthermore, it emphasizes a relational approach in which leaders show interpersonal consideration through relationship building, empathy, and interdependence that is so appropriate for rural areas (Avant, 2006). Pigg (1999), suggests that community leadership should be based on our knowledge of communities rather than organizations.

In support of the above claim, this study concurs with the fact that community leaders cannot rely on formal authority or power positions. Leaders should, on the contrary, depend on their ability to build relationships and support from the community itself. This idea of building relationships is not the way organizational leaders conduct business. This study examined the history of water technology innovations at the global, SADC and Regional Levels. It was revealed that water technology innovations started many years ago. It was also noted that, water technology innovation is not a new thing to be associated with humankind, it has been in existence for a long time. However, it is worth noting that water technology innovations have been changing and developing from time to time as humankind started to come up with effective and efficient ways of using water to enhance economic development and create jobs. The case of Egypt has been studied in the past and is an excellent source of information on this topic.

To begin with, the Egyptian technology was a shaduf. A shaduf is a device that has been used in Egypt since early times to get water for irrigation. It is a machine used to move water from a

lower place to a higher place. The shaduf is a large pole that is balanced on a crossbeam, then a rope and bucket on one end and a heavy counter weight at the other. When the shaduf is placed into the water and gets full, it is lifted and placed into a canal or field to water the crops. The shaduf*s* are still used in rural parts of Egypt to this day. These were very helpful to Egyptians and quicker. This was their amazing shadu*f* technology.

The study revealed that, the well was a transformative invention although it is often overlooked. This source of freshwater, vital for the expansion of inland communities, dates back nearly 10,000 years to 3,000 years before the wheel was ever imagined. The well is but one of a long list of innovations in water technology that have enabled human development to continue. Sophisticated pipeline networks and treatment plants today furnish us with this elixir of life and industry. As intense pressure is placed on the planet's limited water supplies, businesses are again turning to technological innovation. New and emerging inventions should see human civilisation through the 21st century and, with any luck, the next 10,000 years.

The study further revealed that, almost 50 years after the success of their first drip irrigation system, Netafim is still a world leader in growing more crops with less water. Such an irrigation system should be brought to rural communities, where people are dependent on agriculture for both food and income. Even in times of drought, Netafim technology helps farmers grow the crops they need to feed their families and to sell in local markets.

The study also revealed something which is worth mentioning, namely that, Botswana's use of the Kavango has been on its tourism; Namibia viewed the river as a passing resource to be exploited before it exits at Muhembo. Thus, the river is perceived as a source of water for irrigation and provides water for domestic and industrial needs in the Central Regions. Private individuals and companies have developed a number of lodges and campsites including one conservancy. However, the leadership has paid little attention to the creation of wealth and jobs through the use of water in the Kavango River. Traditional Leaders (Headmen) need to know about water technology innovations and its importance through awareness and training from the regional leaders.

The study further uncovered that, it is estimated that 70% of worldwide water use is for irrigation. In some areas of the world, irrigation is necessary to grow any crop, in other areas it permits more profitable crops to be grown or enhances the crop yield. Various irrigation methods involve different trade-offs between crop yield, water consumption and capital cost of equipment and infrastructure.

Irrigation methods such as most furrow and overhead sprinkler irrigation are usually less expensive but also less efficient, because much of the water evaporates or runs off. More efficient irrigation methods include drip or trickle irrigation, surge irrigation, and some types of sprinkler systems where the sprinklers are operated near ground level.

Imperative observation in this study has revealed the aspect of job creation in the Kavango East Region. From the inception of this study, it was highlighted that water is a key natural resource, which is not scarce in the Kavango East Region and can be used to enhance job creation among

the rural poor of the region. This is expected to strengthen socio-economic development in the region concerned.

The study also revealed that, International Fund for Agricultural Development (IFAD) in November 2012, in El Tambo, Ecuador, said that providing water effectively for a range of agricultural needs has been proven to reduce poverty. At the individual farm scale, access to a reliable water source can be the difference between a crop failing or thriving during dry spells, which in turn will determine whether or not a poor farmer has enough food to feed his or her family. At a global scale, achieving food security through effective water management can prevent the deaths of millions from starvation and malnourishment. While past efforts to develop irrigation infrastructure have had success in reducing poverty, the benefits have not been equitably shared and there are many regions where pockets of poverty remain. With the increasing climate changes there is now an even greater need to find the most appropriate solutions to address poverty and vulnerability, specifically in regions that have not yet been reached.

The role of women's in agriculture has been overlooked for a long time when decisions about water use have been made. There is a perception that rural women are solely responsible for fetching and carrying water, and that men are responsible for farming, but this is not necessarily the case. Often, women have different roles to men; female villagers might manage fruit trees, while men manage crops in the fields. If a government or development organization comes to install an irrigation system and is guided by village men to cut down trees, they may inadvertently dispossess women of their livelihoods. Increasingly, poor families are seeking to

escape poverty by sending men to cities to find alternative work. This trend has been observed in many places where women are increasingly taking on full responsibility of running farms. Despite assuming chief decision-making roles in many farming systems, they often remain underrepresented in water users' groups because of community attitudes and neglect on the part of policymakers to improve the rights and access of women.

Many of today's smallholder farmers grow a range of crops, often on infertile marginal lands such as uplands. They would benefit from access to a combination of small-scale water storage facilities, along with soil improvement technologies. These would help them to overcome issues of rainfall variability, which is likely to be exacerbated in the future due to climate change.

They may also provide them with opportunities to diversify, for example, by farming fish as well as crops. Providing a large number of smallholder farmers with access to artificial ponds or tanks, small reservoirs, wetlands, and groundwater or soil moisture, has the potential to lift individual families from poverty and underpin global food security. In southern Sri Lanka, the construction and linking of a large storage reservoir to five small existing reservoirs resulted in a 400% increase in productivity (McCartney and Smakhtin 2010). The study also revealed that, Decision-makers need to take into account the roles of women much more if they are to effectively address poverty as well as food security. A project to include women in decision-making on irrigation in Jambar, South Gujarat, India, resulted in a higher social status for the women along with greater productivity. (van Koppen et al. 2001). The project involved researchers educating men from that community as to why the women should be involved in

making decisions. IWMI and the International Food Policy Research Institute (IFPRI) are presently developing a gender map of smallholder farming in Africa. This will be used to develop recommendations on how to target the main decision-makers of the farms with water management technologies.

It was also noted in this chapter, that one of the common assumptions regarding 23 irrigator farmers – specially in African and Asian countries – is that they are predominantly male, which leads to the assumption that farm household resources and labour are effectively controlled and allocated by males. Research has shown that failure to recognize gender issues affects agricultural productivity of irrigated crops negatively, and that women's lack of independent access to, and control of land and water threatens household food security. In many cases water resource policies and programs have proven detrimental to women's water rights and, therefore, to sustainable management and use of water. Interventions such as irrigation habitually fail to take into consideration the existing imbalances between men and women's ownership rights, division of labour and income. Numerous studies led governments as well as international and local agencies to realize the important role played by women in water management. Women are increasingly being trained in various aspects of water supply and irrigation operation and maintenance.

The chapter also revealed that, Gender balance and employment has been an issue of top priority for the government of Namibia. However, gender has not been a priority on the agendas of irrigation policy makers, interventionists, irrigation leaders and researchers, the gap between positive intentions and concrete action is still considerable. An important but hitherto ignored cause for this gap lies in the lack of adequate conceptualization and methodological tools that

provide the insights that policy makers and change agents need. The challenges to improve the current body of knowledge on gender and irrigation are fourfold.

- First, in order to accommodate the huge variation in the gendered organization of farming across the globe, policy makers and change agents need generic analytical tools that capture relevant and site-specific issues in any irrigation context, including the role of irrigation agencies themselves.

- Secondly, concepts need to be accurate and valid. Water obtains its value only as an input in an encompassing farm enterprise. The significance of water for women farm decision makers, who mobilize inputs themselves, differ fundamentally from its importance for women who are family laborers in farm households managed by their male partners. This needs to be taken into account in conceptualizing water in the gendered organization of farming, preferably quantitatively.

- Thirdly, analytical tools for gender analysis should be easy to apply in an intervention context.

- Finally yet importantly, the meaning and merits of "gender inclusiveness" need to be clear enough, widely endorsed and well corroborated by evidence in order to serve as a generic yardstick for measuring "good gender performance."

As briefly outlined in Chapter 3, this study derived its empirical results from a case study of Kavango East Region using a mixture of exploratory and descriptive methods. The selection of this methodology was based on the assumption that it proves effective in probing into the real-

life experiences and psychology in Kavango East Region as interpreted in the normative trends of efforts of communities in that region on using water on their own. This entails that this dissertation adopts the constructivists approach with a definite normative dimension, hence research aims for transformative outcome, and is not interested in "knowledge for knowledge's sake." It was assumed that this methodology has successfully facilitated the exploration of empirical data concerning the experiences of the people of Kavango East Region.

It was found that the results of this study can be generalised to the role of leadership in water technology innovations to enhance job creation of all people along the Kavango river as well as along the northern and north eastern regions of Namibia. This is so because a total 777 respondents drawn from a total population of 105 000 of the Kavango East Region inhabitants justifies the validity of the results. However, this study does not claim external validity of the results since these results are generalised in the Namibian context only. This is so because the availability of water differs from the northern regions, as one goes to the central and southern parts of Namibia.

