The impact of rural water supply and sanitation programmes in Chivi District, Zimbabwe

UNIVERSITY OF ZIMBABWE

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DEPARTMENT OF CIVIL ENGINEERING

In collaboration with

THE IMPACT OF RURAL WATER SUPPLY AND SANITATION PROGRAMMES IN CHIVI DISTRICT, ZIMBABWE

by

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A thesis submitted in partial fulfilment of the requirements for the degree of Master of Science in Integrated Water Resources Management of the University of Zimbabwe

July 2010
DECLARATION

I, Vimbayi Rosemary Machiwana, declare that this research report is my own work. It is being submitted for the degree of Master of Science in Integrated Water Resources Management (IWRM) in the University of Zimbabwe. It has not been submitted before for any degree of examination in any other University.

Date: ____________________

Signature: ____________________
The findings, interpretations and conclusions expressed in this study do neither reflect the views of the University of Zimbabwe, Department of Civil Engineering nor of the individual members of the MSc Examination Committee, nor of their respective employers.
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LIST OF SYMBOLS AND ABBREVIATIONS

AGRITEX  Agricultural Extension Department
DDF    District Development Fund
DFID  Department of Foreign and International Development
IRWSSP Integrated Rural Water Supply and Sanitation Programme
JMP  Joint Monitoring Programme
MDGs  Millennium Development Goals
MHCW  Ministry of Health and Child Welfare
NAC  National Action Committee
NGOs  Non Governmental Organisations
NMPWSS National Master Plan for Rural Water Supply and Sanitation
O&M  Operation and Maintenance
PHHE  Participatory Health and Hygiene Education
RDC  Rural District Council
SLF  Sustainable Livelihoods Framework
VIP  Ventilated Improved Pit Latrine
WSS  Water Supply and Sanitation
WVZ  World Vision Zimbabwe
ZWP  Zvishavane Water Project
Mum, dad, Aunt Precious, thank you for believing in me,
You never gave up on me,
My sisters and brothers, you have been my pillars of strength throughout,
I could lean on you anytime,
My boyfriend, Arnold, I love you dearly,
You encouraged me till the end, I appreciate it
My baby, I can’t wait to see you, you came at the right time,
I know I can afford to buy you ice cream anytime you want it. I LOVE YOU
To God, I have never had a faithful friend like you, I will always praise your name
And draw my wisdom from you
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The effectiveness of development activities in water and other sectors can be improved through a broad-based analysis of livelihoods and the factors that influence them, including the wider ‘vulnerability context’ in which people live. It is also important to ascertain the role that water resources play in combination with other ‘assets’ to support economic and human activities. A research study was carried out between December 2009 and April 2010. Its aim was to assess the impact made by the water supply and sanitation programmes implemented by Zvishavane Water Project and World Vision Zimbabwe in Chivi District of Zimbabwe since 2005. Wards 7, 9 and 15 were studied. Ward 9 and 15 had water supply and sanitation programmes, while Ward 7 had no water supply and sanitation programme since the IRWSSP. This allowed comparison of livelihoods between the wards which had programmes and that which did not. The impact was assessed in terms of design, functionality, usage and livelihoods. The design, functionality and usage were assessed using design criteria obtained from literature, while the Sustainable Livelihoods Framework (SLF) was used to assess impact made on the livelihoods of the rural poor.

The methods used to collect data were household survey, in which 90 households were interviewed per ward in the three wards. Focus group discussions with men, women, youths and water point committees in each ward were done as well as field visits and observations. Key informant interviews were done with staff from Agricultural Extension (AGRITEX), District Development Staff (DDF), Ministry of Health and the Rural District Council (RDC). Six school headmasters were interviewed to ascertain the impact made by the programmes and diarrheal and cholera disease prevalent records were obtained from three health centres.

The results obtained show that Wards 9 and 15 had a better choice of water technologies (Elephant Pump and Windlass respectively and B-type bush pump for both), which were low cost and therefore better designs than Ward 7, which only had the B-type bush pump. Functionality and usage was high in the three wards. Impact has been made by water supply and sanitation programmes implemented by ZWP and WVZ in Ward 9 and 15 compared to Ward 7 which has not had a programme. The physical, natural and human capitals were more supported by water supply and sanitation programmes, than the social and financial capitals.

It was concluded that the design of water and sanitation facilities influences functionality and use of the facilities. This subsequently affects the impact made by the facilities. The financial and social capitals are not rooted firmly in water supply and sanitation programmes, unlike the physical, natural and human capitals. The study therefore recommends that NGOs should implement, with support from Government, more of low cost technologies, which communities can look after using locally available materials as this will ensure sustainability and therefore sustained impact. Extensive geological surveys should be done before water point development to ensure that wells have a greater depth and therefore yield more. This will enable use of water for productive purposes which encourage continued functionality of water points, thereby ensuring sustainable impact.

Key words: water supply and sanitation, Chivi, Sustainable Livelihoods Framework
1. INTRODUCTION

1.1 Background
A livelihoods approach that puts people at centre stage should be advocated rather than one which puts emphasis on the water resources they use (Calow and Nicol, 2005). This has not always been the case in the past as a concern with water resources themselves has tended to detract attention from the more important issue of how water is accessed and used, in combination with other assets, to sustain livelihoods. Developing an understanding of the role water plays in supporting livelihoods through health, economic (production and income) and environmental effects and linkages makes it much easier to predict the effects on different groups of water interventions (DFID, 1994). This, in turn, can indicate which types of water activities can do the most to reduce poverty (Majale, 2002; Calow and Nicol, 2005).

Gandure and Drimie (2007) noted that rural interventions by NGOs in Zimbabwe to provide access to safe drinking water have clearly helped, however, many households still relied on unsafe water sources such as rivers and dams, and coverage needs to improve. Water for productive purposes remained an issue and supply options and water conserving irrigation options needed to be assessed and promoted so as to improve livelihoods. More opportunities for home-based activities due to improved access to water lead to improved employment, productivity and incomes. Non-water-based livelihood activities are possible because of time savings, better health and opportunities to invest expenditure savings (Moriaty et al., 2004). Opportunities for water-based livelihood activities are increased which improve incomes because people can access improved (more reliable, greater quantity) supplies. Improved incomes lead to improved status, for example, of women when their economic contribution to the household is visibly improved. In a study carried out in Gaja, Ethiopia on impact of a water supply and sanitation programme, about 88% of beneficiary households asserted that their food security status and livelihoods had improved following water supply interventions, most particularly in terms of household health and income diversification (Tolossa, and Tafesse, Undated). In Eastern Sierra Leone, sustainable livelihoods were ensured through rendering the population healthy enough to work as a result of a water supply and sanitation programme, such that they now have livelihood schemes in the forms of beekeeping and sewing (IHSA, 2008). Rautanen et al., (2006) documented in Tanzania, a case study on Joyce Mtenda Chitunda of how the introduction of improved water and sanitation services in Nala enabled her to set up a small business. She has opened a small café next to the road from Dodoma which serves breakfast, lunch and drinks to villagers and truck drivers. This shows how the programmes have been able to empower women. The examples show that access to sufficient and safe water and sanitation on a sustainable basis will help in the various dimensions of food security reducing vulnerability to shocks, increasing food availability and access and enhancing utilisation by improving health and sanitation. These, in turn, enhance the wellbeing and food security status of people.
Several studies have been carried out on different aspects of rural water supply and sanitation programmes implemented by NGOs in Zimbabwe. Demberere et al., (2006) conducted an evaluation of the sustainability of a water supply and sanitation project in Mt Darwin District of Zimbabwe. Katsi (2006) did an assessment of factors which affect multiple uses of water and their impact on the sustainability of rural water supply sources. Mazango (2008) carried out a study on whether communities can maintain, manage and sustain their water supplies with minimal support from Government and NGOs in rural Zimbabwe (Kadoma District). Little academic studies have been done to assess impact of water supply and sanitation programmes on livelihoods, except through midterm and end of term evaluations, where they measure impact in terms of number of facilities installed. Elsewhere in the world, impact studies have been done in water supply and sanitation, but have mostly focused on health, education, employment and evaluated the sustainability of water supply and sanitation interventions and not the entire livelihoods package through the use of the Sustainable Livelihood Approach. An example is Rauniyar (2009), who did a study on the impact of Rural Water Supply and Sanitation in Panjub, Pakistan.

Calow and Nicol (2005) and DFID (1999) said the effectiveness of development activities in water and other sectors can be improved through a broad-based analysis of livelihoods and the factors that influence them, including the wider ‘vulnerability context’ in which people live (e.g. vulnerability to floods, drought, and seasonal changes), and the role resources such as water play, in combination with other ‘assets’, in supporting economic and human development. Poverty-related indicators (rather than water supply coverage, for example) therefore become the benchmark against which impacts and outcomes are measured. This is the basis upon which this study was built. It looked at livelihood improvements brought about by the WSS programmes implemented by NGOs in Chivi District, under Masvingo Province in Zimbabwe. Most water and sanitation programmes in Zimbabwe mostly focus on the provision of water for domestic purpose only without imagining how the whole package of water for domestic and productive purpose would improve rural livelihoods. Despite this fact, communities in Chivi District use the facilities that they have for productive purposes and this study tries to assess the impact that this has had on the livelihoods of the people in the district. This will allow for recommendations to be made on how important it is to design programmes that are focused on livelihood improvement, through provision of adequate water for productive purposes.

1.2 Problem statement
Different NGOs have made efforts to increase access to water supply and sanitation through provision of shallow wells, boreholes, rehabilitation of existing water points, and provision of material for latrine construction and participatory health and hygiene education in Chivi District. Although the programmes were designed to provide domestic water (ZWP, 2008; WVZ 2006), some communities with adequate supplies use the water for productive purposes and it is worth developing an understanding of the role water plays in supporting livelihoods through health, economic (production and income), capacity building and societal changes. This is because few studies have been done to assess impact of these programmes on the livelihoods of beneficiaries. The few that have been done have focused on impact on health, which has been widely accepted (Cairncross et al., 2003; Calow and Nicol, 2005; UN, 2009), while the other impacts like
capacity building, education, productivity and income and societal changes are not well documented (ODI, 2002; Cairncross et al., 2003).

1.3 Research objectives
1.3.1 Main objective
To evaluate the impact of water supply and sanitation provision programmes implemented by NGOs in Chivi District of Zimbabwe since 2005.

1.3.2 Specific objectives
1. To evaluate water supply and sanitation programmes implemented by World Vision Zimbabwe and Zvishavane Water Project in Chivi District since 2005 in terms of design, functionality and usage.
2. To make a comparative analysis of the impact of water supply and sanitation programmes in three wards using the Sustainable Livelihoods Framework.

1.4 Scope and limitations
Chivi District has 31 Wards, but the study was carried out in three wards only. Two wards had WSS programmes which were implemented by World Vision and Zvishavane Water Project since 2005 and these were Wards 9 and 15. The third ward was Ward 7 and had never had water supply and sanitation programmes implemented by NGOs, except during the IRWSSP which was designed to end in 2005. This allowed better assessment of impact made through comparison between the wards with intervention and that without. Improved and unimproved water supply and sanitation systems have been defined by WHO/UNICEF in the Global Water Supply and Sanitation Assessment Report of 2000 (UNEP, 2003). The following technologies, in Table 1.1 were included in the assessment as representing "improved" and “not improved” water supply and sanitation and they shall be used in the study as such.

Table 1.1 Improved and unimproved water supply and sanitation according to UNEP (2003) classification

<table>
<thead>
<tr>
<th>WATER SUPPLY</th>
<th>SANITATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;improved&quot;</td>
<td>&quot;not improved&quot;</td>
</tr>
<tr>
<td>Household connection</td>
<td>Unprotected well</td>
</tr>
<tr>
<td>Public standpipe</td>
<td>Unprotected spring</td>
</tr>
<tr>
<td>Borehole</td>
<td>Vendor-provided water</td>
</tr>
<tr>
<td>Protected dug well</td>
<td>Bottled water*</td>
</tr>
<tr>
<td>Protected spring</td>
<td>Tanker truck-provided water</td>
</tr>
<tr>
<td>Rainwater collection</td>
<td>water</td>
</tr>
<tr>
<td>Connection to a public sewer</td>
<td>Service or bucket latrines</td>
</tr>
<tr>
<td>Connection to septic system (where excreta are manually removed)</td>
<td>Public latrines</td>
</tr>
<tr>
<td>Pour-flush latrine</td>
<td>Latrines with an open pit</td>
</tr>
<tr>
<td>Simple pit latrine</td>
<td>Ventilated improved pit latrine</td>
</tr>
</tbody>
</table>

* Considered as "not improved" due to concerns about the quantity of supplied water, not over the water quality.

Source: UNEP, 2003

The options for improved water supply in the selected three wards are boreholes and protected dug wells, while for sanitation, it is the simple pit latrine and the ventilated improved pit latrine.
1.5 Structure of the Thesis

The study is organized into five chapters. Chapter one contains the Introduction, which gives a picture of the water supply and sanitation sector in Zimbabwe in relation to livelihoods and also tries to identify the gap the provision of water supply and sanitation services based on literature in order to bring out the purpose of the study. The problem statement, objectives, scope of the study and justification are also contained in this Chapter. Chapter two has literature review on the development of rural water supply and sanitation in Zimbabwe, impact of water and sanitation programmes in the context of Millennium Development Goals (MDGs), livelihood indicators of water supply and sanitation programmes and the analytical framework of the study. Chapter three gives a summary of the study area, in terms of the geographical location, population size and distribution, livelihood options of the people in Chivi District, and water supply and sanitation facilities available in Wards 7, 9 and 15. It also contains materials and methods used to sample, collect and analyse data for the study in order to fulfil the objectives. Chapter four gives a presentation of the results and discussions, according to the objectives. Chapter five gives conclusions and recommendations as per objective.
2. LITERATURE REVIEW

2.1 Global, regional and Zimbabwe’s water and sanitation situation

The world’s population is about 6.8 billion (PRB, 2009) and approximately 884 million, about 13% of the world’s population are without improved water supply (WHO/UNICEF JMP, 2010). Sub-Saharan Africa accounts for over a third of that number and is lagging behind in terms of progress towards the achievement of MDG 7 target 10, with only 60% of the population using improved sources of drinking water (WHO/UNICEF JMP, 2010). Figure 2.1 shows the distribution of the 884 million without access to improved water supplies across the regions.

Figure 2.1 Regional distributions of the 884 million people not using improved drinking water sources in 2008. The figures are in millions. Source: WHO/UNICEF JMP, (2010)

Figure 2.1 shows that 37% of people using unimproved drinking water sources in 2008 live in Sub Saharan Africa. In terms of access to sanitation, 2.6 billion, approximately 38 percent of the world’s population, are without improved sanitation (Moe and Gangarosa, 2009, WHO/UNICEF JMP, 2010). Figure 2.2 shows the regional distributions of the 2.6 billion without access to sanitation.

Figure 2.2 Regional distributions of the 2.6 billion people not using improved sanitation facilities in 2008. Figures are in millions. Source: WHO/UNICEF JMP, (2010)

The Figure shows that 72% of the people that do not have access to improved sanitation live in Asia, while Oceania has the least figure which translates to 0.2%. Coverage is higher in urban than rural areas for both water supply and sanitation in most countries (UN, 2009).
In Zimbabwe, 85% of the total population of 11.6 million had access to improved water supply, while 68% had access to improved sanitation in 2000 (WHO, 2000). Coverage for safe water supply in the urban areas was 100% and 77% in rural areas, while improved sanitation was at 99% and 51% in urban and rural areas respectively (WHO, 2000). However, the progress in improvement in rural sanitation coverage in Zimbabwe has been adversely affected in the last eight years because of the country’s economic challenges.

Some efforts have been made to improve access to water supply and sanitation. The first collaborative international effort to create significant impacts on the global water and sanitation situation came from the First International Drinking Water Supply and Sanitation Decade (1981–1990) which had limited success (Moe and Gangarosa, 2009). However, new innovations exist that may lead to greater success in the second decade of the International Decade for Action: Water for Life (2005–2015). These include increases in public-private partnerships, investments by large corporations, more community-based organizations and non-governmental organizations (NGOs) that work on improving access to water and sanitation (Moe and Gangarosa, 2009).

At the United Nations Summit in September 2000, 189 UN Member States adopted the Millennium Declaration, from which emerged the Millennium Development Goals (MDGs) (Toubkiss, 2006). The MDGs form a set of political commitments aimed at tackling the major development issues faced by the developed and developing world, within a fixed deadline. Whilst almost all the MDGs can be indirectly linked to water supply and sanitation (WSS) issues, Goal 7 on environmental sustainability addresses them directly. One of its targets, Target 10, is to “halve by 2015 the proportion of people without sustainable access to safe drinking water and basic sanitation”.

Although there is progress towards meeting the targets in the Millennium Development Goals (MDGs) related to water and sanitation, achieving universal access to safe water and improved sanitation will require time and considerable investment in most regions (Konkagul, 2009). With the exception of sub-Saharan Africa, the world is well on its way to meeting the drinking water target by 2015, but progress in sanitation is stalled in many developing regions (Jong-Wook and Bellamy, 2004). According to Konkagul (2009), Estonia, Italy, the Netherlands, Spain, Finland and Uruguay are the countries that have already reached this goal. It is recommended also that countries should identify or establish an institutional base for water and sanitation and prioritize investment for it where needs are greatest and the impacts likely to be most substantial, for example in health centres, schools and workplaces. Both financial and human resources are required for both water and sanitation, together with more community involvement and an emphasis on low cost technology options (UN, 2006).

Actions to meet the water and sanitation targets have been done, but there is need for them to focus on impact on livelihoods and not just on the construction of facilities. Calow and Nicol (2005) argued that a preoccupation with the epidemiological impacts of water supply projects has distorted water supply interventions over many years. A focus on wider water supply-livelihood linkages, for example through impacts on household labour and income generation, would lead to changes in the way water supply activities are conceived and implemented. This demands better quality socio-economic data on time expenditure, relative costs of time for other activities, patterns of labour demand
within households, intra-household decision making on the division of labour (who benefits, who loses), what the increasing availability of water at a household level means in terms of priority usage, and how this translates into income, health, education and other benefits. Thus impact of services delivered should be assessed at local levels and community innovations to cope with change and disasters identified so that Governments and NGOs can build upon them (UN, 2009).

2.2 Rural water supply and sanitation developments in Zimbabwe

After attaining independence in 1980, the Zimbabwe Government recognised the priority for development and uplifting of the long neglected rural communities in development by giving them access to safe water and improved sanitation. It embarked on the IRWSSP guided by a National Master Plan for Water Supply and Sanitation (NMPWSS). The IRWSSP was coordinated by the National Action Committee (NAC), which was made up of all key Government agencies. The NAC is duplicated at both Provincial and District levels through the Provincial and District Water and Sanitation subcommittees to ensure continuity in the coordination of the programme (Makasi, 1998). The NMPWSS was prepared through the Ministry of Energy, Water Resources and Development in December 1985. It aimed at providing guidance to the availability, reliability and quality of the national water resources and sanitation facilities and the variations in demand throughout the rural areas. Special consideration was given to communal lands and resettlement areas (MWRD, 1983). Its specific objectives were to:

1. Provide an organized inventory of available resources within the sector
2. Provide an organized inventory of existing water supply and sanitation facilities and ongoing schemes
3. Assess water demand for domestic, village, gardening and livestock consumption
4. Formulate standard schemes and strategies that will best serve the needs of the population in the rural areas, and which are in accordance with realistic social, technical and economic goals, yet preserving the flexibility required to integrate the diverse functions and approaches of the various institutions operating within the sector
5. Formulate training proposals and organisation of structures that will ensure the necessary manpower is available for implementation and future operation and maintenance
6. Formulate a strategy for a National Rural Sanitation programme and proposals for public health education
7. Formulate phased development programmes on a priority basis

The NMPWSS makes specific recommendations on inter Ministerial cooperation and planning and provides specific guidelines for the implementation of National Water Supply and Sanitation Programmes (MWRD, 1983).

Butcher (1990) stated the goal of the IRWSSP as laid out in the NMWSS as follows:

- ‘To provide the entire population in the communal and resettlement areas with access to safe (quality) and adequate (quantity) water supply and sanitation facilities by the year 2005 in a cost-effective way’

Its specific objectives were as follows:

1. Piped water supplies. To implement the phased construction (or upgrading where possible and appropriate) of 576 piped water supplies to service the domestic...
needs of an estimated 330,000 people living in growth points, districts and rural service centres and selected resettlement areas by the year 2005.

2. Primary water supplies. To implement on (or upgrading where possible and appropriate) of 36,000 primary water supplies (i.e. boreholes, protected hand dug wells, protected springs and roof rainwater catchment) to serve an estimated 8, 6 million people by the year 2005. The water supplies were supposed to achieve 100% coverage.

3. Ventilated improved pit latrines. To construct 1, 4 million ventilated improved pit latrine (at a construction rate of 80,000 VIPs per annum) reaching the entire population in the communal and resettlement areas by the year 2005, thus 100% coverage.

The bush pump, family upgraded well and the BVIP were the only technologies used during the IRWSSP. By 1999, the IRWSSP had implemented projects in 47 out of the 57 districts in Zimbabwe (Makoni et al., 2004). Robinson (2002) documented the achievement of the targets of IRWSSP by 1999 in Table 2.1

<table>
<thead>
<tr>
<th>Facility</th>
<th>Planned number</th>
<th>Facilities 1985</th>
<th>Facilities 1999</th>
<th>IRWSSP achievement</th>
<th>1999 rural coverage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protected primary water supply</td>
<td>36,000</td>
<td>9,000</td>
<td>34,000</td>
<td>25,000</td>
<td>94%</td>
</tr>
<tr>
<td>Sanitary latrines</td>
<td>1,400,000</td>
<td>100,000</td>
<td>560,000</td>
<td>460,000</td>
<td>40%</td>
</tr>
</tbody>
</table>

Source: Robinson (2002)

1985 is the base year when the programme started and Table 2.1 shows that the programme had more achievements in water supply than sanitation up to 1999. Practical Action (2007) said the successes scored began to be adversely affected by the country's economic challenges towards the end of the year 2000. The IRWSSP did not introduce community based management at the onset. The country’s economic challenges thus adversely affected the maintenance of rural water infrastructure in particular, and social amenities in general as the maintenance and management of the water infrastructure was left to ill prepared communities and other external support agencies. It was clear that the main objectives of the IRWSSP were unlikely to be met (Makoni et al., 2004). Nevertheless, the IRWSSP had some successes which give valuable lessons for water supply and sanitation practitioners (IWSD, 2001).

In 2000, the country faced an economic challenges, which led to the collapse of public sector investment and the flight of donor finance (Makoni et al., 2004). This has seen minimal new investments in service delivery for nearly a decade. With the adoption of the MDGs in 2000 and the 2004 Zimbabwean Domestic Water Supply and Sanitation Policy, which is still a draft, new coverage rates have been agreed relative to the 1990 levels. The World Bank (2010) quotes Zimbabwe’s MDG target for water supply in the rural areas as 90%, while the policy target is 100%. While for sanitation, the MDG target is 68% and the policy target is 80%. The MDG targets are more conservative than the
policy targets. According to Makoni et al., (2004) and Robinson (2002) these targets are unlikely to be met if funding for the sector does not improve and sector leadership is not restructured to build momentum for a new era in sector development.

Despite this, there have been efforts by several NGOs to increase access to improved water supply and sanitation as well as improve livelihoods. Several low cost technologies have been introduced in water supply and sanitation programmes in an effort to reach out to many people with the services. In water supply, technologies such as the rope and washer pump, rower joma pump, treadle pump and the afridev have been introduced. While in sanitation, the ecological sanitation and other low cost technologies have also been introduced. Ecological sanitation is a system that makes use of human waste and turns it into something useful and valuable, with minimum pollution of the environment (Morgan, 1999; Esrey, 1998). Ecological sanitation is designed to provide benefits in such a way that the end product can easily be transferred to agriculture or forestry, while reducing open defecation at a low cost. The concept has been used widely in countries such as Sweden, Mexico, Ecuador and India. Esrey (1998) said the concept was introduced successfully in Ethiopia by Almaz Terrefe and Gunder Edstrom of SUDEA. In Zimbabwe, ecological sanitation was promoted by Mvuramanzi Trust in 1998/9 and now has been adopted by several NGOs (Morgan, 2001). Examples of the ecological sanitation include the Aberloo, Fossa alterna and the Skyloo. All these low cost water supply and sanitation technologies are still under pilot in Zimbabwe. The only approved and standard technologies according to the Government of Zimbabwe are the B-type bush pump for rural water supply and the VIP for sanitation.

2.3 MDGs and water
Improvements in access to safe drinking water, adequate sanitation and hygiene have an impact on wider development issues (UN, 2006). Poverty assessment research has consistently showed that improvement in water services is a core element in most strategies designed to alleviate poverty (Adhikari and Bhattarai, 2007). The MDGs attempt to address all contemporary issues affecting both developing and developed countries and achievement of these is directly or indirectly linked to water. Extreme poverty and hunger, child mortality, maternal death, education, income earnings, Human Immune Virus and Acquired Immune Deficiency Syndrome (HIV and AIDS), malaria and other diseases as well as environmental sustainability are all dependent on water quantity and quality in a population (UN, 2003). Therefore, significantly increasing the coverage of rural water supply in Africa is fundamental to achieving the MDGs. The impact of improved water supply and sanitation is discussed in the context of MDGs and is clearly illustrated in Appendix 1. This study will try to illustrate how the provision of improved water supply and sanitation facilities has contributed to livelihood improvement and give an indication of achievement of MDGs in Chivi District of Zimbabwe.

2.4 Multiple uses of water and benefits
Safe and secure water is essential to poor people’s survival and health. However, meeting basic needs is not just about health and hygiene. Providing water security can play a wider role in poverty reduction and improving livelihoods (Makoni et al., 2004; Kati,
This was supported by Van Koppen (2006) who argued that what people desire is water for multiple uses so as to meet their needs, especially in rural areas where livelihoods continue to be based on a range of water-dependent activities. Global Water Partnership (2004) declared the need for multiple use approaches as appropriate forms of Integrated Water Resources Management (IWRM) in poor areas with backlogs in infrastructure development as they seem to offer promising pathways in all poverty alleviation strategies. More research needs to be done on how communities are benefiting and managing the multiple use approach in boreholes and wells in view of the fact that most water points were developed for domestic use in Zimbabwe. It is only recently that linkages between water and livelihoods are being explored and some of the wider benefits such as better health, time saving and empowerment have been noted (Makoni et al., 2004).