It was revealed in Chapter 4, that information on Kavango East Region confirmed the reality of the difficulty, which the community face in using water technology innovations to produce more food, while creating jobs for themselves. This dissertation confirms the findings of Kavango Regional Council's Operational Audit Report (2013), which revealed that the communities are not using water technology innovations to create jobs for themselves and effectively, due to the lack of leadership involvement. This has resulted in high unemployment and high poverty levels.

It also confirms the report developed by Mendelsohn and Obeid (2006), which established that while the focus of Botswana's use of the Kavango has been on its tourism, Namibia viewed the river as a passing resource to be exploited before it exits at Muhembo. Thus, the river is perceived as a source of water for irrigation and provide water for domestic and industrial needs in the Central Regions. Private individuals and companies have developed a number of lodges and campsites including a conservancy. However, the leadership has paid little attention to the creation of wealth and jobs using water in the Kavango River.

The findings confirms Molenki's (2012) findings, that point to that fact that the relationship between leadership and sustainable development is very important, because there is no development without leadership especially in the social, human and cultural dimensions. It is clear that leadership plays an important role in administration and this role is highlighting the human side than in other aspects (Molenki, 2012). The role of leadership in the development and growth of such regions is paramount, with the understanding that leadership is one of the most creative elements of the regional economic development process (Florida, 2002).

To test these assumptions, this dissertation has applied the following hypothesis to the case study in the role of leadership in water technology innovations to enhance job creation in the Kavango

East Region. A poor education background within grassroots communities of Kavango East Region may lead to lack of understanding in terms of the meaning of the followings:

1. Allocation

2. Community

3. Constituency
4. Economic water scarcity
5. Empowerment
6. Enhance
7. Inequality
8. Job creation
9. Leadership
10. Natural resources
11. Physical water scarcity
12. Poverty

It was observed that the grassroots communities in the Kavango East Region attach different meaning and understanding to the above words. These words in the context of this study mean the followings:

(a) Allocation

To reserve or select for a specified purpose: allocated time for recreation; appropriated funds for public education; assign new computers to the science lab; designated a location for the new hospital; money that was earmarked for a vacation. Distribution of limited resources among

competing requirements for employment. Specific allocations (e.g., air sorties, nuclear weapons, forces, and transportation) are described as allocation of air sorties, nuclear weapons.

(b) Community

Makins (1993:269) refers to community as "group of people having cultural, religious, or other characteristics in common or interest." For example, as Illes (year, page) explains, the community is a village (ward) of the rural Kavango Region who belongs to the same ethnic group. This definition is used in this dissertation to refer to the communities of the Kavango East Region, who live in the rural villages.

(c) Constituency

A constituency is the body of people who are eligible to vote and elect a leader, or a group of supporters or potential supporters. In this study it is also referred to as a group of people in a given area (district) who vote for their leader.

(d) Economic water scarcity

Is caused by a lack of investment in infrastructure or technology to draw water from rivers, aquifers or other water sources, or insufficient human capacity to satisfy the demand for water. One quarter of the world's population is affected by economic water scarcity. Symptoms of economic water scarcity include a lack of infrastructure, causing the people without reliable access to water to have to travel long distances to fetch water, that is often contaminated from rivers for domestic and agricultural uses. Large parts of Africa suffer from economic water scarcity; developing water infrastructure in those areas could therefore help to reduce poverty.

Critical conditions often arise for economically poor and politically weak communities living in already dry environment.

(e) Empowerment

Community empowerment refers to the process of enabling communities to increase control over their lives. "Communities" are groups of people that may or may not be spatially connected, but who share common interests, concerns or identities. These communities could be local, national or international, with specific or broad interests. 'Empowerment' refers to the process by which people gain control over the factors and decisions that shape their lives. It is the process by which they increase their assets and attributes and build capacity to gain access, partners, networks and/or a voice, in order to gain control. "Enabling" implies that people cannot "be empowered" by others; they can only empower themselves by acquiring more of power's different forms (Waisbord S. (2005)). It assumes that people are their own assets, and the role of the external agent is to catalyse, facilitate or "accompany" the community in acquiring power.

Community empowerment, therefore, is more than the involvement, participation or engagement of communities. It implies community ownership and action that explicitly aims at social and political change. Community empowerment is a process of re-negotiating power in order to gain more control. It recognizes that if some people are going to be empowered, then others will be sharing their existing power and giving some of it up (Baum, 2008). Power is a central concept in community empowerment and health promotion invariably operates within the arena of a power struggle.

Community empowerment necessarily addresses the social, cultural, political and economic determinants that underpin health, and seeks to build partnerships with other sectors in finding solutions.

Globalization adds another dimension to the process of community empowerment. In today's world, the local and global are inextricably linked. Action on one cannot ignore the influence or impact on the other. Community empowerment recognizes and strategically acts upon this inter-linkage and ensures that power is shared at both local and global levels.

Communication plays a vital role in ensuring community empowerment. Participatory approaches in communication that encourage discussion and debate result in increased knowledge and awareness, and a higher level of critical thinking. Critical thinking enables communities to understand the interplay of forces operating on their lives, and helps them take their own decisions.

Let's take an example of a conference to be organized that will focus on the conceptual and practical issues in building empowered communities. Through examples and case studies it will analyse how successful partnerships with communities can be forged even in the environment of vertical health programming. It will examine how empowerment oriented health promotion can be practiced both in local and global settings. In this study, the term is used to describe the action that leadership of Kavango East Region is supposed to do to the community in order for them to be self-reliant and reduce poverty.

(f) Enhance

To rise to a higher degree; intensify; magnify, to raise the value or price of, to improve someone's life. The term is used in this study to refer to the enhancement of job creation in the Kavango East Region of Namibia.

(g) Inequality

Economic inequalities are most obviously shown by people's different positions within the economic distribution - income, pay, wealth. However, people's economic positions are also related to other characteristics, such as whether or not they have a disability, their ethnic background, or whether they are a man or a woman. While the Equality Trust recognizes the importance of these measures, the focus of our work is specifically the gap between the well-off and the poor in the overall economic distribution. This is reflected in the choice of terms and statistics in this section.

There are three main types of economic inequality:

1. Income Inequality

Income inequality is the extent to which income is distributed unevenly in a group of people. Income is not just the money received through pay, but all the money received from employment (wages, salaries, bonuses etc.), investments, such as interest on savings accounts and dividends from shares of stock, savings, state benefits, pensions (state, personal, company) and rent. Measurement of income can be on an individual or household basis – the income of all the people sharing a particular household. Household

income before tax that includes money received from the social security system is known as gross income. Household income including all taxes and benefits is known as net income.

2. Pay Inequality

A person's pay is different from their income. Pay refers to payment from employment only. This can be on an hourly, monthly or annual basis. It is typically paid weekly or monthly and may also include bonuses. Pay inequality therefore describes the difference between people's pay and this may be within one company or across all income received around the globe..

3. Wealth Inequality

Wealth refers to the total amount of assets of an individual or household. This may include financial assets, such as bonds and stocks, property and private pension rights. Wealth inequality therefore refers to the unequal distribution of assets in a group of people.

(H) Job creation

The process by which the number of jobs in an economy increases. Job creation often refers to government policies intended to reduce unemployment. Job creation programs may take a variety of forms. For example, a government may lower taxes and reduce regulation to make hiring less expensive. On the other hand, a government may empower the community with resources for them to create jobs for themselves.

(i) Leadership

Is a person's ability to be a leader. A leader is one or more people who selects, equips , trains, and influences one or more follower(s) who have diverse gifts, abilities, and skills and focuses the follower(s) to the organization's mission and objectives, causing the follower(s) to willingly and enthusiastically expend spiritual, emotional, and physical energy in a concerted effort to achieve the organizational mission and objectives. The leader achieves this same state for his/her own self as a leader, as he/she seeks personal growth, renewal, regeneration, and increased stamina-mental, physical, emotional, and spiritual-through the leader-follower interactions (Bruce et al., 2006). Leadership and transformational leadership is likely to be more appropriate to the creative innovation process than transactional leadership, since the creative endeavor requires risk-taking, experimentation, change and challenge to the status quo - which transformational leadership encourages (Oke et al., 2009). This in short, explains the fact that change, which brings development, needs leadership in order for it to take place.

(K) Natural resources:

Are all that exists without the intervention of humankind. This includes all natural characteristics such as magnetic, gravitational, and electrical properties and forces. That also includes sunlight, atmosphere, water, land (includes all minerals) along with all vegetation and animal life that naturally subsists upon or within the identified characteristics and substances.

Particular areas such as "The rainforest in Fatu-Hiva" are often characterised by the biodiversity and geodiversity existent in their ecosystems. Natural resources may be further classified in different ways. Natural resources are materials and components (something that can be used) that can be found within the environment. Every manufactured product is composed of natural

resources (at its fundamental level). A natural resource may exist as a separate entity such as fresh water, and air, as well as a living organisms such as a fish, or it may exist in an alternate form which must be processed to obtain the resource such as metal ores, mineral oil, and most forms of energy.