Productive uses of water have crucial roles in system sustainability (Moriaty et al., 2004). Foremost they provide opportunities to turn water into the cash needed to buy spare parts and to pay for routine maintenance. In addition, Moriaty et al., (2004) asserted that clearly establishing the link between water supply and economic benefits also seems to increase people’s willingness to pay for their water and makes cost recovery more realistic. But, equally important, systems that are designed to provide minimal domestic norms and that do not take account of productive use can be expected to fail if people actually want to use water for productive activities. The study will also find out whether wells and boreholes installed for communities in Chivi District are being used for multiple uses, how the benefits are distributed within the community and how this is contributing to sustainability of the water sources and livelihoods.

2.5 Livelihood Indicators of water supply and sanitation interventions

The term livelihood has been defined by several authors almost in a similar way. Drinkwater and Rusinow (1999) said a livelihood comprises the capabilities, assets (stores, resources, claims and access) and activities required for a means of living. They further asserted that a livelihood is sustainable when it can cope with and recover from stress and shocks, maintain or enhance its capabilities and assets and provide sustainable livelihood opportunities for the next generation. This contributes net benefits to other livelihoods at the local and global levels in the long and short term. Elasha et al. (2005) described livelihoods conceptually as means, activities, entitlements and assets by which people make a living. Assets, in this particular context, are defined as not only natural/biological (land, water, common-property resources, flora, fauna), but also social (community, family, social networks, participation, empowerment), human (knowledge, creation by skills) and physical (roads, markets, clinics, schools, bridges). Access to sufficient and safe water on a sustainable basis will help in the various dimensions of livelihood. This can be by reducing vulnerability to shocks, increasing food availability and access, and enhancing utilisation by improving health and sanitation. These, in turn, enhance the wellbeing, productivity and subsequently the food security status of people.

Different authors and organisations have used several livelihood indicators to measure the impact due to water supply and sanitation projects, some of which are discussed in Table 2.2.

Table 2.2 Livelihood indicators related to water supply and sanitation

<table>
<thead>
<tr>
<th>Author</th>
<th>Aspect of livelihood</th>
<th>Indicators</th>
<th>Comments</th>
</tr>
</thead>
</table>

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<table>
<thead>
<tr>
<th>Source</th>
<th>Indicator</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>UNICEF, 2007</td>
<td>Safe drinking water</td>
<td>Adequate water handling practices to minimize contamination practised by x% of the population.</td>
</tr>
<tr>
<td>MWLD et al., 2002, UNICEF, 2007, CSO, 2009</td>
<td>Safe excreta disposal</td>
<td>X% of children’s and babies’ faeces are safely disposed of. Toilets are used by the majority of men, women and children.</td>
</tr>
<tr>
<td>MWLD et al., 2002, UNICEF, 2007</td>
<td>Hygiene Practices</td>
<td>Soap or ash for hand washing is available in all households. Hand washing facilities are available at 100% of communal latrines or in the majority of homes.</td>
</tr>
<tr>
<td>UNICEF, 2007</td>
<td>Women’s privacy and dignity around menstrual hygiene</td>
<td>Appropriate sanitary materials and underwear for all women and girls are available.</td>
</tr>
<tr>
<td>Community participation &amp; representation</td>
<td></td>
<td>All sections of the community, including vulnerable groups, are consulted and represented at all stages of the project. The majority of community members are satisfied with the provision of facilities. Users take responsibility for the management.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The indicators are applicable in rural areas, but adequate water handling practices to minimize contamination is difficult to measure because information can only be obtained from interviewees, who can give false information.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The indicator is a proxy indicator to hygiene and appropriate sanitary materials is influenced by many factors. Underwear is a sensitive issue and communities may feel offended being asked about it. The three indicators are relevant to the rural context as they influence sustainability of the facilities, which to a large extent guarantees continued livelihood improvement.</td>
</tr>
</tbody>
</table>
|                               |                                                                           | The advantages of the SLF are that it is people-centred, holistic in approach, dynamic and it acknowledges that the poor have answers to their problems. It puts emphasis on vulnerability to several phenomena and how these shape livelihood strategies and technology choices, all of which come to determine outcomes. Furthermore, the ability to look beyond aggregated households by considering the significance of social
The impact of rural water supply and sanitation programmes in Chivi District, Zimbabwe

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| Physical capital | - Savings  
| - easily disposable assets such as livestock |

| Human capital | - Includes infrastructure such as roads, irrigation works, boreholes, developed wells |
| - Skilled labors |
| - Access of marginal groups to education, training and extension services |
| - Health |

| Social capital | - Organizational set-up (local village committees) |
| - Role of village committees in the decision making process. |
| - Membership to organizations |
| - Conflicts |

| MWLD et al., 2002, Muller, 2003 | Safe drinking water | Use of improved water source for drinking |

| MWLD et al., 2002 | Water quantity | Time taken to fetch water (go, wait, collect and return) |

| MWLD et al., 2002 | Water accessibility | Use of improved source as reserve during times of water insecurity |

| MWLD et al., 2002 | Water reliability | Use of a) water supply in home b) water supply managed by community c) water supply managed by private individual or company |

| MWLD et al., 2002 | Management of water supply | Number of people working as vendors |

| MWLD et al., 2002 | Livelihoods directly dependant on water | Household expenditure on water as proportion to total expenditure |

Savings - easily disposable assets such as livestock differentiation presents a more realistic picture of rural livelihoods. Hence, the Sustainable Livelihoods Framework adopts a definition of poverty that goes beyond income and consumption data to include asset base, social relationships, vulnerability impacts, and perceptions. The main strength of the Sustainable Livelihoods Framework, therefore, is that it views impact in context and can be used in water supply and sanitation programmes.

MWLD et al., 2002

Water quantity
Time taken to fetch water (go, wait, collect and return)
It is an important indicator as it gives an indication of the availability of time for productive activities.

MWLD et al., 2002

Water accessibility
Use of improved source as reserve during times of water insecurity
The two indicators are applicable to rural settings, because they give a picture of the extent to which livelihoods have been improved.

MWLD et al., 2002

Water reliability
Use of a) water supply in home b) water supply managed by community c) water supply managed by private individual or company

MWLD et al., 2002

Management of water supply
Number of people working as vendors
Cannot use vendors as a measure of management of water supply system. There are no water vendors in the area of study.

MWLD et al., 2002

Livelihoods directly dependant on water
Household expenditure on water as proportion to total expenditure
The aspect of livelihood and indicator are not directly related. Communities in the study area do not pay water bills, but are supposed to contribute towards an operation.
<table>
<thead>
<tr>
<th>Source</th>
<th>Category</th>
<th>Indicator</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>MWLD et al., 2002, UNEP, 2003</td>
<td>Expenditure in relation to affordability</td>
<td>Use of improved toilet facilities</td>
<td>It is not very feasible to measure expenditure in relation to affordability by looking at the use of improved toilet facilities. Materials for construction of latrines in Wards 9 and 15 are given by donors, but the indicator can give a picture of replicability of the programme, which also shows impact.</td>
</tr>
<tr>
<td>MWLD et al., 2002</td>
<td>Excreta disposal</td>
<td>Use of toilet facilities a) connected to sewage b) with cesspit that is emptied</td>
<td>Not applicable. The only technologies available in the area is BVIP, pit latrine, cat and bush sanitation.</td>
</tr>
<tr>
<td>UNEP, 2003</td>
<td>Social / health</td>
<td>Presence of water-related diseases in low income areas (incidence per year). Number of people participating in awareness workshops on sanitation and hygiene issues Number of toilets constructed per year Number of women using toilets</td>
<td>All are applicable.</td>
</tr>
<tr>
<td>UNEP, 2003</td>
<td>Economic</td>
<td>Proportion of costs of sanitation services covered by Government subsidies Average income from fisheries for fishery livelihoods in area ‘y’ Number of livelihoods that can make a living from fisheries in area ‘y’ Annual economic value of fisheries in area ‘y’ (based on annual catch and market value)</td>
<td>No sanitation services are covered by Government. Fisheries are not common because the water sources provided by the donors under study are point sources—boreholes and wells.</td>
</tr>
<tr>
<td>UNEP, 2003</td>
<td>Environmental</td>
<td>Emissions of persistent organic pollutants in area ‘y’ through rivers Concentration of pollutants in the coastal waters in area ‘y’ Number of incidents of unacceptable high pollutant emissions Viability index of coral reefs in area ‘y’</td>
<td>All the indicators are not applicable.</td>
</tr>
<tr>
<td>Source</td>
<td>Indicator</td>
<td>Description</td>
<td></td>
</tr>
<tr>
<td>-----------------</td>
<td>---------------------------------------------------------------------------</td>
<td>-----------------------------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>UNEP, 2003</td>
<td>Political/ institutional</td>
<td>- Number of decentralised Government employees undergoing training on sanitation and wastewater treatment</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Number of sanitation and wastewater treatment projects being executed by decentralised Government</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- National budget available for sanitation and wastewater treatment projects</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Number of policies mentioning sanitation and wastewater treatment as a priority</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Number of workshops organised by Government on sanitation and wastewater</td>
<td></td>
</tr>
<tr>
<td>Muller, 2003</td>
<td>Health</td>
<td>- Disability-adjusted life year</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Prevalence of stunting among children under age 5</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Mortality rate of children under age 5</td>
<td></td>
</tr>
<tr>
<td>Billig et al., 1999, Muller, 2003, CSO, Zimbabwe, 2009</td>
<td>Sanitation</td>
<td>- Percentage of population using hygienic sanitation facilities</td>
<td></td>
</tr>
<tr>
<td>Billig et al., 1999</td>
<td>Sanitation</td>
<td>- Percentage of children under &lt;36 months with diarrhoea in the last two weeks</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Hygiene</td>
<td>- Percentage of child caregivers and food preparers with appropriate hand washing behaviour</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Appropriate hand washing includes the time at which it is done and the technique used.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>The indicator is relevant.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Water quantity</td>
<td>- Quantity of water used per capita per day</td>
<td></td>
</tr>
<tr>
<td>CSO, Zimbabwe, 2009</td>
<td>Safe drinking water</td>
<td>Use of improved drinking water sources, percentage, total population</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>All the indicators by CSO, Zimbabwe, 2009 are important in determining livelihood improvement.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>There is no wastewater treatment in the study area, except for faecal disposal into pit latrines.</td>
<td></td>
</tr>
</tbody>
</table>

Applicable.
The SLF will be used to assess impact made by the water supply and sanitation programmes implemented in Chivi District. This is because of the advantages that it has over other methods and indicators shown in Table 2.1 above. The major advantage is that it views impact in context, which in this case the context is rural water supply and sanitation. It is also a people centred approach which has the ability to look beyond aggregated households by considering the significance of social differentiation, which presents a realistic picture of rural livelihoods (Carney, 1998). The SLF is best suited for use in this study because its components are in line with what the study seeks to assess in terms of livelihoods. Other methods have been used in Community Based Management (CBM) like the Qualitative Information Assessment, but have no documentation on their use and indicators, which leaves the SLF with an advantage because it is well documented.

<table>
<thead>
<tr>
<th>Improved sanitation</th>
<th>Percentage of total population using an unimproved drinking water source using the bush or fields as toilets (no facility)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percentage of total population using drinking water appropriately treated at household level</td>
<td>Percentage of total population using an unimproved drinking water source, who treated the water appropriately</td>
</tr>
</tbody>
</table>

2.6 Analytical Framework: The Sustainable Livelihoods Framework (SLF)

The Sustainable Livelihoods Framework will be used in this study as a tool to assess and analyse impact made as a result of water supply and sanitation programmes in Chivi District of Zimbabwe. In broad terms, the framework creates linkages between water sector work and a range of parallel socio-economic and policy issues including decentralisation, community based ownership, political representation and accountability, and managing risk in dynamic natural environments (Majale, 2002). The SLF comes from the Sustainable Livelihoods Approach (SLA). The SLA is a holistic, asset-based framework for understanding poverty, the work of poverty reduction and the relationships between these factors. This in turn facilitates the planning and implementation of more effective development interventions (DFID, 1999, NZIADA, 2006). It has six core principles outlined below:

- People centred- Focus on perspectives, priorities and strengths of people
- Holistic- Recognise that different factors and processes influence the livelihood opportunities and choices of people, and that people have multiple livelihood strategies in pursuit of multiple livelihood outcomes.
- Dynamic- Recognise that poor people’s livelihood strategies can change rapidly.
- Building on strengths- Start with an analysis of strengths rather than needs.
Macro-micro linkages- Consider the linkages between the two levels to inform more supportive policies and institutions.

Sustainability- Include analysis of environmental, social, economic and institutional sustainability.

2.6.1 Description of the SLF
The conceptual framework of the SLA is the Sustainable Livelihoods Framework. The framework helps in understanding and analysing the livelihoods of the poor and in assessing the effectiveness of existing efforts such as provision of water and sanitation to reduce poverty in Chivi District. It aims at putting people in general and the poor in particular at the centre of development. The approach recognises the multiple dimensions of poverty and attempts to help poor people and the marginalised to achieve lasting improvements against the indicators of poverty that they themselves identify. The following regarding the SLF were observed by DFID (1999), Carney (1998), Majale (2002) and Nicol (2000):

- It is a useful tool for analyzing how regulations, policies and interventions impact on the livelihoods of the poor people;
- Its adoption as a research instrument facilitates learning as to its potential utility in understanding rural and urban development issues;
- It can be applied at various levels of analysis, for example, individual, household, neighbourhood or city-wide;

The notion of sustainability is key to the approach. Sustainability has many dimensions all of which are important to the sustainable livelihoods approach. Livelihoods are sustainable when they:

- Are resilient in the face of external shocks and stresses;
- Are not dependent upon external support (or if they, this support itself should be economically and institutionally sustainable;
- Maintain the long-term productivity of natural resources; and
- Do not undermine the livelihoods, or compromise the livelihoods open to others (DFID, 1999).