There is much debate worldwide over natural resource allocations, this is partly due to the increasing scarcity (depletion of resources) but also because the exportation of natural resources is the source of foreign currency for many economies (particularly for developed nations).Some natural resources such as sunlight and air can be found everywhere, and are known as ubiquitous resources. However, most resources only occur in small sporadic areas, and are referred to as localized resources. There are very few resources that are considered inexhaustible (will not run out in the foreseeable future) – these are solar radiation, geothermal energy, and air (though access to clean air may not be). The vast majority of resources are exhaustible, which means they have a finite quantity and can be depleted if not managed properly. In this study water from the Kavango River is referred to as a natural resource.

(I) Physical water scarcity

Where there is inadequate water resources to meet a country's or regional demand, including the water needed to fulfill the demand of ecosystems to function effectively. Arid regions frequently suffer from physical water scarcity. It also occurs where water seems abundant but where resources are over-committed, such as when there is over development of hydraulic infrastructure for irrigation. Symptoms of physical water scarcity include environmental degradation and declining groundwater as well as other forms of exploitation or overuse.

(m) *Poverty*

Condition where people's basic needs for food, clothing, and shelter are not being met. Poverty is generally of two types: (1) Absolute poverty is synonymous with destitution and occurs when people cannot obtain adequate resources (measured in terms of calories or nutrition) to support a minimum level of physical health. Absolute poverty means about the same everywhere, and can be eradicated as demonstrated by some countries. (2) Relative poverty occurs when people do not enjoy a certain minimum level of living standards as determined by a government (and enjoyed by the bulk of the population) that vary from country to country, sometimes within the same country. In this study, poverty is referred to as the condition of the rural community of Kavango East Region.

Another area of contention from which this study has drawn some important conclusions is the implication of the complexity of the role of leadership in water technology innovations in enhancing job creation as well as its socio-economic development. This study shows that 52.4% , of the respondents agree with the fact that proper leadership will contribute to poverty eradication, job creation, improved economic activities, and sustainable development. Sadly, 47.6% of respondents indicated that they are not aware of anything. This may be attributed to a lack of education in the community. The study also found that, there is a strong correlation between the village distances and the number of times Regional Leaders were engaged in discussion with community members at those villages ($r = 0.576$, $p=0.06$). This also applies to the number of times Regional Leaders were engaged in discussion on water technology innovations ($r =0.484$, $p= 0.026$).

The closer the village is to town, the less the times, the regional leaders visit that particular village.

This can attribute to the fact that regional leaders in a radius of 80 Kilometers and below reside in Rundu Town. Most of the times, they are just in the urban area. If they want to go to the villages, they will always commute. If regional leaders attempt to visit their community they mostly visit those nearby villages like in the case of the regional leader for Rundu Rural East (Vhungu Vhungu village).

Regional leaders from the radius of 81-222 kilometres reside within their communities, due to the long distance between the urban area and their constituencies. This gives them more opportunities to meet their community from time to time without incurring travelling costs.

Therefore, regional leadership impact on development is felt strongly in villages which are situated far away from Rundu Town ($r = 0.74$, $p = 0.00$). This supports the 56% of poverty level in the Kavango East Region reported by Namibia Statistics agency. This is so because most of the people of the Kavango East Region live at villages near to Rundu Town and the regional leaders do not visit those villages frequently. That is the reason why the poverty level is higher in that Region.

The study found that, the community of Kavango Region believes that the involvement of leadership in water technology innovations will influence poverty eradication, job creation, improved economic activities and sustainable development. From the spearman correlation of the research findings (Table 6.4 below), on village distance from Rundu Town, we see that at least

54.76% ($r = 0.74)^2$ of the predictability of regional leadership impact on development is the result of the distance from the urban Centre (Rundu Town).

The spearman correlation of the research findings also indicate that there is a strong negative correlation between having a committee to discuss development (water) problems in villages and the influence of regional leadership on development , especially, when the community try to seek audience with the regional leaders and the leaders don't accord them such an opportunity ($r = 0.439$, $p = 0.05$).

The study found 61.9% of respondents indicated that, communities seek audience with regional leaders, mostly by going physically to the regional leaders' office. This study has shown that 76.2% of the respondents are of the opinion that regional leaders listened to their issues but did not provide resources to address the. The rationale behind this is that there is no dedicated budget given to regional leaders on community development at present, and this is hampering development in the rural areas of Kavango East Region. It might be that regional leaders are willing to allocate resources, but they do not have the resources at their disposal.

The research also showed that 28% of the respondents indicated that they have a committee that discuss problems in the villages. A total of 33.3% of the respondents said the committee is not in place, because they can't afford to pay them, since government does not pay them while 33.3%, also indicated that the committee is not in place and no reason was given.

On the influence of regional leadership on development 52.4% indicated that proper leadership will contribute to poverty eradication, job creation, improved economic activities, and sustainable development. Sadly, 47.6% of respondents indicated that they are not aware of anything. This may be attributed to a lack of education on the part of the community to know what is expected from their elected Regional leaders.

The mean of jobs created is 21.8095, with standard deviation of 22.07627, the maximum jobs created is 101 at Shighuru village. The result from the research finding indicated that 85.7% of the jobs created were in gardening and manual irrigations. This indicates that the community of Kavango East Region is committed to strive and improve their lives with gardening and manual irrigation (using water). All they need is support in water technology innovations to produce at a large scale for sale.

The research findings revealed that 57.1% of the respondents said that Water Technology Innovations, Training, Marketing and Information on development opportunities are factors affecting economic development at their respective villages. Therefore, it means that water technology innovations can be a key to economic development of some villages of Kavango East Region. It also indicates that the poverty level of 53% for the Kavango East Region, can be reduced if leadership show a willingness to assist the community in their efforts to use water to create jobs for themselves. Because there is no support from the leaders on aspect/ factors affecting the economic development of their villages, therefore, poverty, unemployment, inequalities and all other social ills prevail in the Kavango East Region.

The research shows that 100% of respondents indicated that regional leaders have a role to play in job creation and water technology innovations. This means that the regional leaders are not playing that role at present that is why the poverty level is high (56%, NSA). Until they begin to play that role the Kavango East Region will remain poor or the situation might even get worse. On the other hand 95% of respondents indicated that water technology innovations will influence wealth creation, job creation, improve self-reliance, reduce poverty and reduce inequality.

The study also revealed that, as you move from Mukwe constituency towards Rundu Rural East constituency the number of regional leadership visitation to the community declines.

The absence of regional leadership visitation to the grassroots communities indicates a lack of commitment from the Regional Leadership towards the development of the rural poor communities of Kavango East Region. It is only through leadership visitation to the communities that leader-community relations can be enhanced, and foster common vision and understanding towards what needs to be done at the grassroots level in order to empower them and promote self-reliance, and reduce poverty.

5.3 Recommendations

This study has identified various factors that affect the use of water technology innovations in enhancing job creation in the Kavango East Region. Based on these factors, this study considers recommendations that would help leaders to support the use of water technology innovations in enhancing job creation in the Kavango East Region to:

- Understand the type of tools and equipment, which the communities need to use water technology innovations to enhance job creation.
- To know other sort of support which leaders should offer to the communities in order for them to feel motivated to continue using water technology innovations to create jobs for themselves.
- For leaders to know and understand the barriers affecting the use of water technology innovations by the communities

These recommendations are important to enable regional leaders of Kavango East Region be conscious of the existing gap between leadership involvements in water technology innovations in enhancing job creation to the grassroots communities and the asymmetric nature within the regional economies.

Therefore, this study recommends:

<u>To the Central Government</u>

- That there should be a policy to compel regional leaders to live within the community or constituency from which they are elected during. If Regional Leaders do not live within

the communities, which elected them, it will be hard for them to know their community's needs which require their attention.

- That there should be a prescription on the number of villages developmental community meetings based on the number of villages in the particular constituency. These meetings should be convened by regional leaders. At such meetings, the community will be given a chance to rate the quality of their regional leader's engagement.

- That the central government/ the Ministry of Urban and Rural development needs to come up with capacity development program for regional leaders. Regional leaders need extensive training to understand their roles and influence on community development, poverty eradication and job creation, before they can resume their duties and not just a mere induction since some regional leaders lack advanced education in development matters.

- That there should be a mechanism in place, which will give certain power to regional Governors to supervise Constituency leaders (including the Chairperson of the Regional Council) in their activities in the villages including community development issues.

- That the Ministry of Rural and Urban development, should allocate a budget to the Constituencies, to enable regional leaders to fund some critical development projects such as the use of water to create jobs for the rural poor.

To the regional leaders

- That there is a high need for Regional Leaders to implement water technology innovations in Kavango East Region, this will impact on wealth creation, job creation, improve self-reliance, reduce poverty and reduce inequality.

- That there should be a mechanism in place for regional leaders to improve their working relations with the communities.

- That regional leaders should understand the importance of community empowerment, as a key to self-reliance and a way of promoting socio-economic development in their regions.

To the grassroots communities

- That there should be a program to capacitate community members to understand the role of their leaders. The community must be trained to understand the roles of the regional leaders. This will make them focused and not give up in their efforts to self-reliance by using their regional leaders.

- That their Community should be given legal power to remove constituency (Regional) leaders who are not cooperating with the community or not contributing to development within their communities even when their term of office has not expired.

- That there should be a mechanism to make regional leaders account for the promises they make to the communities based on their discussion or during community meetings or visits.