The SLF presents the main factors that affect people's livelihoods and typical relationships between them. It can be used in both planning new development activities and assessing the contribution to livelihood sustainability made by existing activities. Water related and sanitation provision projects undertaken by development agents such as World Vision, Zvishavane Water Project and some other organisations should be seen as having some form of economic and social impacts on the livelihoods of the villagers in Wards 9 and 15 of Chivi district. These villagers in Chivi district depend on wide range of resources including water and proper sanitation services for their livelihoods. By being engaged in activities related to water and sanitation, villagers in Chivi district hope to improve their livelihoods and to acquire and utilize some of the core assets necessary for sustaining their livelihoods.

The SLF seeks to gain an accurate and realistic understanding of people’s strengths (assets or capital endowments) and how they endeavour to convert these into positive livelihood outcomes (DFID, 1999). The SLF was actually developed with the aim and hope of finding ways about how the marginalized people could meet their livelihood needs and interests through the exploitation of resources or forms of capital which are within their reach. The framework is thus concerned about making sure that marginalized people have access to critical resources which can sustain the lives.
According to DFID’s livelihoods framework, the approach is founded on a belief that people such as those in Chivi rural district require a range of core assets to achieve positive livelihood outcomes. These are shown in the Figure 2.1 below.

![Figure 2.1 The Sustainable Livelihoods Framework](image)

These forms of assets needed to sustain livelihoods include human capital, social capital, natural capital, financial capital, and physical capital (DFID, 1999). The framework recognises that people are operating in a context of vulnerability and in Chivi District, people have no access to safe and clean water for drinking and that for productive purposes is only accessible to a few people. This is because the District is in the semi arid regions four and five of the agro ecological regions of Zimbabwe, which receive little rainfall, between 400mm-500mm. The sustainable livelihoods framework recognizes the need for men and women, communities and households to develop their livelihoods on the basis of the assets to which they have within the broader socio-economic context. In this regard, livelihood strategies should be linked to transforming structures and processes, which relate to policy, institutions and processes and aim to make the poor urban men and women have access to the core assets.

The framework therefore helps to broaden out water supply from health institutions and public health approaches. Majale (2002) goes on to say that whilst this embedding in wider contexts has attendant practical problems, it can simultaneously establish a greater reality in addressing community water supply problems, not least because it is more likely to identify early on potential barriers to sustainable supply development.

Where the demand-based view identifies water primarily as a consumable good, the livelihoods approach sees it also as a productive asset (DFID, 1998). Thus, the relationship between demand and available supply at the household level is finely balanced between the success (or otherwise) of particular livelihood strategies. Household water management becomes part of the wider water management environment and suggests (though does not necessarily cause) a closing of the water supply–water resources management gap (Majale, 2002). The notion has important implications for differing types of water resource scarcity, and how these are viewed by communities and households.
2.6.2 Aspects of the asset pentagon considered in the thesis

The following aspects of the asset pentagon will be considered in this study in assessing the impact of water supply and sanitation programmes.

- Physical - infrastructure, such as wells, boreholes, latrines;
- Natural – Under natural capital the thesis will mostly look at the management of natural capital, that is, management of water wells, maintenance of water pumps, effectiveness of management systems applied to water and availability of spare parts;
- Financial - IGAs, easily disposable assets, income levels and stability, savings;
- Human- access of marginal groups to education, training and extension services, health;
- Social- organisational set up, conflicts, membership to organisations (committees);

According to Carney (1998), different asset bundles at the household level are manifested in the different degrees and types of access to water resources in different environments. Income is spent to meet household consumption needs and maintain household asset levels. Water is thus both part of the expenditure and part of the consumption of a household economy. Water is a consumption need which must be paid for with revenue gained from economic activities (or in time spent collecting it), and is an asset which can produce certain types of income in combination with other assets (Clarke, 1998). Increased scarcity of water (through drought or other access restrictions) reduces household capacity to combine water with other assets in order to produce income. Carney (1998) said, the main point of the asset pentagon is to force ‘users to think holistically rather than sectorally about the basis of livelihoods’ and this is why the SLF is being used in this study to assess impact on livelihoods.

2.7 Data collection techniques

Data collection techniques enable us to systematically collect information about our objects of study (people, objects, and phenomena) and about the setting in which they occur (IWSD, 2001). If data are collected haphazardly, it will be difficult to answer our research questions in a conclusive way. According to IWSD (2001) and Robinson (2002), one of the most common ways of collecting data is through using available information. Its advantage is that it is inexpensive, because data already there and permits examination of trends over the past. Using available information also provides valuable cross validation of other measures, either in support or disconfirmation of them (Robinson, 2002; Nayaran, 1996). The disadvantages are that the information is not always easily accessible due to ethical issues concerning privacy, the Information may not be precise or incomplete and there are ethical difficulties of researching without people’s knowledge of consent.

Observation is another way of data collection. It can be participant observation, where the researcher goes to stay in the study area with the population being studied. He or she then observes the way in which the people behave in relation to a particular aspect under research. Observation can also be once off, where the researcher goes to an area once to observe a particular issue of his or her research. Its advantages are that it gives more detailed information as the researcher is in contact with the actual situation (Robinson, 2002 and IWSD, 2001). Information on facts not mentioned in the questionnaire can also
be collected using observation and it permits tests on reliability of responses to questionnaires. The researcher has direct contact with the situation (Robinson, 2002, Mikkelsen, 1998). The disadvantages are that there can be observer bias, where the researcher may only notice what interests him, it is time consuming and presents logical problems in the sense that you don’t know what the behaviour would have been like if it hadn’t been observed (IWSD, 2001 and Robinson, 2002).

Data collection can also be done through interviews. These can be structured and unstructured. Their major advantage is that they are suitable for illiterates as clarification of questions is possible (IWSD, 2001; Nayaran, 1996; Mikkelsen, 1995). The response rate is higher than that of written questionnaires and allows capturing of non verbal cues. The presence of the interviewer encourages participation and involvement (Robinson, 2002). The disadvantages of interviews are that the presence of researcher can influence responses of respondents, quality of data collected depends on the skill of the interviewer and are time consuming (IWSD, 2001 and Robinson, 2002). Interviews allow a limited number to be interviewed and respondents may feel their answers are not anonymous and be less forthcoming (Robinson, 2002).

Focus group discussions are also used to collect data. This is where a group of 8-12 people (Robinson, 2002) are gathered to discuss a particular issue under research. The researcher is the facilitator who guides the discussion. The advantages of focus group discussions are that they can process a large body of knowledge and enable the collection of socially related data (IWSD, 2001 and Robinson, 2002, Mikkelsen, 1995). It allows cross checking of information and provides a platform for feedback. Group dynamics help in focusing on the most important topics and it is fairly easy to access the extent to which there is a consistent and shared view (Robinson, 2002). Robinson (2002) also argues that the method is relatively inexpensive and flexible and can be set up quickly and facilitation can help in the discussion of taboo subjects.

2.8 Sampling methods

A sample is a selection from the population, while a population refers to all the cases (Robinson, 2002). There are different types of sampling methods which can be used in different studies and in most cases are used in combination. Table 2.4 gives an overview of some of these methods as well as their advantages and disadvantages.

Table 2.3 Sampling methods, their advantages and disadvantages

<table>
<thead>
<tr>
<th>Author</th>
<th>Method</th>
<th>Description</th>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>IWSD, 2001; Nayaran, 1996</td>
<td>Convenience sampling</td>
<td>It is a method in which for convenience sake the study units that happen to be available at the time of data collection are selected to compose the sample</td>
<td>-Less time consuming</td>
<td>-Sample may not be representative for the population you want to study.</td>
</tr>
<tr>
<td>IWSD, 2001; Nayaran, 1996; Robinson,</td>
<td>Quota sampling</td>
<td>It is a method, which ensures that from different categories of all they sampled are</td>
<td>-Representative of all categories as they are sampled in</td>
<td></td>
</tr>
<tr>
<td>Year</td>
<td>Method</td>
<td>Description</td>
<td></td>
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<tr>
<td>------</td>
<td>-------------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2002*</td>
<td>Study units with specific</td>
<td>It is an extension of quota sampling. The various dimensions thought to be of importance in a survey are incorporated into the sampling procedure in such a way that at least one representative of every possible combination of these dimensions is included.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>characteristics, at least a</td>
<td>-Representative of all categories as they are sampled in quotas</td>
<td>-It is subject to bias</td>
<td></td>
</tr>
<tr>
<td></td>
<td>certain number appear in the</td>
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<td></td>
<td>sample so that all these</td>
<td></td>
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<tr>
<td></td>
<td>characteristics are</td>
<td></td>
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<tr>
<td></td>
<td>represented.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Robinson, 2002</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Dimensional sampling</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Purposive sampling</td>
<td>A sample is built up which enables the researcher to satisfy her specific needs in a project.</td>
<td>It is convenient to the researcher as it is the researchers judgement as to typicality or interest</td>
<td></td>
</tr>
<tr>
<td><strong>Robinson, 2002; Nayaran, 1996</strong></td>
<td><strong>Snowball sampling</strong></td>
<td>The researcher identifies one or more individuals from the population of interest. After they have been interviewed, they are used as informants to identify other members of the population, who are also used as informants.</td>
<td>-It is useful when there is difficulty in identifying members of the population, for example, when this is a clandestine group</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Probability sampling methods</td>
<td></td>
<td>Information collected through this sampling method is not reliable</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Simple random sampling</td>
<td>Each unit in the study population has an equal chance of being selected for the sample. A numbered list of all the units in the population from which the sample is to be drawn is made. The required number of sampling units is selected using a &quot;lottery&quot; method or a</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>-Each unit in the study sample has an equal chance of being selected</td>
<td>-Does not ensure that the proportions of individuals with certain characteristics in the sample will be the same as those in the whole study population</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sampling Method</td>
<td>Description</td>
<td>Advantages</td>
<td>Disadvantages</td>
<td></td>
</tr>
<tr>
<td>-------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>-----------------------------------------------------------------------------------------------</td>
<td>-----------------------------------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>Systematic sampling</td>
<td>Individuals are chosen with regular intervals (for example every fifth) from the sampling frame. A number is randomly selected to tell us where to start on the list.</td>
<td>- Less time consuming</td>
<td>- There is a risk of bias, as the sampling interval may coincide with a systematic variation in the sampling frame</td>
<td></td>
</tr>
<tr>
<td>Stratified sampling</td>
<td>The sampling frame is divided into subgroups, or strata, according to specified characteristics. Random or systematic samples of a predetermined size will then have to be obtained from each stratum.</td>
<td>- Includes representative subgroups of study units with specific characteristics (for example, residents from urban and rural areas, or different age groups)</td>
<td>- It can be difficult to come up with stratas</td>
<td></td>
</tr>
<tr>
<td>Cluster sampling</td>
<td>It involves dividing the population into a number of units or clusters, each of which contains individuals having a range of characteristics. The clusters are chosen on a random basis.</td>
<td>- Useful where the population is dispersed</td>
<td>- It can be time consuming if a second visit is required if the population is dispersed</td>
<td></td>
</tr>
<tr>
<td>Multistage sampling</td>
<td>In very large and diverse populations sampling may be done in two or more stages. For example, in first instance a sample of clusters (e.g. villages) may be selected in a simple random way, after which further sampling of individual units (e.g. persons) may be done Systematically within each cluster. This would be called a two-stage sampling procedure. Three stage sampling procedures are also possible</td>
<td>- A sampling frame of individual units is not required for the whole population. Initially a sampling frame of clusters is sufficient. Only within the clusters finally selected do the individual units need to be enumerated.</td>
<td>- There is a larger probability that the final sample will not be representative of the total study population</td>
<td></td>
</tr>
</tbody>
</table>
3. MATERIALS AND METHODS

3.1 Introduction
This chapter presents the characteristics of the study area in terms of location, population, climatic conditions and water supply and sanitation facilities in the three Wards under study. Materials and methods used in the study will also be discussed. These are categorised into sampling design and methods, data collection and data analysis methods used.

3.2 Description of Study Area

3.2.1 Location and population
Chivi district is in Masvingo Province of Zimbabwe. The area lies in the Lowveld area (below 900 meters above mean sea level). There are 31 Wards in Chivi District. The total population was about 161,230 in 2008 in an area of 3,510 km² (MHCW, 2008). The map of Chivi District is shown in Figure 3.1 below.

![Figure 3.1 Map showing Chivi District relative to other towns in the map of Zimbabwe and Wards 7, 9 and 15 in the Map of Chivi District](image-url)
Chivi District is in Zone 21 of the Zimbabwe’s Livelihood Profile zones (Bush, 2010) in the lowveld of south-central Zimbabwe. The zone encompasses communal lands in several districts including Mwenezi, southern Mberengwa and south Zvishavane. The area is classified as Natural Region V. Annual rainfall is low, around 500-600mm, and soils are poor and prone to erosion (MHCW, 2008). Chivi District which is in the south east of Masvingo Province has a rainfall season that begins in November and lasts until March. The major crops grown are millet, sorghum, maize, round nuts, groundnuts and cowpeas (Bush, 2010, ZimVac and FEWSNET, 2005). Garden activities are done from March to September.

The key to food security in this zone is the capacity of households to earn enough cash to purchase food during the year. The opportunities for employment are varied. They include local seasonal labour as well as temporal or permanent migration to the Mwenezana Estates, the Murowa Diamond Mine, or towns within Zimbabwe and South Africa (Bush, 2010). The Runde River provides opportunities for irrigation, gold panning and fishing. Wealth in this zone depends on employment and remittance opportunities (ZimVac and FEWSNET, 2005). Less skilled household members also take on less lucrative local jobs such as local farm work on neighbours’ fields or on nearby commercial sugar estates. Backyard gardening is also a major part of the poor’s livelihood (Gandure and Drimie, 2007). Other factors linked to wealth include the size of land cultivated, access to tools and labour and the size of the animal herd. Almost all households own some animals. However, the poor tend to own goats and chickens whereas the middle and better off own cattle, goats and donkeys (Bush, 2010). Campbell (2002) calculated the total net income for the people in Chivi District as US$670 per household per annum or US$1, 80 per household per day.

Gandure and Drimie, 2007 found out in an assessment in Chivi District on the role of humanitarian food and nutrition security responses to HIV and AIDS that the most important source of livelihood and cash income for this community includes selling of small livestock, vegetables, legumes (groundnuts and round nuts) and mopane worms. In the assessment, nutrition gardens received the best ratings and clearly played an important role in improving food security and nutrition as well as generating cash incomes for the poor. Poor households also sell a local wine extracted naturally from plants such as amarula and palm trees (ZWP, 2009). By contrast, better off households often have a family member with a more permanent job in the skilled ‘formal’ sector (Bush, 2010). Some of their wage earnings are remitted home. Better off households supplement these remittances with sales of cash crops and livestock. Households living near dams and registered fishing groups engage in small scale fishing and selling the fish caught in the dam.

Households use savings to buy livestock and use income from livestock to pay school and medical fees and to buy food. Gandure and Drimie (2007) identified stressors within the community and these include hunger, limited employment opportunities, climate variability, limited access to safe drinking water and increasingly adverse macro-economic conditions. There is also high HIV/AIDS prevalence in Chivi District due to increased prostitution along the highway leading to South Africa. The cholera epidemic which struck the country in 2008/9 was also rampant in the district. Figure 3.2 shows the spread of cholera in Zimbabwe as at 3 December 2008.
Figure 3.2 shows that four months after the start of the outbreak in August, 2008, most districts in Zimbabwe were affected and Chivi was not an exception. A high death rate, an increasing number of orphans, lack of draught power, and lack of farming inputs, were also identified as stress factors.

3.2.2 Characteristics of the wards under study
The wards in which the study was carried out are Ward 9, where WVZ has been working since 2005, Ward 15, where ZWP has been working since 2005 and Ward 7 which has had no water supply and sanitation programme since the IRWSSP. WVZ is currently working in three Wards and ZWP in four Wards. Table 3.1 shows the number of households and water and sanitation facilities constructed by the two NGOs in Wards 9 and 15 and facilities available in Ward 7.
The impact of rural water supply and sanitation programmes in Chivi District, Zimbabwe

### Table 3.1 Characteristics of Wards 7, 9 and 15 in terms of Population and WSS facilities in 2009

<table>
<thead>
<tr>
<th>Ward</th>
<th>Water Supply and Sanitation programmes</th>
<th>Approximate Number of households in 2008</th>
<th>Number of boreholes</th>
<th>Number of protected wells</th>
<th>Number of VIPs</th>
</tr>
</thead>
<tbody>
<tr>
<td>7 *</td>
<td>No intervention</td>
<td>900</td>
<td>11</td>
<td>12</td>
<td>95</td>
</tr>
<tr>
<td>9 **</td>
<td>Latrine construction, borehole drilling and rehab, well upgrading, PHHE (WVZ)</td>
<td>1000</td>
<td>16</td>
<td>40</td>
<td>732</td>
</tr>
<tr>
<td>15 ***</td>
<td>Latrine construction, borehole rehab, well upgrading, PHHE (ZWP)</td>
<td>1540</td>
<td>17</td>
<td>69</td>
<td>323</td>
</tr>
</tbody>
</table>

Sources: *DDF, 2009  
** WVZ 2009  
*** ZWP 2009

### 3.3 Methodology

Researchers use various methodological concepts in carrying out research. Two common concepts exist in social science that can be used in carrying out research, namely the positivist and the interpretivism. The positivist paradigm holds the view that the truth is out there, waiting to be discovered. Positivists employ quantitative data collection methods such as structured questionnaires in their enquiries (Robinson, 2002). Interpretivists hold the view that the social world cannot be described without investigating how people use language and symbols to construct social practices, that is, understand their experience (Robinson, 2002). It therefore believes that the world is interpreted through the mind and it uses qualitative data in its research.

Quantitative research mainly focuses on quantifiable data in terms of numbers and measures that can be analyzed statistically, while the qualitative gives more emphasis on the qualities of entities and on processes and meanings that are not experimentally examined or measured in terms of quantity, amount, intensity or frequency (Kujinga, 2004). This research used both the quantitative and qualitative approaches so that they could complement each other in collecting data which describes livelihood improvement as a result of water supply and sanitation interventions. The quantitative method which was used was the questionnaire and was conducted through a household survey, while the qualitative methods were focus group discussions, semi structured interviews with key informants and field visits and observations.

### 3.4 Data collection

The research used the Sustainable Livelihood Framework (SLF) of the United Kingdom’s Department of Foreign and International Development (DFID), to frame the inquiry and capture perceptions of livelihood improvement due to WSS in the data collection process. Livelihood improvement questions for the household survey using questionnaires and for structured and semi structured interviews as well as focus group discussions were centred on the five capitals (physical, natural, human, financial and social) of the SLF.
A questionnaire was used to collect data in a household survey. The questionnaire was used to collect data in Wards 7, 9 and 15 and is shown in Appendix 2. The researcher and a team of assistants conducted face to face interviews in selected villages of Ward 7, 9 and 15. The advantage of this was that the questionnaire could be administered to illiterate people and explanations could easily be made to clarify questions. The disadvantage of using questionnaires administered face to face was that communities were expecting to have their names written down so that they could get some aid. This was noticed early during pretesting of the tool, such that the data collection team was trained by the researcher to correctly introduce the purpose of the survey to respondents so as to circumvent the problem.

Semi structured interviews with ZWP and WVZ staff were held to ascertain their activities and impact made by the programmes. The semi structured interviews were also conducted with Agricultural Extension services (AGRITEX), District Development Fund (DDF), Rural District Council (RDC) and the Ministry of Health and Child Welfare staff to get views on the design and impact of water supply and sanitation activities. Village heads and councillors were also interviewed on their perception of the water supply and sanitation programmes and also provided records of the number of households and villages in the Ward, respectively. The semi structured interviews were also conducted with clinics and school staff members. Six schools were visited, two in Ward 7, two in Ward 9 and two in Ward 15, to ascertain changes in school attendance brought about by the construction of latrines and water sources in Wards 9 and 15 and the impact of lack of adequate facilities in Ward 7 schools. The three Wards have a health centre each and these were visited for records of diarrheal and cholera disease prevalence.

The advantages of using semi structured interviews were that they were suitable for illiterates, clarification of questions was possible and they allowed the researcher to capture non verbal cues. The major disadvantages were that they were time consuming and allowed a limited number to be interviewed. In some cases the respondents affected the data which was collected and to overcome this, the researcher had to triangulate the data obtained with other methods.

Focus group discussions were done with water point committee members, women, men and youths separately in Wards 7, 9 and 15 to get more information on improvements noted in their livelihoods as a result of the water supply and sanitation programme and management of the water points. Each focus group discussion had an average of 12 people as recommended by Robinson (2002). In total, 12 focus group discussions were held. Their major advantages were that facilitation helped in the discussion of taboo subjects and group dynamics helped in focusing on the most important topics and it was fairly easy to access the extent to which there was a consistent and shared view. The disadvantages were that conflicts arose among participants, and the facilitator had to manage them through giving everyone a chance to say their views. The number of questions covered was limited.

Field visits and observations were done to triangulate the information and to get some information which could not be gathered through the other methods mentioned. Their advantage was that the researcher had direct contact with the situation and permitted tests on reliability of responses to questionnaires.
Information collected from Wards 9 and 15 where there has been a lot of intervention from the above mentioned NGOs since 2005 was compared with that collected from Ward 7 so as to see whether there was a difference in livelihoods between the wards with water supply and sanitation programmes and that without. Conclusions were drawn by the study as to whether there has been impact made or not, in terms of health and other aspects of livelihoods as outlined in the Sustainable Livelihoods Framework. Recommendations were made to NGOs on best practices and lessons learnt from the two NGOs under study.

Some ethics were considered in the conduct of the study. Permission to undertake the study was sought from ZWP and WVZ and the Rural District Council of Chivi. The researcher assured the three organisations as well as respondents to the household survey and focus group discussion participants that the study was undertaken for academic purposes and that their responses would be treated with confidentiality and anonymity.

3.5 Sampling design
Wards 9 and 15 were chosen because they had a lot of water supply and sanitation facilities installed unlike the other wards, so impact was easily seen. Ward 7 was chosen because it did not have any water supply and sanitation interventions. This allowed comparison between the wards that had interventions and that which did not so as to assess the impact made due to water supply and sanitation programmes. Population size information was sought from councillors and organisation reports. The sample size per ward for the household survey was calculated using Equation 3.1:

\[ n = \frac{N}{1 - N(e)^2} \]  

(3.1)

Where: \( n \) is the sample size, \( N \) population and \( e \) is precision (Israel, 2009)

The confidence level which was used to calculate the sample size was 90%. A higher confidence level like 95% was not used because the sample size was going to be too big considering the time span of the research and the resources.

Stratified sampling was done to divide the wards into different areas according to types of livelihood activities. Its major advantage was that it allowed greater representation of different groups. Stratified sampling enabled the researcher to evaluate impact on different livelihoods. Random sampling was done to select the villages in which the household survey was conducted. Systematic sampling was done to select households where the questionnaire (Appendix 2) was administered. Households were chosen at regular intervals (for example every fifth) from the sampling frame. Using the above formula, 270 households were interviewed using the questionnaire. From each ward 90 households were selected.
3.6 Data analysis

3.6.1 Quantitative data entry into the analysis software
Data from the questionnaire was entered into the Statistical Package for Social Sciences (SPSS) version 16. Single transfer coding, where the response was already in the form which had to be entered into the computer was done with questionnaires as they were coded. Each column in the data view window represented a variable in the data. Labelling and the kind of data which was to be entered in each column were defined. Each row in the data view window represented a record or a case. Data cleaning was done manually.

3.6.2 Frequency distributions and graphical displays
Frequency distributions were done to analyse the data. This is counting the frequency or the number of times that certain things happen and presenting the information in a table or graphical way. Robinson (2002) suggested that they are quickly and easily understood by a variety of audience.

3.6.3 Summary statistics
These are ways of representing some important aspect of the data set by a single number. This was done by describing the level of distribution of the data, using measures of central tendency. Three measures of central tendency were used, namely the mean, median and mode. The mean was obtained by adding all the scores together and diving by the number of scores. The median is the central value when all the scores are arranged in order of size and the mode is the most frequently occurring value.

3.6.4 Analysing relationships between two variables
Relationships between two variables were analysed through cross tabulation. Data was presented using a contingency table which was produced by SPSS.

3.6.5 Qualitative data analysis
Qualitative data was analysed using the thematic approach. The themes which the data was analysed were physical capital, natural capital, human capital, financial capital and social capital.
4. RESULTS AND DISCUSSION

4.1 Presentation approach
This chapter gives results of the study on the impact made by water supply and sanitation programmes implemented by ZWP and WVZ in Chivi District. The methods used in data collection were focus group discussions with men, women, youths and water point committees, key informant interviews, field visits and observation and household survey. Results will be presented using graphs, tables as well as descriptively, according to the objectives of the study. Discussion will be done after presentation of each set of results to explain differences and similarities in data obtained from each ward. Literature will also be used to compare results during discussion and a conclusion and recommendation for each objective will be given after the presentation of results and discussion.

4.2 Status of water supply and sanitation programmes

4.2.1 Background to water supply and sanitation programmes in Chivi
Non Governmental Organisations (NGOs) namely CARE, World Vision Zimbabwe (WVZ), Action contre la faime, Zvishavane Water Project (ZWP) and Red Cross were implementing water supply and sanitation programmes and other programmes in Chivi District at the time of the study. Their aim was to improve access to water supply and sanitation facilities and uplift the livelihoods of communities. Data on impact made by water and sanitation programmes was collected for ZWP and WVZ programmes. One ward was selected for data collection from the wards that each of the organisations is operating in. Ward 9 and 15 were selected because they had more coverage in terms of water supply and sanitation programmes. A third ward (Ward 7) was selected on the basis that it had no intervention and this was done in consultation with DDF. To fulfil the first objective, data was collected from key informant interviews, field observations and focus group discussions. The data obtained is presented below.