5.4 POINTS FOR FURTHER RESEARCH

This study also recommends that further research should be carried out in the following areas:

- An attempt should be made to improve the descriptive background of this dissertation by quantifying the role of leadership-community relationship in water technology innovations to enhance job creation in the Kavango East Region. This means that outcomes of additional quantitative research would be important to determine what economic, social and cultural indicators should be used to produce scenarios, which can be used in projecting the value that leadership-community relationship would add to water technology innovations in enhancing job creation.

- Since the issue of gender balance have become a serious concern, especially in rural poor empowerment, further research is necessary to probe the role of women in water technology innovations to enhance job creation. This research will add value to this study since it will bring in the issue of how women can influence water technology innovations in their communities.

- The issue of land use, which always call for the involvement of traditional leadership, has become a matter of serious concern. There is need to investigate the role of traditional leadership in water technology innovations to enhance job creation in the Kavango East Region. This research will bring in another understanding as to how traditional leadership can influence the use of water technology innovations in the Kavango East Region.

- Youth empowerment has become an issue of contention. It is worth to note that it will add value to this study if the dimension of youth involvement is also looked at. With this in mind, I recommend further investigation to probe the role of youth empowerment in water technology innovations to enhance job creation.

- Community support be it financial or training, is important for economic development. Therefore, I recommend that a study be carried out to determine the impact of community support in water technology innovations to enhance job creation.

- Leadership capacity building is key in the development of any given area, especially in socio-economic development of an underdeveloped country like Namibia. It will assist in understanding more and it will add value to this dissertation if a study will be carried out to probe the impact of education in leadership in water technology innovations to enhance job creation.

- In the same vein, community education is an important aspect in socio-economic development. Therefore, it will be important for a research to be carried out to probe the impact of community education in water technology innovations to enhance job creation. This will add value to this study in looking at what value the community adds to the use of water technology innovations in the Kavango East Region.

- Leadership accountability is a matter of serious concern in Namibia, since in most cases communities blame leaders over lack of service delivery. Against this background, I recommend that further research be carried out to investigate the role of managing performance of leadership in water technology innovations to enhance job creation and rural development, in the Kavango East Region. This will add value to this study, since performance management is a tool that enhances accountability in service delivery.

- Community organization is very important in rural development and the use of Natural resources, especially water. I recommend a further research to probe the role of community development technical committee in water technology innovations to enhance job creation in the Kavango East Region.

5.5 SUMMARY

This study was carried out in a two hundred and twenty two (222) kilometre area in the Kavango East Region, in the Republic of Namibia. The study investigated the role of leadership in water technology innovation enhancing job creation. The study was carried out in the villages of the Kavango East Region, were mostly the grassroots communities live in abject poverty. The study was prompted the levels of poverty in that As stated by the Kavango Regional Council's Operational Audit Report (2013), the communities are not using water technology innovations to create jobs for themselves and to use water effectively, due to the lack of leadership involvement; this has resulted in high unemployment and high poverty levels.

While Mendelsohn and Obeid (2006), found that while the focus of Botswana's use of the Kavango has been on its tourism, Namibia viewed the river as a passing resource to be exploited before it exits at Muhembo. Thus, the river is perceived as a source of water for irrigation and provides water for domestic and industrial needs in the Central Regions. A number of lodges and camp sites have been developed by private individuals and companies, and one conservancy, but the leadership has paid little attention to the creation of wealth and jobs through the use of water in the Kavango River. I believe that traditional leaders (Headmen) should know about water technology innovations and its importance through awareness and training from the Regional leaders.

According to Molenki (2012), the relationship between leadership and sustainable development is very important, because there is no development without leadership especially in the social,

human and cultural dimensions. It is clear that leadership plays an important role in the administration and this role is highlighting the human side than other aspects (Molenki, 2012). The role of leadership in the development and growth of such regions is paramount, with of course the understanding that leadership is one of the most creative elements of the regional economic development process (Florida, 2002).

The study investigated the impact of leadership involvement in water technology innovations in enhancing job creation, with the aim of addressing inequality, poverty and unemployment, consequently promoting socio-economic development. It also looked into the challenges and barriers impeding the rural community of Kavango East Region to use water technology innovations to realize self-reliance.

Given the fact that the expectations from the community and demand for leadership is higher than before, especially in the Kavango East Region, where poverty has increased from 39% in 1990 to 53% in 2014, the study investigated various leadership theories and it established that not all types of leadership are fit for water technology innovations to enhance job creation. The type of leadership which was found to better fit the issue of water technology innovations in enhancing job creation is the transformational theory where the focus of the leader is on the unique connection between the leader and the followers that account for performance and accomplishments for the larger group and the organization (Bass, 1985). Transformational leadership theories involves the transactional theory which focuses on the leader awarding or disciplining followers depending on the adequacy of their performance (Bass, 1998).

Transformational leadership goes beyond the attempts of the leader to satisfy the followers through transactions or exchanges based on contingent rewards. In contrast, transformational

leaders typically heightens awareness and interest in the group or organization, increase confidence, and move followers gradually from concerns for existence to concerns for achievement and growth. Furthermore, transformational leaders develop followers to the point where they are able to take on leadership roles and perform beyond established standards or goals (Avant, 2006; Bass & Avolio, 1994).

Each of the leadership models discussed offer suggestions of various aspects that might be appropriate for rural leadership. Taken together, these and literally hundreds of other leadership models, identify fundamental aspects of leadership that are appropriate for developing a rural leadership model. In summary, some of these aspects include the significance of the work environment and the importance of tasks and relationships. Other attributes of leadership models include trust, integrity, power, influence and finally cultural competence (Northouse, 2007). The authors propose that, of all the leadership models discussed, transformational leadership is the best model for rural areas.

According to Arches (1997), transformational leadership theory is an example of the development of leadership theories that have surpassed the traditional bureaucratic organisational models of leadership. Transformational leadership is a model that includes a structure that stresses leadership styles that allows flexibility and individualisation. It encourages input in decision making and stresses the importance of teamwork and social relationships. The transformational leader is very important to the community. The leader has a clear perception of her/his followers and is aware of his/her own values, needs and vision, and acts in a manner that promotes the needs of both. This leadership model recognises the importance of connectedness of the individual, the work group, and the community. It calls for an individual input while working for the overall benefit of the community. This type of

leadership is ideal for the situation in the Kavango East Region, since there seem to be a challenge for leader- community relation.

As a result, individuals feel included and they are prone to want to spend more time and energy in meeting the needs of the community. Transformational leadership creates an atmosphere in which all individuals feel included and appreciated. This motivates them to enhance their own satisfaction while working to promote the good of the community (Barling, Weber & Kelloway, 1996).

Transformational leadership is empowering and participatory because it promotes decision-making and fosters local leadership. Teamwork is emphasized and the community is viewed as a system of people working together with common dreams. This leadership style creates a culture based on openness, trust, and respect, and inspires team spirit. Transformational leadership has several implications for addressing the problem of leadership in rural areas. It has been well established in the literature that rural areas are in need of leaders. Transformational leadership is a model that provides the type of leadership necessary to deal with the complexity of issues facing rural communities. It has the elements of trust and respect that facilitates the cooperation needed for effective teamwork. Furthermore, it emphasises a relational approach in which leaders show interpersonal considerations through relationship building, empathy, and interdependence that is so appropriate for rural areas (Avant, 2006).

From the empirical results of this study, it is clear that there is a wide gap between what the Government of Namibia want to see in the lives of the rural grassroots communities in the Kavango East Region and the existential situation in the life of the rural inhabitants of Kavango East Region in terms of empowerment and socio-economic development. Therefore, the study

concluded with recommendations to improve the status quo and provides a scope for further studies on various issues, which it has not addressed.

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APPENDIXES

Page

Appendix A: Codebook

Questionnaire No

		Value	Count	Percent
Standard Attributes	Label	Questionnaire Number		
Valid Values	1.00		1	100.0%

Constituency

		Value	Count	Percent
Standard Attributes	Label	Kavango Regional Constituency		
Valid Values	1.00	Rundu Rural	1	100.0%
	2.00	Mashare	0	0.0%
	3.00	Ndonga Linena	0	0.0%
	4.00	Ndiyona	0	0.0%
	5.00	Mukwe	0	0.0%

VillageNo

		Value	Count	Percent
Standard Attributes	Label	Village Code		
Valid Values	1.00	Vhungu-Vhungu	1	100.0%
	2.00	Ngone	0	0.0%
	3.00	Muhopi	0	0.0%
	4.00	Katimba	0	0.0%
	5.00	Gove	0	0.0%
	6.00	Tjeye	0	0.0%
	7.00	Muroro	0	0.0%
	8.00	Mashare	0	0.0%
	9.00	shighuru 2	0	0.0%
	10.00	shikenge	0	0.0%
	11.00	Ndonga linena	0	0.0%
	12.00	Shankara	0	0.0%
	13.00	Kaduva	0	0.0%
	14.00	Karukuta	0	0.0%
	15.00	Guma	0	0.0%
	16.00	Katere	0	0.0%
	17.00	Kangongo	0	0.0%

18.00	Tjova	0	0.0%
19.00	Kake	0	0.0%
20.00	popa	0	0.0%
21.00	bagani	0	0.0%

Number Interviewed

		Value
Standard Attributes	Label	Number of people in the focused group
N	Valid	1
	Missing	0
Central Tendency and Dispersion	Mean	32.0000
	Standard Deviation	.
	Percentile 25	32.0000
	Percentile 50	32.0000
	Percentile 75	32.0000