The strategy that ZWP and WVZ were using was to provide technologies like the rope and washer pump (locally called Elephant Pump), Windlass and B-type bush pumps for water supply, and the Ventilated Improved Pit Latrine (VIP) for sanitation (Figs 4.1 and 4.2). The programmes implemented include the rehabilitation of existing water sources, construction of wells and latrines, and the promotion of Participatory Health and Hygiene Education (PHHE) to empower both men and women to be better equipped to take care of their family health needs.
These technologies were considered easy to maintain at community level. Table 4.1 gives details of the activities and strategies that the two organisations were implementing, showing similarities and differences.
Table 4.1 Comparative analysis of activities and strategies implemented by ZWP and WVZ in Chivi District (January 2005-April 2010)

<table>
<thead>
<tr>
<th>Activity</th>
<th>Description of activity and strategy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Borehole repair and rehabilitation</td>
<td>ZWP: Repairs and rehabilitations were done to B-type boreholes by trained village pump minders. Spares and tools came from ZWP through DDF. WVZ: Repairs and rehabilitations were done to B-type boreholes by trained village pump minders. Spares and tools came from WVZ through DDF.</td>
</tr>
<tr>
<td>Borehole drilling</td>
<td>ZWP: No borehole drilling, WVZ: Borehole drilling was done through contracting.</td>
</tr>
<tr>
<td>Well upgrading</td>
<td>ZWP: ZWP was promoting community wells, which were fitted with Elephant Pump (EP). The community dug the first three meters and selected four well diggers to continue with the digging. They were given incentives by ZWP and the community assisted with food and locally available material. The Elephant Pump was installed by a contracted company called Pump Aid Zimbabwe. WVZ: WVZ was implementing family wells, which were installed with Windlasses. Individual households hired trained well diggers to dig the wells. They agreed on payment and were given Windlasses by WVZ upon finding water.</td>
</tr>
<tr>
<td>Latrine construction</td>
<td>ZWP: Latrines were constructed at schools and households. Builders were trained and beneficiaries help them in groups of five. Their payment was material for latrine construction. At schools, parents assisted the builders with bricks, food and labour. WVZ: WVZ was also constructing latrines at households and schools. Trained builders were hired by households to construct latrines at an agreed payment. Parents paid school latrine builders as well as provided labour, food and locally available material.</td>
</tr>
<tr>
<td>Participatory Health and Hygiene Education (PHHE)</td>
<td>ZWP: Training of trainers was done to selected members of the community, who then trained the rest of the community. Health clubs were formed eventually. These were clubs where communities meet and share knowledge on health and hygiene. Most of them had started income generating projects. WVZ: The same strategy as for ZWP was also used by WVZ, although no health clubs were formed.</td>
</tr>
</tbody>
</table>

Table 4.1 shows that the activities undertaken by ZWP and WVZ were similar, but with different strategies except for borehole drilling, which was only peculiar to WVZ. The activities were similar because they comprise the full package of a rural water supply and sanitation programme. The differences were there because of budget differences.
4.2.2 Design of water supply and sanitation systems
The design of water supply and sanitation technologies has an influence on functionality and usage of the facilities and ultimately the impact of the programme. This is because if the design of the facilities is suitable, community members find them easier to use and also find it necessary to repair the facilities if they breakdown. Use of facilities has an impact on the livelihoods of the people. Key informant interviews with ZWP, WVZ, DDF staff, informal interviews with the communities and field visits and observations provided information on the appropriateness of the design of the rope and washer pump (Elephant Pump), B-type bush pump, Windlass and the VIP, based on the criteria given by Fraenkel (1994) and Baumann (2000). The criteria given by Fraenkel (1994) and Baumann (2000) were used because Zimbabwe does not have design criteria for water supply and sanitation technologies because it considers the B-type bush pump and the Blair Ventilated Improved Pit Latrine as the standard technologies. All the other technologies are still under pilot and have not yet been approved by the Government of Zimbabwe. Table 4.2 provides results of the design criteria of these technologies.

Table 4.2 Design characteristics of the Elephant Pump, B-type bush pump and Windlass used in Chivi District of Zimbabwe

<table>
<thead>
<tr>
<th>Design criteria</th>
<th>Elephant Pump</th>
<th>B type bush pump</th>
<th>Windlass</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total equipment and installation costs</td>
<td>USD 500</td>
<td>USD 2 500</td>
<td>USD 110</td>
</tr>
<tr>
<td>Appropriateness and suitability (Baumann, 2000)</td>
<td>Very appropriate as material was locally available among communities</td>
<td>Appropriate as spares were available in local shops</td>
<td>Very appropriate as material was locally available among communities</td>
</tr>
<tr>
<td>Ease of operation and maintenance (O&amp;M) (Fraenkel, 1994 and Baumann, 2000)</td>
<td>Easy O&amp;M as design was simple and spares could be improvised from local material</td>
<td>Not easy to O&amp;M as spares were expensive and required trained personnel to repair</td>
<td>Easy O&amp;M as design was simple and spares could be improvised from local material</td>
</tr>
<tr>
<td>Reliability (Fraenkel, 1994 and Baumann, 2000)</td>
<td>Not suitable for large populations because it easily broken down</td>
<td>More reliable as it did not breakdown easily</td>
<td>Reliable but the bucket and chain wore out with time</td>
</tr>
<tr>
<td>Corrosion resistant (Baumann, 2000)</td>
<td>Did not corrode</td>
<td>Corroded easily-iron tainted water in Wards 9 and 15 boreholes</td>
<td>The chain used to draw the water bucket corroded easily</td>
</tr>
<tr>
<td>Ease of use (Fraenkel, 1994 and Baumann, 2000)</td>
<td>Easy to use such that the old, sick and disabled could get water</td>
<td>Easy to use when yield was high and when spares were new. Became heavy with time</td>
<td>Not very easy to use. Required a lot of energy to draw out the water bucket</td>
</tr>
</tbody>
</table>
Table 4.2 shows that the cost of a Windlass was cheaper than that of an Elephant Pump and B-type bush pump. The B-type bush pump had more components than the Elephant pump and the Windlass and hence was more expensive. According to the organisations implementing the activities, the costs explained why the Elephant Pump and the B-type bush pump were communal facilities, while the Windlass was being used for households by WVZ. The more expensive technologies were meant to benefit more people, while the cheap one was meant to benefit individual households. In case of breakdown of the Elephant pump and the B-type bush pump, communities would contribute towards repair so that the cost was manageable considering their total net income of US$1, 80 per household per day (Campbell, 2002). Repair would have been difficult if the two technologies were for individual households.

There were also other aspects of the design criteria which the technologies had, with regards to appropriateness, suitability and application. ZWP and WVZ indicated that the Elephant Pump and Windlasses were manufactured locally and therefore, were easy to repair and maintenance using simple, locally-available materials. This was in support of what Fraenkel (1994) and Baumann (2000) said in their design criteria recommendations for water lifting devices. The B-type bush pump was also manufactured locally, but the spares were more expensive and the communities in the three wards explicitly said that they could not afford to buy the spare parts for themselves. In Wards 9 and 15, spares came from ZWP and WVZ as part of the programmes for no payment, while Ward 7 got them from DDF for free.

Water point committee members argued that Elephant Pump, Windlass and B-type bush pump were easy to repair and install such that village mechanics could maintain the pumps themselves. They also argued that B-type bush pumps were more reliable, because they took long before breakdown than the Elephant Pump and the Windlass. This was because most of the parts for the B-type bush pumps were made of steel, unlike the Elephant Pump, which had PVC pipes and rubber washers. Although the Elephant pump and the Windlass broke down easily, they were easily repaired because of their simplicity of design, unlike the B-type bush pump, which required a lot of money and expertise to repair.

In the discussion on water quality during focus group discussions in Wards 9 and 15, one of the complaints raised was that water from boreholes was reddish in colour. Water users stated that they were reluctant to drink the water because of its colour. This could be an indication of corrosion of pipes due to the presence of iron. In Ward 9, there was evidence of corrosion on the chains used in wells to pull up the water bucket. The communities said it was almost a natural occurrence to them for the chains to rust, but it took place after a long time. Baumann (2000) termed corrosive water “aggressive water” and said it makes it imperative to use only fully corrosion-resistant pumps with plastic or stainless steel rising mains and rods. He went on to recommend the use of corrosion-resistant pumps, like the Elephant.

The users of the three technologies also talked about ease of use of the pumps. The borehole was said to be easy to operate before the spare parts wore out and the Elephant pump was said to be easy to operate such that even the sick could operate it without difficulty. The Windlass was difficult to operate because it required a lot of energy to pull out the bucket when it had water. The community in Ward 9 mentioned that they actually preferred the B-type bush pump to the Windlass, but apart from ease of use, the Windlass
had more advantages than the B-type bush pump. The major advantage that the Windlass had was that it was at household level and therefore closer to people. They concluded that the Windlass was more manageable and they spent less time on fetching water due to its proximity to their households. This gave the community time to do other productive work like field work in the irrigation scheme which was in the ward and the men could afford to look for jobs elsewhere so as to improve their livelihoods. Ease of operation was one of the design criteria highly recommended by Fraenkel (1994), Baumann (2000).

The materials to construct a VIP are not many and the cost averaged USD 110 depending on the design of the latrine, with labour included. It came out clearly during focus group discussions that most of communities could not afford to pay for construction of latrines. Given the total net income calculated by Campbell (2002) as US$1, 80 per household per day, which gives a total of US$55 per household per month, it is true that the communities could not afford to construct VIPs for themselves. The total net income might have decreased due to the economic challenges which the country faced over the last few years. The community said construction of VIPs was a luxury because they needed money for grocery, school fees, medical expenses and farming inputs and US$55 per month for an average household size of six was not adequate to save for latrine construction. In Ward 9 where the community was paying for its own construction, those who could not afford to pay cash paid in the form of small livestock or grain. They said it was not easy to get any income and it was also not easy to start income generating projects. This explained why there were very few latrines in Ward 7 compared to Wards 9 and 15 (see Section 4.3.2 on access to sanitation) which had non-governmental organisations implementing water supply and sanitation activities. The alternative that the communities in Ward 7 and those that have not been reached by the programmes in Wards 9 and 15 can adopt is the low cost technologies such as the ecological sanitation. These will help to reduce open defecation and have the advantage that the excreta is used as a resource in agriculture. The ecological sanitation has been used successfully in Ethiopia and is being used in other parts of Zimbabwe.

The design of the VIP was highly commended by communities in the three Wards. They said it was easy to construct, use and clean. It could also be adapted to suit the users’ condition, for example a rump could be put at the entrance if the latrine was to be used by a disabled person with a wheel chair. The only disadvantage that they said was that it could not be accessed inside the house and its use might be dangerous at night.

4.2.3 Functionality of water points
Functionality refers to whether the water point was working or not. Information on functionality of water points was sought from key informant interviews. Figure 4.3 shows results of functionality which came out of the key informant interviews with councillors. Table 4.3 shows the total number of boreholes, protected wells and VIPs from which the percentages for Figure 4.3 were derived.
Table 4.3  Total number of boreholes, protected wells and VIPs in Wards 7, 9 and 15 of Chivi District in March 2010

<table>
<thead>
<tr>
<th>Ward</th>
<th>Number of boreholes</th>
<th>Number of protected wells</th>
<th>Number of VIPs</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>17</td>
<td>69</td>
<td>323</td>
</tr>
<tr>
<td>9</td>
<td>16</td>
<td>40</td>
<td>732</td>
</tr>
<tr>
<td>7</td>
<td>11</td>
<td>12</td>
<td>95</td>
</tr>
</tbody>
</table>

Figure 4.3 shows that 78% of the wells in Ward 9 and 15 were functional, and 50% in Ward 7 and all functional water points were being put to use in all the three wards. In Ward 15, where the Elephant Pump was used for community wells, it was observed that most of the wells were functional because the technology was easy for the community members to repair. Locally available material, like old car tyres could be used to replace the washers and rope guide in the Elephant Pump if they got worn out. Four well diggers per well were trained to do the repair, hence the high percentage of functionality. The other 22% which was not functional were mostly dry wells which were shallow in depth of about 6 m and some were vandalised wells. Vandalism of some pumps was done by community members who wanted to use the parts for other things like making pots, hoes and the use of the rope for Elephant Pump to harness cattle. Although some community members were said to be able to repair their pumps, some were not very innovative and were still waiting for spare parts from the donor. Ward 9 also had a high percentage of functional wells mostly because they were household wells, which every household felt obliged to look after because they were personal property. The Windlass which was used for water lifting in Ward 9 was also easy to look after as it only needed greasing for maintenance. The other 22% were dry wells because of shallow depth. Ward 7 had 50% of its wells functioning with the use of makeshift Windlasses, which they installed for themselves. The other 50% were either dry or had worn out chains, which could not be used. The communities said they were failing to replace the chains because they were expensive and also not available in their local shops.

Functionality was also high for boreholes in Wards 9 and 15, with 88% each, unlike Ward 7, which had 75%. The high percentage of functionality was attributed to the presence of village pump minders who repaired boreholes in cases of breakdown in Wards 9 and 15. Ward 7 also had trained village pump minders, but most of them had left the villages and some had died, because they were trained a long time ago by DDF. It also came out during focus group discussions that those who were still available were never given tools by DDF and therefore not very efficient.

Latrines built by the programmes in both Wards 9 and 15 were all functional, because they were still within their design life. According to WHO (1996), the design life of latrines depends on the number of users and on average, one person produces a volume of $0.06 \, \text{m}^3$ of faecal matter per year. If the family size is six like what came out of the household survey on average size of households interviewed, with a pit depth of 3 m, which ZWP and WVZ were implementing, the design life of the latrine will be about...
eight years. This means that the latrines which the two organisations built were still within their design life when the study was carried out, because they were installed starting 2005. The oldest latrines were about five years old and still had about three years in use according to the formula provided by WHO (1996) and this explained why all the latrines installed by ZWP and WVZ programmes were still functional. Ward 7 had 95% functionality of latrines. The construction of most of the latrines was financed by individual households. The other 5% of latrines which were not functional in Ward 7 had filled up and some were collapsed.