Females in Group

		Value
Standard Attributes	Label	Number of females in the group
N	Valid	1
	Missing	0
Central Tendency and Dispersion	Mean	20.0000
	Standard Deviation	.
	Percentile 25	20.0000
	Percentile 50	20.0000
	Percentile 75	20.0000

Regional Leader Visits

		Value	Count	Percent
Standard Attributes	Label	Q 1.1 - 1.2 Number of times the Regional Leaders visited the village in the last 5 years		
Valid Values	1.00	none	0	0.0%
	2.00	once	1	100.0%

Engaging Regional Leaders

		Value	Count	Percent
Standard Attributes	Label	Q1.3 Number of times the Regional Leaders were engaged in discussion		
Valid Values	1.00	none	1	100.0%

Water Related Discussions

		Value	Count	Percent
Standard Attributes	Label	Q.1.4 Number of times the Regional Leaders were engaged on water technology innovations		
Valid Values	1.00	none	1	100.0%
	2.00	once	0	0.0%
	3.00	twice	0	0.0%

Amount Allocated to Water Resources

		Value	Count	Percent
Standard Attributes	Label	Q 1.5 - 1.8 How much has been allocated to Water in the Regional Budget		
Valid Values	1.00	None	1	100.0%
	2.00	Proposed but no allocation	0	0.0%
	3.00	Proposed and allocated	0	0.0%
	5.00	Allocated without proposing	0	0.0%

Engagement Methods

		Value	Count	Percent
Standard Attributes	Label	Q 1.9a -1.10 How do you seek an audience with the Regional Leaders		
Valid Values	1.00	Sent a letter	0	0.0%
	2.00	went physically to the offices	1	100.0%
	3.00	sent an emissary	0	0.0%

Responses by Regional Leaders

		Value	Count	Percent
Standard Attributes	Label	Q 1.9b How did the regional leaders respond to your requests for meeting		
Valid Values	1.00	Ignored our request	0	0.0%
	2.00	leader listened but did not provide resources	1	100.0%
	3.00	leader listened and provided resources	0	0.0%

Technical Team

		Value	Count	Percent
Standard Attributes	Label	Q1.11 Do you have committees to discuss problems in the village		
Valid Values	1.00	Not in place	0	0.0%
	2.00	No, but we would like to have them	0	0.0%
	3.00	No, we cannot afford to pay them	1	100.0%

Leadership

		Value	Count	Percent
Standard Attributes	Label	Q1.12 Impact of leadership on development		
Valid Values	1.00	Poverty eradication	0	0.0%
	2.00	Job creation	0	0.0%
	3.00	improved economic activities	0	0.0%
	4.00	sustainable development	0	0.0%
	5.00	all of the above	1	100.0%

Job creation

		Value
Standard Attributes	Label	Q1.13 How many jobs have been created
N	Valid	1
	Missing	0
Central Tendency and Dispersion	Mean	20.0000
	Standard Deviation	.
	Percentile 25	20.0000
	Percentile 50	20.0000
	Percentile 75	20.0000

Types of jobs

		Value	Count	Percent
Standard Attributes	Label	Q.1.13b Types of jobs created		
Valid Values	1.00	Gardening	1	100.0%
	2.00	Fencing	0	0.0%

Factors of Production

		Value	Count	Percent
Standard Attributes	Label	Q2.1 Factors affecting economic development in your village		
Valid Values	1.00	Water pumps/pipes and tanks (innovations)	0	0.0%
	2.00	Water innovations and related training	0	0.0%
	3.00	Water innovation technologies (WIT), training and fencing	0	0.0%
	4.00	water innovation technologies, training, fencing, information on developme	0	0.0%

	nt opportunities		
5.00	WIT, training, marketing, information on development opportunities	1	100.0%

Regional Leadership role

		Value	Count	Percent
Standard Attributes	Label	Q.2.3 What is the role of regional leaders in job creation and water innovations		
Valid Values	1.00	Water pumps/pipes and tanks (innovations)	0	0.0%
	2.00	Water innovations and related training	0	0.0%
	3.00	Water innovation technologies (WIT), training and fencing	0	0.0%
	4.00	water innovation technologies, training, fencing, information on development opportunities	0	0.0%

	5.00	WIT, training, marketing, information on development opportunities	0	0.0%
Missing Values	System		1	100.0%

Impact of Water Innovations

		Value	Count	Percent
Standard Attributes	Label	Q.2.4 Impact of Water innovation in wealth creation		
Valid Values	1.00	job creation	0	0.0%
	2.00	improve self reliance	0	0.0%
	3.00	reduce poverty	0	0.0%
	4.00	reduce inequality	0	0.0%
	5.00	all of the above	0	0.0%
Missing Values	System		1	100.0%

Critical success factors

		Value	Count	Percent
Standard Attributes	Label	Q2.7 Are regional leaders currently improving job creation through water innovation		
Valid Values	1.00	Yes	0	0.0%
	2.00	No	0	0.0%
Missing Values	System		1	100.0%

Leadership involvement

		Value	Count	Percent
Standard Attributes	Label	Q2.9 Are your leaders involved		
Valid Values	1.00	yes	0	0.0%
	2.00	No	0	0.0%
Missing Values	System		1	100.0%

Appendix B: Questionnaire uncoded

FOCUS GROUP QUESTIONS

Section A

Demography Information

(a) Number of respondents in a focus group

(b) Number of males

(c) Number of females

(d) Number of youths

(e) Number of disabled people

Section B

1. **What are the roles of leadership involvement in water technology innovations to enhance job creations ?**

1.1. Did your regional leaders visit your place (Village) within the last five (5) years? Yes/No

1.2. How many times the did the regional leaders visit your village ?

1.3. How many times were you engaged in discussion with regional leaders ? why ?

1.4. How many times have you discussed with regional leaders concerning water technology innovations at your village ? why ?

1.5. Did your regional leaders ever suggest the allocation of resources for water technology innovations ? Yes/No

1.6. If yes, how much was that ? if no why ?

1.7. Did the regional leaders really allocate financial resources to water technology innovation ? Yes/No

1.8. If yes how much was that ? if no why ?

1.9. What did you do as village leaders to seek an audience/engagement with the regional leaders concerning water technology innovations at your village ? What were the reactions of your regional leaders on the matter ?

1.10. Is there a technical group at your village, which is responsible to speak to regional leaders concerning the need of using water technology innovations to enhance job creation at your village ? Yes/No

1.11. Have this technical team managed to speak to the regional leaders on the need of using water technology innovations to enhance job creation at your village ?

1.12. How do you view leadership involvement or lack thereof in water technology innovations impact on job creation at your village ?

1.13. How many jobs have been created at your village by the use of water technology innovations ? why such a number ?

Section C

2. How does leadership involvement in water technology innovations contribute to job creation ?

2.1. How do you want regional leadership to be involved in water technology innovations in order to contribute to economic development of your village and Region in particular ?

2.2. How many times did you sit with your regional leaders to discuss the role of Leadership in water technology innovations to enhance job creation ? why ?

2.3. Do you think regional leadership has a role in water technology innovations to enhance job creation at your villages? Yes/No

2.4. Explain your answer?

2.5. Will water technology innovations use at your village contributes to wealth creation and reduce inequality ? Yes/No

2.6. In what way?

2.7. Is your Regional Leadership involved in water technology innovations to enhance job creation at your village ? Yes/No

2.8. Explain your answer ?

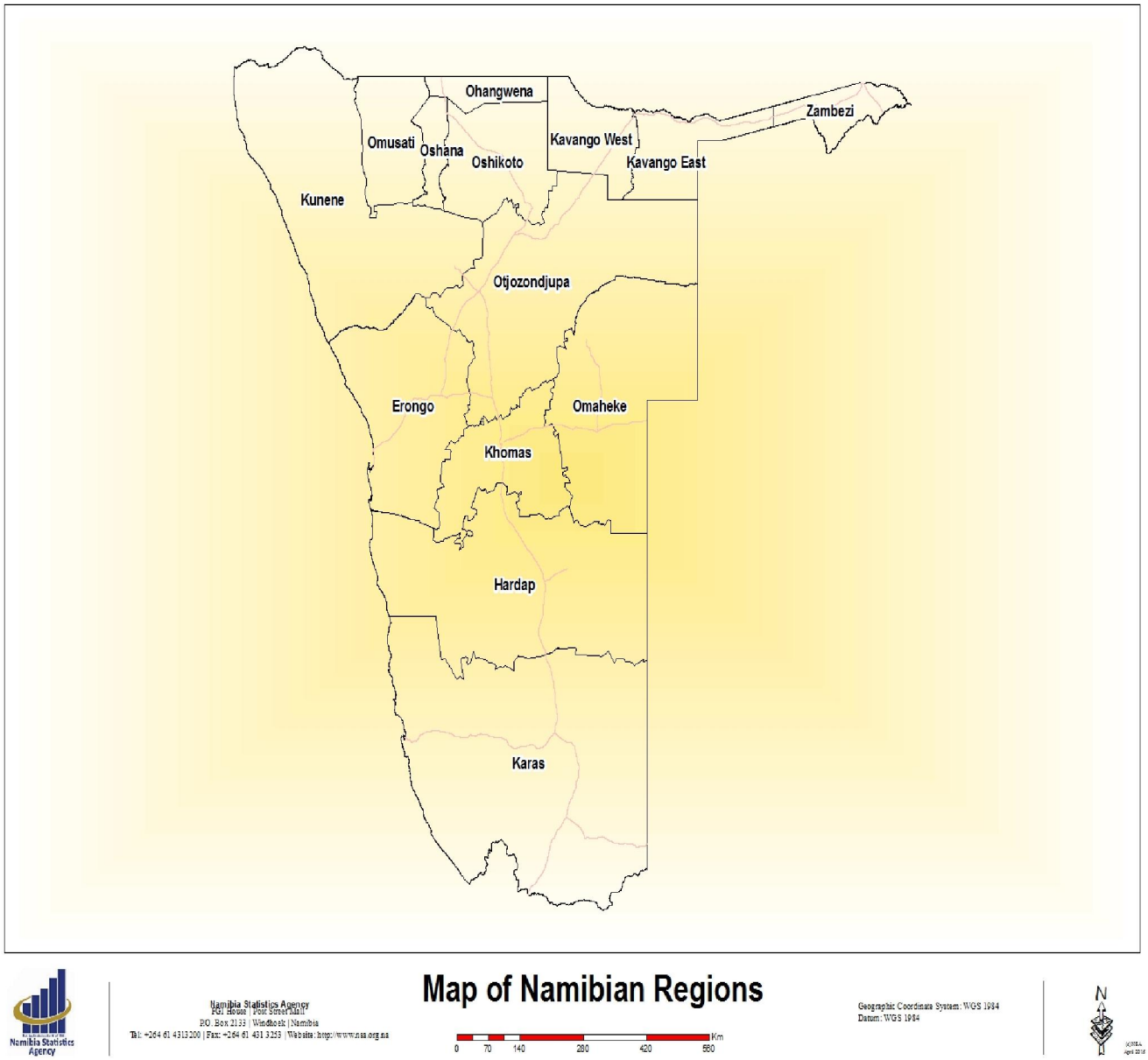
2.9. How is your regional leadership involved in water technology innovations to enhance job creation ?

Appendix C: Research Schedule

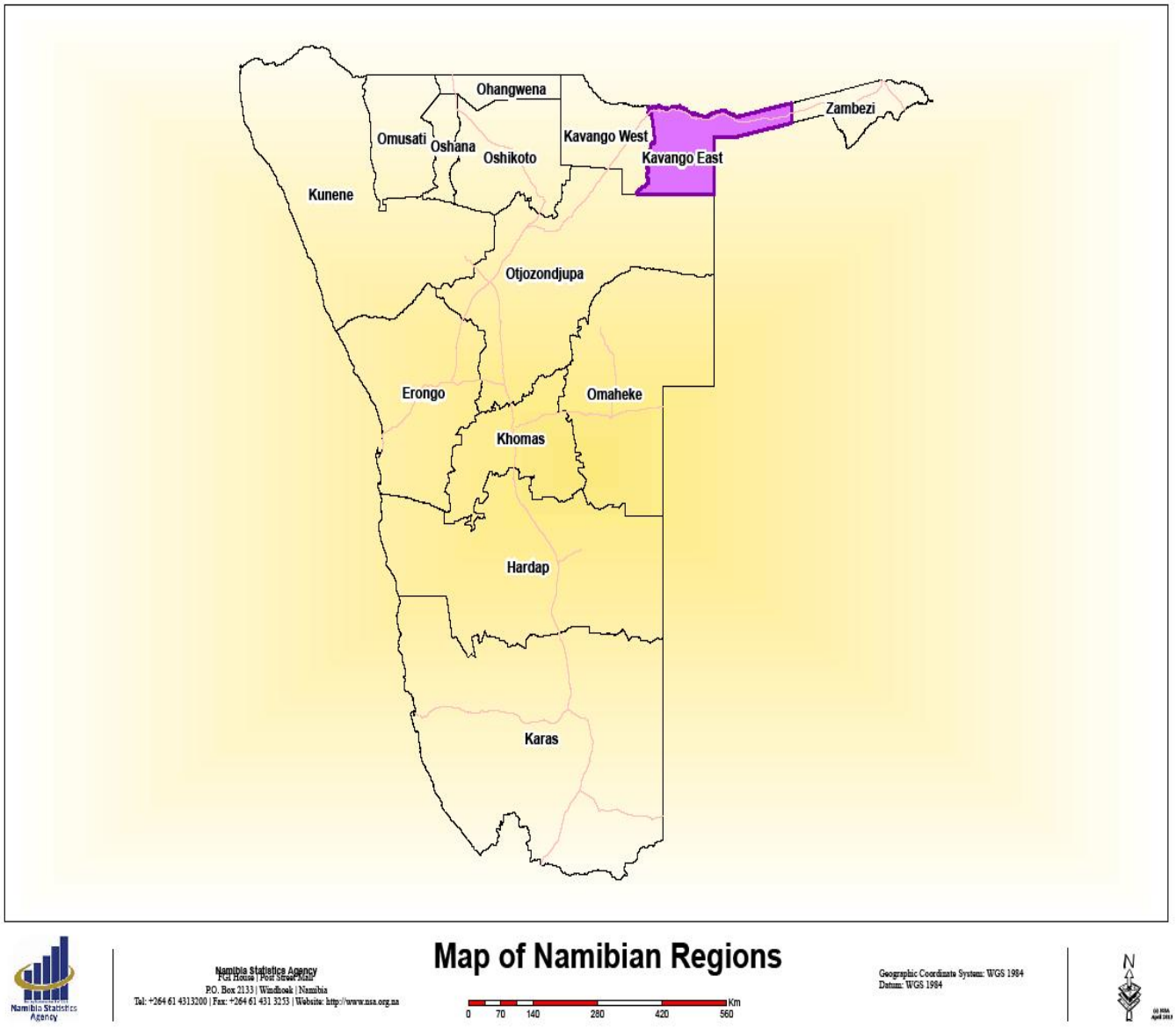
Constituency (Strata)	Village Interviewed	**Date**
Rundu Rural (4 Villages)	Vhungu-Vhungu	17/12/2015
	Ngone	17/12/2015
	Muhopi	17/12/2015
	Katimba	18/12/2015
Mashare (4 Villages)	Gove	18/12/2015
	Tjeye	18/12/2015
	Muroro	19/12/2015
	Mashare	19/12/2015
Ndonga Linena (4 Villages)	shighuru 2	19/12/2015
	Shikenge	20/12/2015
	Ndonga linena	20/12/2015
	Shankara	20/12/2015
Ndiyona (4 Villages)	Kaduva	21/12/2015
	Karukuta	21/12/2015
	Guma	21/12/2015
	Katere	22/12/2015

Mukwe (5 Villages)	Kangongo	22/12/2015
	Tjova	22/12/2015
	Kake	23/12/2015
	Popa	23/12/2015
	Bagani	23/12/2015
Total (21 Villages)		