4.2.4 Usage of water points and sanitation facilities
Use of the water points was influenced by design and functionality of the water points and sanitation facilities, according to data gathered from focus group discussions and key informant interviews. This meant that 78% of the wells in Wards 9 and 15 were in use, while 50% were in use in Ward 7. For boreholes, 88% of the boreholes were in use in Wards 15 and 9, whilst 75% were in use in Ward 7. This was mostly because the design of the technologies was convenient to the users in ways described in Section 4.1.2. Water points that were not in use were either dry or not functional.

All the latrines which were constructed by WVZ and ZWP were in use in Wards 9 and 15. Ward 7, which had all of its latrines self-financed by the households, had 95% of its latrines being used, while 5% were said to be full and some collapsed. The household survey also got responses to use of latrines in households that had got latrines from the programmes and those that were not from the programmes. Table 4.4 gives the results.

Table 4.4 Responses to use of latrines from the household survey Wards 7, 9 and 15 of Chivi District in March, 2010

<table>
<thead>
<tr>
<th>Ward</th>
<th>Response</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>Latrines in use</td>
<td>56</td>
<td>62</td>
</tr>
<tr>
<td></td>
<td>Latrines not in use</td>
<td>10</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>No latrines</td>
<td>24</td>
<td>27</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>90</td>
<td>100</td>
</tr>
</tbody>
</table>

| 9    | Latrines in use   | 79        | 88      |
|      | Latrines not in use | 0     | 0       |
|      | No latrines       | 11        | 12      |
|      | Total             | 90        | 100     |

| 7    | Latrines in use   | 42        | 47      |
|      | Latrines not in use | 3     | 3       |
|      | No latrines       | 45        | 50      |
|      | Total             | 90        | 100     |

In Ward 15, 62% of the respondents said that their latrines were in use, 11% were not in use and 27% had no latrines. Ward 9 had 88% of its latrines in use, whilst only 12% had no latrines. In Ward 7, 47% had their latrines in use, whilst 12% not in use and 50% had no latrines. The reason why some latrines were not in use in Ward 15 was because some were full and some collapsed and these were self financed before the programmes started. The results show that the communities in Wards 9 and 15 had better access to improved
sanitation facilities than those in Ward 7. This was because the number of households with latrines that were in use was high in Ward 9, followed by Ward 15. Ward 7 had the least number of households with latrines that were in use and also the largest percentage with households that did not have latrines. This shows impact of the sanitation programmes implemented by ZWP and WVZ.

4.2.5 Discussion and conclusions on status of water supply and sanitation programmes

From the foregoing results, two things are clear and these are summarized below:

- Of the three designs analyzed, the Elephant Pump had a more desirable design according to the community, using the design criteria given by Fraenkel (1994) and Baumann (2000).
- Functionality influenced use of the Elephant Pump, B-type bush pump, Windlass and the VIP in Wards 7, 9 and 15. Functionality and use of the water supply and sanitation facilities was high in Wards 9 and 15.

The Elephant pump had a desirable design because the investment cost was manageable if shared by community members, appropriate and suitable for the Chivi community, easy to operate and maintain, reliable, did not corrode and was easy to use. The B-type bush pump was expensive, susceptible to corrosion and was not so easy to use, whilst the Windlass was not easy to use and was susceptible to corrosion. Functionality and use were high in Wards 9 and 15, because there were aspects of the design of the technologies that communities found to be desirable and therefore could manage to keep them functional. Ward 7 which only had one type of water lifting technology, the B-type bush pump also had a high functionality and it had few protected water sources (Table 4.3). This was mostly because of the need for safe drinking water and caution which the communities are taking for fear of a cholera outbreak which struck the community in 2008.

A conclusion can be drawn that while it is true according to Fraenkel (1994) and Baumann (2000) that the design of water technologies affects functionality and subsequently use, the situation may be influenced by other factors such as limited choice of technologies and protected water points, like in Ward 7 and convenience in terms of proximity to the household in the case of the Windlass in Ward 9. This may cause the community to overlook the design aspects and focus on accessing safe drinking water. Looking at the design aspects of the Elephant Pump, B-type bush pump and Windlass, it can be concluded that Wards 9 and 15 had a wider choice of technologies, which were low cost and therefore better designs than Ward 7 which only had the bush pump. Communities in Wards 9 and 15 thus had a greater chance of always having functional facilities, because they had alternatives which were easy and cheap to maintain, thus showing the impact of the water supply and sanitation programmes on the livelihood of the communities could be sustained.

For sanitation, the design can really affect use of latrines. This is because if the design is not suitable, for example for a disabled person, he or she may find it very difficult to use. The design that was being used by ZWP and WVZ was suitable for communities because they also had special toilets which they constructed for disabled persons. The latrines were therefore in use. Ward 7 latrines also had the same design criteria as for Wards 9 and 15 and a high percentage of the available latrines were in use, except for those that had filled up and those that had collapsed. A recommendation can be made for
communities in Ward 7 and those that have not been reached by the programme in Wards 9 and 15, that they can make use of the ecological sanitation which is cheaper since they cannot afford to construct VIPs. This will improve coverage and reduce open defecation.

4.3 Comparative analysis of three wards using the Sustainable Livelihoods Framework.

4.3.1 Demographic characteristics and average size of household
Two hundred and seventy households were interviewed in Wards 7, 9 and 15. The respondents were grouped in terms of sex and age groups. Table 4.5 shows the distribution of respondents by sex and age.

<table>
<thead>
<tr>
<th>Ward</th>
<th>Sex</th>
<th>Age of the respondent in years</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>11-20</td>
<td>21-30</td>
</tr>
<tr>
<td>15</td>
<td>Male</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>1</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>1</td>
<td>19</td>
</tr>
<tr>
<td>9</td>
<td>Male</td>
<td>4</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>2</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>6</td>
<td>17</td>
</tr>
<tr>
<td>7</td>
<td>Male</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>4</td>
<td>17</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>6</td>
<td>19</td>
</tr>
</tbody>
</table>

Table 4.5 shows that more women were interviewed than men in all the three wards. This made the results of the household survey more credible because it was observed and confirmed by the household survey and focus group discussions, that women fetch water most of the time than men. They were therefore in a better position to give accurate information than men who were not directly involved in the activity.

The average size of households interviewed in Wards 9 and 15 was six and the mode was also six. Ward 7 had an average size of households of five and the mode being four. The size of the household influenced the amount of water consumed by the household per day. Appendix 3 shows the actual figures for household size in Wards 7, 9 and 15. On average the households with six members indicated that they required between 60-100 liters of water for use in their households per day. Households with five members required between 50-100 liters of water per day. Depending on availability and proximity, more water can be used.

4.3.2 Physical capital
Using the Sustainable Livelihoods Framework in water supply and sanitation, the physical capital comprises of issues of access to infrastructure, such as wells, boreholes, latrines. The results from the study will be presented and discussed below.
**Access to water**

The information collected on access to water covered the source of drinking water, average downtime, adequacy of water for the households, distance travelled, queuing time and water quality as perceived by consumers.

The household survey revealed that the respondents have different sources of water. These are shown in detail in Appendix 4. The summary is given in Figure 4.5.

![Figure 4.5 Sources of water of respondents from the household survey in Wards 7, 9 and 15 of Chivi District in March 2010](image)

Using Figure 4.5 it can be deducted that 88% of the respondents in Ward 15 were getting their water from protected sources, namely family protected and community protected wells as well as community and family boreholes. In Ward 9, 84% of the respondents were also getting water from improved sources, while in Ward 7 only 30% of the respondents were getting water from improved sources. A greater percentage (66%) of the respondents in Ward 15 were getting water from community protected wells because Zvishavane Water Project was implementing community wells, which were installed with Elephant pumps. For Ward 9, the greater percentage (46%) was using family protected wells because they were the major focus of World Vision’s water supply programme. Community boreholes also had a fairly large percentage (34%) of users because of the geology of Ward 9. The eastern part of the ward had hard rock, which made it difficult to do hand dug shallow wells, whilst the western side had soft rock which enabled hand dug wells to be constructed. About 67% of the respondents in Ward 7 were getting water from unimproved sources according to UNEP (2003) and Toubkiss (2006), mainly the sand wells. This was because the boreholes which were drilled during the Integrated Rural Water Supply and Sanitation (IRWSSP) programme were too few (shown in Table 3.1) to support the whole ward. According to the focus group discussion held with water point committees, three out of twelve boreholes were broken down in Ward 7 at the time of data collection. The water point committees were still trying to mobilise funds from the communities so that they could invite DDF to do the repairs, because they had no functional village pump minders, unlike in Wards 9 and 15. The access to improved sources by most respondents in Ward 9 and 15, distinguishes them from Ward 7 which
has had no interventions. Access to improved supplies has important roles in promoting food security, health and household maintenance, water-based livelihoods and livelihood diversification.

In relation to the MDG targets for 2015 for Zimbabwe, mentioned in the Country Status report for Zimbabwe (2010), Ward 15 had reached the target of 85% coverage according to the responses given in the household survey. Ward 9 which had 84% coverage was left with only 1% to meeting the target, while Ward 7 was still far from reaching the target of 85% coverage. This showed a difference in coverage in terms of water supply between the wards which had interventions and that which did not. Although this was the case, the three wards still had to meet the water supply policy target of Zimbabwe of 100% by 2015 in rural areas. This shows that although the NGOs have made some effort in improving the coverage, more has to be done to meet the targets in the water sector policy of Zimbabwe.

The results of the focus group discussions with men, women and water point committees showed that average downtime in the three wards was not very different. The average down-time was said to be between one week and one month. This was because all the communities had to source funds to enable the repairs and rehabilitations to take place and in Ward 7, members of water point committees said they did not want to take long before they repaired their boreholes because they had few protected sources so they wanted them functional so as to avoid disease outbreak. The downtime was long for Ward 7 if spares were not available at DDF. Communities were not able to buy them because most of them were expensive. A shorter downtime ensured that communities always had access to improved sources of water, thus encouraging good hygiene practices, reduction in distance travelled, which allows for time savings. The time will then be used for other productive work, which improves livelihoods.

Average distance travelled to water points was ascertained through measurement of distances to water points from households in two villages of Ward 7 and 15, using a Global Positioning System (GPS). The household survey also provided information on distance travelled to water points from the respondent’s point of view. The results from the GPS are shown in Figure 4.6 where only ten households are represented.

![Figure 4.6 Distances travelled to water points in Gwezuva and Huni villages of Ward 15 and 7 respectively in April, 2010](image)

Figure 4.6 shows that Ward 7 communities were travelling long distances to water points as compared to the 250m which Zimbabwe seeks to achieve by 2015 in its water sector
policy. Most of the people in Gwezuva village in Ward 15 were within the distance which Zimbabwe wants to achieve by 2015, although some households were still travelling distances more than 250m. The two villages were used to give a picture of the average distances that communities travel to fetch water in an area where there was an intervention and that where there was no intervention. This was because some communities were unable to give an estimation of distances that they travelled to water points. The results of Figure 4.6 show that the water points provided by ZWP had helped to reduce the distances that people travelled to water points. Ward 7 communities were still travelling long distances because the water points were few and far apart. Figure 4.7 shows approximate distances that respondents to the household survey said they travel to water points.

Figure 4.7 Respondents’ approximate distances travelled to water points in Wards 7, 9 and 15 in March 2010

Figure 4.7 shows that most of the respondents in Wards 9 and 15 were within the less than 100 m to 1 km range, while 49% in Ward 7 were travelling more than 1 km to water points. The discrepancies were high in Wards 9 and 15 for ranges less than 100 m and 100 m – 500 m, because Ward 9 had more family wells that were within the households, while Ward 15 had more community wells (refer to Figure 4.5). Community wells serve a lot of households which at times may be far apart, thus increasing the distance to the water points. Ward 7 also had community water points which are fewer than family water points, therefore the people had to travel long distances to access the few water points. The distances travelled to water points in Wards 9 and 15 were shorter than those in Ward 7, showing impact of water supply activities implemented by ZWP and WVZ. The distance travelled was one factor which determined whether or not communities were able to use the water points for purpose other than domestic. It also influenced time savings and use of it, particularly for women who fetch water most of the time. From observations made, more women in Ward 15, where distances to water points were shorter, were engaged in other income earning activities like gardening and selling of produce than in Ward 7, where distances were longer.

The queuing time at water points was obtained from the respondents in the household survey as well as focus group discussions with men, youths and women. Those who did not queue at all in Ward 15 were 62%, Ward 9, 75% and Ward 7, 47%. The focus group discussions revealed that queues were experienced at both boreholes and wells in Wards 9 and 15 when yield of water points reduced such that people converged at water points that had higher yield. Queuing time during the dry periods from around April to September could go up to one hour. In Ward 7, 43% of the respondents queued for long
periods of up to one or two hours. During focus group discussions, women also mentioned that the low yield during the dry season coupled with the few water points (Figure 4.5) that they had caused the long queuing time. They said most communities made an effort to seek protected sources of water because of the outbreak of cholera which struck the ward last year. Water users in villages without boreholes had to go to villages with boreholes for safe drinking water, thus causing longer queues. Congestion at school boreholes was also noticed during field visits. School children queued together with community members in one queue such that some hours of school work were taken up by fetching water, which they used for cleaning latrines and drinking in classrooms using hygiene buckets provided by CARE International. When yield of water points reduced, water point committee members would put timetables for fetching water, so that the available water was not wasted and to make sure that everyone got access. The long queuing time in Ward 7 contributed to disruptions in the people’s normal ways of living as well as compromised their ability to do productive work, thus impacting negatively on their livelihoods.