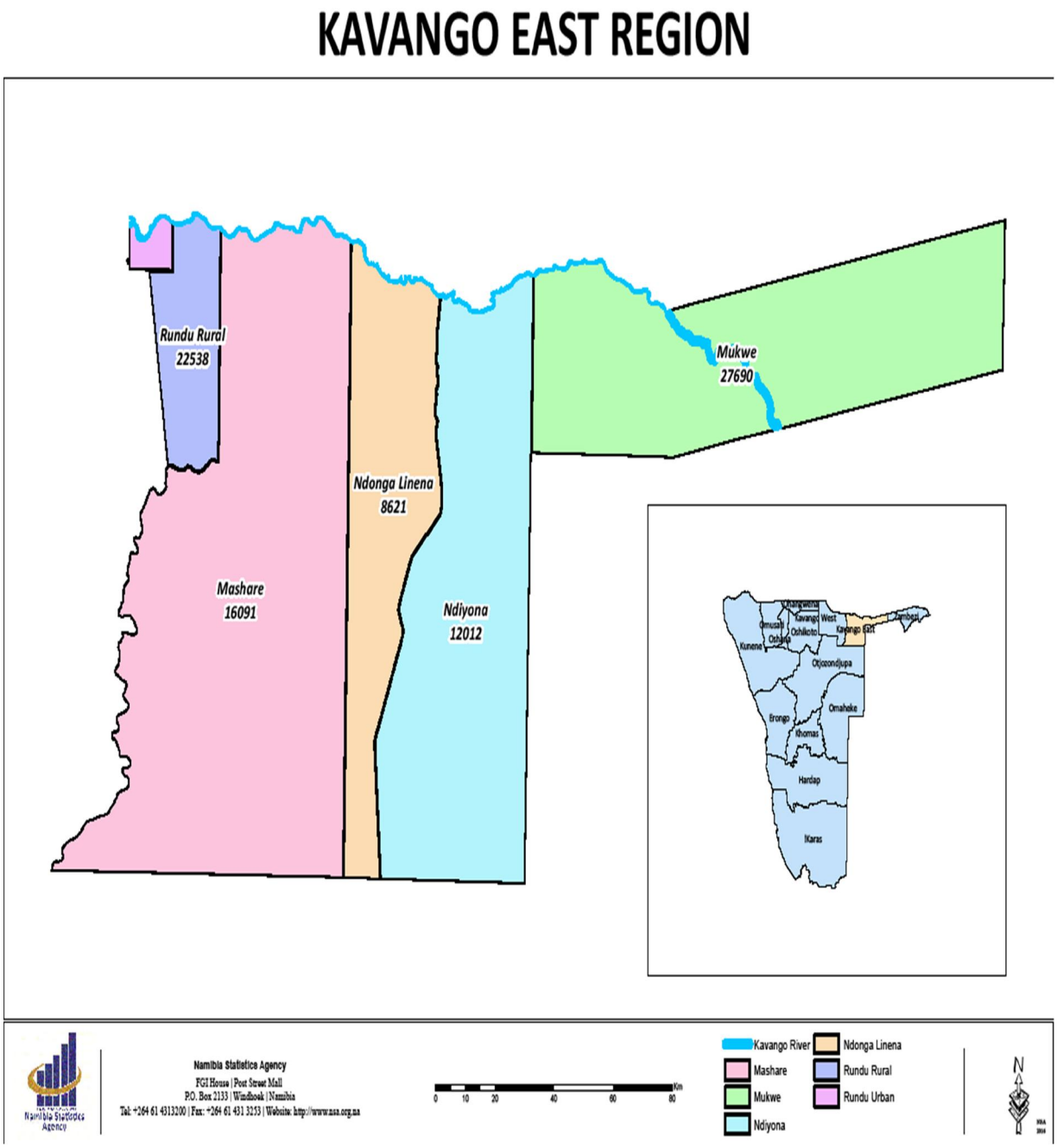
Appendix D: Namibia Maps in 14 Regions



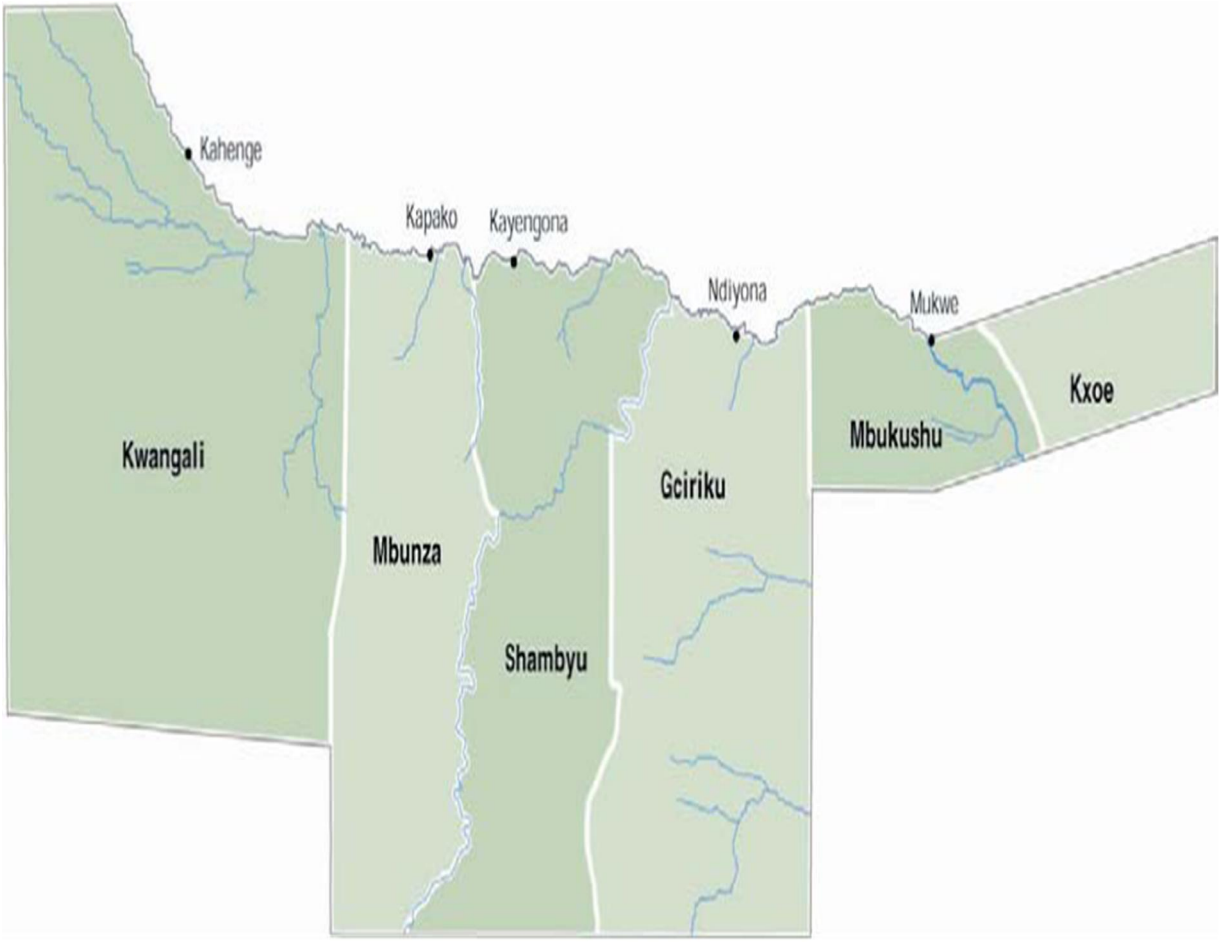
Appendix E: Map of the border Region of Kavango East Region



Appendix F: Map of Constituencies in Kavango East Region

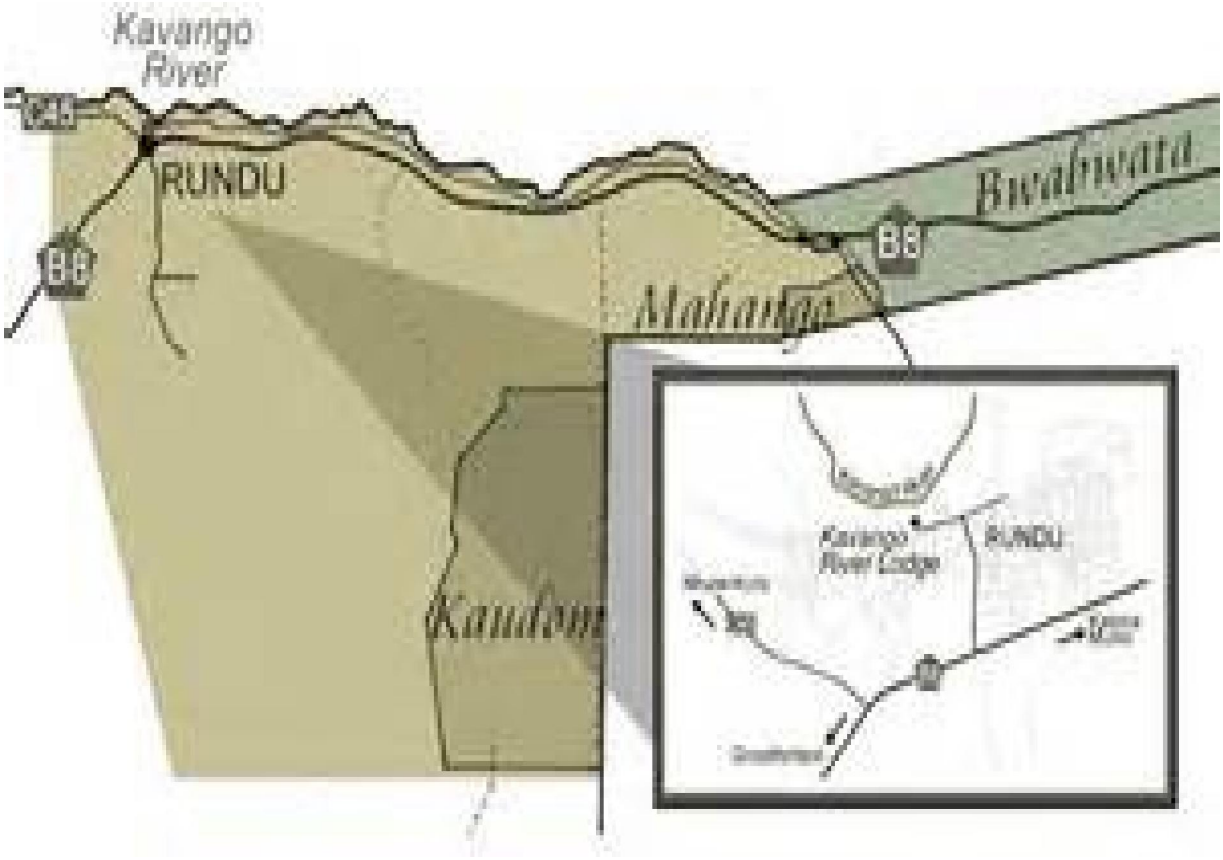


Appendix G: Map of Traditional Authorities' boundaries in Kavango East



Source: Mendelson(2009). The Kavango East Region covers three (3) Traditional Authority namely: Shambyu, Gciriku and Mbukushu, after the delimitation of 2013. Kxoe is not a traditional Authority.

Appendix H: Map of Kavango River



Sources: Mendelson (2009), the map of Kavango River as it inters into Botswana land.

Appendix I: Letter of Request to conduct research

Mr. Romanus Kavindame Kawana
P.O. Box 20815
Windhoek

TO: Mr. Sebastian Kantema
Chief Regional Officer
Kavango Regional Council

DATE: 30 November 2015

SUBJECT: PERMISSION TO CONDUCT A RESEARCH IN REGIONAL COUNCIL EAST REGION

The above mentioned subject has reference.

This note serves to humble request your good office on the above stated matter. I'm currently facing towards accomplishing a Doctorate Degree in Business Administration with the University of Namibia (UNAM). However, as you may be aware, that at this level a thesis (Research) is a prerequisite for this program.

Due to the interest in the well-being of the Namibian people and Kavango East Region in particular, it has necessitated me to carry out a research within the great Kavango East Region. Please take note that this research is designed for academic purpose only and it will be used as such. The topic of my research is **An INVESTIGATION INTO THE ROLE OF LEADERSHIP IN WATER TECHNOLOGY INNOVATIONS TO ENHANCE JOB CREATION: IN KAVANGO EAST REGION.** The research will cover 20 randomly selected villages within the Kavango East Region. At each village a Headman/Headwoman plus at least 7 elders of the village will be involved in the focus group discussion.

The research is expected to be conducted between 15th December 2015 and End March 2016. For any enquiries from the University's side please do not hesitate to contact Dr. Albertus Isaacs, the Associate Dean at the Namibia Business School, at 081 4948 869, or 061 413 500.

Your considerations in this matter will be appreciated.

Yours faithfully,

Mr. Romanus. K. Kawana
Student number: 201401534

Appendix J: Letter of Permission to conduct research

REPUBLIC OF NAMIBIA
OFFICE OF THE REGIONAL GOVERNOR
KAVANGO EAST REGION

Tel : 066-267243/8
Fax : 066-255 036
Enq : Immy Garosab PA)
Email. Immagaro7@gmail.com

Private Bag 2124
Rundu
NAMIBIA
11 December 2015

Mr Romanus Kavindame Kawana
P.O.Box 20815
WINDHOEK

Dear Mr Kawana

SUBJECT: PERMISSION TO CONDUCT A RESEACH IN KAVANGO EAST REGION BETWEEN 15 DECEMMBER 2015 TO END MARCH 2016

The Office of the Governor hereby acknowledge receipt of your request to be permitted to conduct the research (An Investigation into the role of leadership in water technology innovations to enhance job creation in Kavango East Region)

Your request for permission to conduct the above-mentioned research is hereby granted.

Hon Governor also granted your request for a courtesy call to his office on 16 December, 14H30

Please accept the assurance of my highest esteem.

AMB DR SAMUEL K MBAMBO
GOVERNOR
KAVANGO EAST REGION

OFFICE OF THE GOVERNOR
PRIVATE BAG 2124
2015 -12- 11
RUNDU
KAVANGO EAST REGION

Appendix K: SPSS-Raw Materials Crosstabs: the Role of leadership Responses

Table 6.1 Demographic Profile of the Village Focused Groups Interviews

Constituency (Strata)	Village Interviewed	Number of people in the focused group	Number of females in the group
Rundu Rural (4 Villages)	Vhungu-Vhungu	32	20
	Ngone	23	19
	Muhopi	40	32
	Katimba	18	13
	Total	**113**	**84**
Mashare (4 Villages)	Gove	21	19
	Tjeye	48	40
	Muroro	27	21
	Mashare	31	27
	Total	**127**	**107**
Ndonga Linena (4 Villages)	shighuru 2	60	46
	Shikenge	28	24
	Ndonga linena	18	16
	Shankara	34	28
	Total	**140**	**114**
Ndiyona (4 Villages)	Kaduva	24	14
	Karukuta	41	28
	Guma	36	28

	Katere	39	30
	Total	**140**	**100**
Mukwe (5 Villages)	Kangongo	29	22
	Tjova	48	41
	Kake	63	55
	Popa	63	40
	Bagani	54	45
	Total	**257**	**203**
Total (21 Villages)		**777**	**608**

Table 6.2 Correlation of leadership and distance from Urban Centre

Constituency	Village Codes	Range Rundu Town in Kilometers
Rundu Rural	1 – 4	15 - 25 Km
Mashare	5 – 8	26 -70 Km
Ndonga Linena	9 – 12	71 - 80 Km
Ndiyona	13 – 16	81 - 140 Km
Mukwe	17 – 21	141 - 222 Km

Table 6.3 Mean and Standard Deviation of jobs created, number of people in the focus group and number of female in the group

	N	Minimum	Maximum	Sum	Mean	Std. Deviation
Q1.13 How many jobs have been created	21	.00	101.00	458.00	21.8095	22.07627
Number of people in the focused group	21	18.00	63.00	777.00	37.0000	14.31782
Number of females in the group	21	13.00	55.00	608.00	28.9524	11.60378
Valid N (listwise)	21					

4. The role of leadership in water technology innovations

Table 6.4 Spearman's Correlations of variables

Spearman's rho

	Village Code	Q 1.1 - 1.2 Number of times the Regional Leaders visited the village in the last 5 years	Q1.3 Number of times the Regional Leaders were engaged in discussion	Q.1.4 Number of times the Regional Leaders were engaged on water technology innovations	Q 1.5 - 1.8 How much has been allocated to Water in the Regional Budget	Q 1.9a -1.10 How do you seek an audience with the Regional Leaders	Q 1.9b How did the regional leaders respond to your requests for meeting	Q1.11 Do you have committees to discuss problems in the village	Q1.12 Impact of leadership on development	Q.1.13b Types of jobs created
Q1.3 Number of times the Regional Leaders were engaged in discussion	.576**	.706**								
	,01	,00								
Q.1.4 Number of times the Regional Leaders were engaged on water technology innovations	.484*	.607**	.695**							
	,03	,00	,00							
Q 1.5 - 1.8 How much has been allocated to Water in the Regional Budget				.487*						
				,03						
Q 1.9b How did the regional leaders respond to your requests for meeting						.496*				
						,02				
Q1.11 Do you have committees to discuss problems in the village							-.440*			
							,05			
Q1.12 Impact of leadership on development	.740**						.497*	-.439*		
	,00						,02	,05		
Q2.1 Factors affecting economic development in your village					.482*					.594**
					,03					,00
Q.2.4 Impact of Water innovation in wealth creation										.548*
										,01
Kavango Regional Constituency	.980**		.581**	.544*					.731**	
			,01	,01					,00	

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Table 6.5 Role of Leadership in Water Technology Innovations

Variable	Description	Frequency	Percentage
Number of times the Regional Leaders visited the village in the last 5 years	None	7	33.3%
	Once	3	14.3%
	Twice	2	9.5%
	Three	1	4.8%
	Four Time	0	0.0%
	Five Or More	8	38.1%
Number of times the Regional Leaders were engaged in discussion	None	7	33.3%
	Once	5	23.8%
	Twice	2	9.5%
	Three	1	4.8%
	four time	0	0.0%
	five or more	6	28.6%
Number of times the Regional Leaders were engaged on water technology innovations	None	12	57.1%
	Once	2	9.5%
	Twice	2	9.5%
	Three	1	4.8%
	four time	0	0.0%
	five or more	4	19.0%
How much has been	None	9	42.9%

allocated to Water in the Regional Budget	Proposed but no allocation	12	57.1%
	Proposed and allocated	0	0.0%
	Allocated without proposing	0	0.0%

Table 6.6 Leadership Communication in Water Technology Innovations

Variable	Description	Frequency	Percentage
How do you seek an audience with the Regional Leaders	Sent a letter	3	14.3%
	Went physically to the offices	13	61.9%
	Did not contact the leaders	5	23.8%
How did the regional leaders respond to your requests for meeting	Ignored our request	2	9.5%
	leader listened but did not provide resources	16	76.2%
	leader listened and provided resources	0	0.0%
	not applicable	3	14.3%
Do you have committees to discuss problems in the village	Not in place	7	33.3%
	No, but we would like to have them	1	4.8%
	No, we cannot afford to pay them	7	33.3%
	Yes it is in place and organised	6	28.6%
Impact of leadership on	Poverty eradication	0	0.0%

development	Job creation	0	0.0%
	improved economic activities	0	0.0%
	sustainable development	0	0.0%
	all of the above	11	52.4%
	not aware	10	47.6%

Table 6.7 Jobs Created

	N	Minimum	Maximum	Sum	Mean	Std. Deviation
Q1.13 How many jobs have been created	21	0	101.00	458.00	21.8095	22.07627

Table 6.8 Types of jobs created and factor affecting economic development

Variable	Description	Frequency	Percentage
Types of jobs created	No initiatives	3	14.3%
	Gardening & manual irrigation	18	85.7%
Factors affecting economic development in your village	Water pumps/pipes and tanks (innovations)	1	4.8%
	Water innovations and related training	1	4.8%
	Water innovation technologies (WIT), training and fencing	1	4.8%
	water innovation technologies, training, fencing, information on development opportunities	6	28.6%
	WIT, training, marketing, information on development opportunities	12	57.1%
Do Regional leaders have a role to play in job creation and water innovations	Yes	21	100.0%
	No	0	0.0%
Impact Of Water Innovation In Wealth Creation	Job Creation	1	4.8%
	Improve Self Reliance	0	0.0%
	Reduce Poverty	0	0.0%
	Reduce Inequality	0	0.0%
	All Of The Above	20	95.2%

Q 1.1 - 1.2 Number of times the Regional Leaders visited the village in the last 5 years * Kavango Regional Constituency Crosstabulation...