The household survey respondents were also asked on adequacy of water for domestic use from their water points. The results are shown in Figure 4.8.

**Figure 4.8 Responses to adequacy of water for use in the household by respondents in the household survey in Ward 7, 9 and 15 in Chivi District, March, 2010**

In Wards 9 and 15, 86% of the respondents in the household survey said the water that they got from their water points was adequate to meet all their household needs, while 14% said it was not adequate. In Ward 7, only 41% agreed that their water sources provided them with adequate water, while 59% said the water was inadequate. The Joint Monitoring Programme defines ‘access to drinking water’ as the availability of at least 20 litres of drinking water per person per day within 1 km of the dwelling (a 30 minute round-trip journey) (WHO/UNICEF JMP, 2010). Inadequacy in Ward 7 was because there were few protected water points (Figure 4.5) and the community had to travel long distances (Figure 4.6 and 4.7) to get the water. In some cases the service level for boreholes exceeded the 42 households or 250 people recommended by the Ministry of Health in the Project Management Handbook for water supply and sanitation projects (Butcher, 1990). The long distances and long queues hindered them from getting
adequate water for them to use in their households, thus compromising health and hygiene practices. The 14% of inadequate water supply in Wards 9 and 15 was caused by the low yield of some shallow wells in the two wards. According to focus group discussions with women and youths, communities in the two wards compensated for the inadequate water by fetching from neighbouring villages and households, while those in Ward 7 compensated for the inadequacy by fetching from unprotected sources, namely sand wells and open wells. This showed a difference between Wards 9 and 15 which had interventions and Ward 7 which did not have interventions.

**Access to sanitation**

WVZ and ZWP were promoting the construction of the VIP. There were some community members in Wards 9 and 15 who tried to finance themselves to construct latrines, but could not finish them. These are called pit latrines if they have a top slab, but without fly screen and according to UNEP (2003), these people have access to improved sanitation and they were considered as such in this study. Access to sanitation was ascertained through the household survey as well as focus group discussions with men, women and youths. Table 4.6 presents the results of access to improved sanitation in Wards 7, 9 and 15.

**Table 4.6 Responses of access to latrine by type in Wards 7, 9 and 10, Chivi District in March 2010**

<table>
<thead>
<tr>
<th>Ward</th>
<th>Response</th>
<th>VIP %</th>
<th>Pit latrine %</th>
<th>No latrine %</th>
<th>Total %</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>Yes</td>
<td>59</td>
<td>14</td>
<td>0</td>
<td>73</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>0</td>
<td>0</td>
<td>27</td>
<td>27</td>
</tr>
<tr>
<td>9</td>
<td>Yes</td>
<td>84</td>
<td>4</td>
<td>0</td>
<td>89</td>
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<td>No</td>
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<td>0</td>
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<td>11</td>
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<tr>
<td>7</td>
<td>Yes</td>
<td>33</td>
<td>16</td>
<td>0</td>
<td>49</td>
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<td></td>
<td>No</td>
<td>0</td>
<td>0</td>
<td>51</td>
<td>51</td>
</tr>
</tbody>
</table>

Table 4.6 shows that 59% of the respondents in Ward 15 were using the VIP, 84% in Ward 9 and only 33% in Ward 7. Ward 9 had the highest percentage of respondents with access to VIP because WVZ’s investment in sanitation was higher than that of ZWP according to their annual reports. In the year 2009/10, the annual budget for latrine construction for WVZ was USD 20,000, while for ZWP it was only about USD 6,804. The strategy that WVZ was using in sanitation also seemed to be more effective than that of ZWP, because WVZ gave latrine construction material to any household which had locally available materials ready and was able to pay the builder. ZWP on the other hand targeted vulnerable members of the community and these took long to dig the pits and gather locally available materials, such that about a hundred households had not finished latrine construction at the time of the study. They also give the builder latrine construction material, after construction of five latrines, which may not have been a priority to the builder, such that it took long for the builder to construct all the latrines because he had to look for hard cash to feed his family. Engaging committed builders was thus a problem according to focus group discussions held with women and men in Ward 15. Ward 7 had the least percentage because there was never a sanitation
programme in the ward and people were financing themselves to construct latrines. The information from focus group discussions, showed that most of the people in Ward 7 could not afford to construct standard latrines and that was why 16% of the respondents had pit latrines, which UNEP (2003) considers improved. Ward 15 respondents attributed the construction of pit latrines to their consciousness of the need for safe disposal of excreta as a result of the training that they got from the Ministry of Health through ZWP in health and hygiene. The number of respondents without latrines in Ward 7 was the largest with 51%, while Wards 15 and 9 had 27% and 11% respectively. This showed impact of the sanitation programmes in terms of coverage of the programmes implemented by ZWP and WVZ.

Sanitation has had a positive impact on the livelihoods of the poor. Safe sanitation made it possible for poor women and men to undertake initiatives and mobilise their assets. Without a minimal degree of safe sanitation, and the resulting improvements in health and the environment, the poor might lack sufficient energy and productivity to initiate and sustain relevant action, whether at household or community level (Borba et al., 2007). At household level, better sanitation has stimulated poor households to increase their economic and social status through house building or improvements.

According to the Country status report of Zimbabwe (2010), the MDG target for the country in terms of sanitation coverage was 68% and it was only Ward 9, which had reached and exceeded the target by 16%. Ward 15 was still lagging behind by 9%, while Ward 7 was still far off by 35%. This showed that sanitation coverage was still lagging behind, unlike water supply coverage and more financial investments were required in the sector, particularly in areas like Ward 7 where there were no donors, if the MDG target of 68% was to be met. The country sanitation sector policy target of 80% by 2015 was still even far off reach by Wards 7 and 15 and might be difficult to achieve if no major financial inputs are put into the sector. This applies to other areas in Zimbabwe where there have not been sanitation programmes.

**Health and hygiene knowledge**

The household survey and the focus group discussions also brought out information on health and hygiene knowledge. Questions were asked on whether they received training in health and hygiene and the type of training that they received. Table 4.7 shows the responses.

<table>
<thead>
<tr>
<th>Ward</th>
<th>Response</th>
<th>Type of training that the household received</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>PHHE %</td>
<td>Village health worker %</td>
</tr>
<tr>
<td>15</td>
<td>Yes</td>
<td>68</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>9</td>
<td>Yes</td>
<td>63</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>7</td>
<td>Yes</td>
<td>31</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Table 4.7 shows that 68% of the respondents in Ward 15 received training in PHHE and 31% did not receive any training. In Ward 9, 63% also got training in PHHE, a few as
The impact of rural water supply and sanitation programmes in Chivi District, Zimbabwe

Vimbayi Machiwana MSc IWRM 2009/10

Care facilitators and 33% did not receive any training, while in Ward 7 only 31% of the respondents received training and 62% did not. Respondents who received training in Wards 9 and 15 got it from the Ministry of Health and Child Welfare (MHCW), with funding from ZWP and WVZ. The village health workers and care facilitators were also trained by ZWP and WVZ through the MHCW. Ward 7 had the least percentage of people trained in PHHE because they only depended on training which they got from village health workers and the outreach was not as high as it would have been with external funding. The village health workers were trained by the MHCW programmes. Women in Ward 7 also acknowledged that they got some teachings from councillors during ward meetings.

4.3.3 Natural capital management

The issues to be discussed under management of natural capital include management of water wells, maintenance of water pumps, and effectiveness of management systems applied to water and availability of spare parts. These will be discussed under management of water infrastructure and sanitation infrastructure.

Management of water infrastructure

From the focus group discussions held with water point committees, they said they were responsible for ensuring safe keeping of water points. This applied to all the three Wards under study. The committee members were selected by the community at village meetings. Their role was to help community members to come up with rules and regulations for operating water points, ensure cleanliness of the water points, ensure that there was repair of water points in case of a break down. Contributions for repair were sought from community members by the water point committees. They were also responsible for implementing water rationing when yield was reduced. The water point committee members also indicated that there were some problems that they faced the management the water points. For school boreholes, mobilising labour was a problem. The community did not want to contribute labor yet they wanted to fetch water. The committee members said they would end up doing the work. There were also conflicting water uses at some water points, particularly those in Ward 7 where there were few water points. They said people agreed with the water point committee members that they would not use borehole water for watering gardens and livestock, but some would do these activities at night when most people were sleeping. These problems were said to be recurrent in the dry season when the yield of most water points was low. The water point committees also said that they faced a lot of resistance from communities when trying to implement decisions that they agreed with people at meetings. An example came out of Ward 15 where the chairperson was beaten up by some community members for removing the pump handle as a way of rationing water. Some have been threatened several times, both verbally and in writing on washing basins. It also came out in the wards under study that some communities are reluctant to attend water point committee meetings, clean the water points and contribute labour as well as funds for maintenance.

The other issue which was explored under management of infrastructure was the procedure for maintenance. For Ward 15, the Elephant Pump had a different procedure from that of boreholes. When the pumps broke down, the community informed the water point committee members who then invited the trained well diggers to look at the fault and determine whether it could be fixed without the requirement of spare parts. If spares were required, the well diggers would inform the water point committee members so that they could go to the Pump Aid office to get new for the spares. The most common spares
asked for were the PVC pipe and rope guide which were not available in the local shops. This had implications on the sustainability of the programme, because the community was going to be used to being given spares such that they were going to find it difficult to set aside funds for the spares. Despite this, some community members were innovative enough to make spares from locally available material like old tyres for washers and rope guide.

The procedure for maintenance of boreholes was similar in Wards 7, 9 and 15. When they broke down, village pump minders were invited to find the fault, which they would tell to the water point committee members. Water point committees would then call for village meetings to discuss the issue with other community members and call for contributions. The contributions were used to buy soap and food for the village pump minders during repair. For Ward 7, the community had to contribute enough to give the DDF officers bus fare to go to their villages to repair the boreholes as well as their payment. Wards 9 and 15 got their spares from WVZ and ZWP respectively for no payment as part of the programme, while Ward 7 got them for free from DDF when they were available. The water point committees in Ward 7 explained that the spares were not always available at DDF, because of inadequate funding. If unavailable a delay was caused in the rehabilitation of boreholes, causing a longer downtime. This showed the difference between Wards 9 and 15 which had interventions and Ward 7, which did not have such interventions.

Management of Sanitation infrastructure
Management of sanitation facilities was at household level as observed during field visits. Information from focus group discussions and the household survey also provided information on management of sanitation facilities. The household members would decide who cleaned and when to clean the latrines. The information gathered was similar in the three wards. Most households with latrines said they cleaned their latrines everyday and it was everyone who cleaned the latrines during bathing although mothers did thorough cleaning at times. This showed that the households were conscious of the importance of clean latrines.

4.3.4 Financial capital
Issues to be discussed under financial capital include productive uses of water, income realised and use of it.

Productive uses of water
The household survey, focus group discussions and field observations gathered information on other uses that communities were putting the water to, apart from domestic uses. Figure 4.9 shows these uses according to respondents from the household survey.
Figure 4.9 shows that although there were some activities being undertaken by some communities in Wards 9 and 15, most of the respondents were not using the water for productive purposes. In Ward 15 the respondents who were doing gardening were in community gardens, because the water points provided were communal and these are shown in Appendix 5. In Ward 9 there were more of backyard gardens as family wells were provided by WVZ. Family backyard gardens were expected to be more than those using communal wells, but it was not the case. This was because of the geology of Ward 9, which had hard soils, made it difficult to go deeper with hand digging. From observations made some households in Ward 9 had started small orchards at the end of the spillways to capture the wasted water. This is shown in Appendix 6. The reason why there were only a few people undertaking productive activities using the available water in Ward 15 was because the wells that were dug were low yielding as they were only less than 20 m in depth. This confirms one of Katsi’s (2006) conclusions in his study on multiple uses, that unavailability of water of adequate quantity can hinder multiple uses of water. Participants in the focus group discussions explained that although the water from most water points was adequate for household use, it was not enough for other activities. In Ward 15, they said that when the Elephant Pump was situated in the garden, its sole purpose was watering the plants as well as provide water for those who did the gardening when they were going home after the garden work. Boreholes in Wards 9 and 15 were not allowed to be used for any other activity except for domestic and livestock watering where cattle troughs were available. Figure 4.9 shows that Ward 7 which had few protected water sources (Figure 4.5) had some gardening activity taking place. This was explained in focus group discussions that some people had backyard gardens which they were watering using unprotected wells. They did the gardens so that they could get vegetables for their meals and for sale. The boreholes in Ward 15 were also not allowed to be used for any other activity, because they were inadequate to provide enough water for domestic purposes and were far from most households. Distance was also one of the factors that Katsi (2006) found to be a factor affecting multiple use of water and it was also confirmed by this study. The water point committees in Ward 7 pointed out that although they agreed as a community not to water livestock at the boreholes, some people came at night to water their livestock and fetch a lot of water using drums for garden watering.

The unavailability of adequate water supplies has hindered communities from engaging in productive activities like intensive gardening, which they indicated would want to do if water was available. This has limited the in terms of livelihood options and according to Katsi (2006), the availability of water for both domestic and productive purposes determines levels of income in cash and kind and also access to health and education.
Water is a productive asset for the poor and an economic good, which, can be combined with other assets to generate financial and non-financial livelihood benefits (Mokgope & Butterworth, 2001).

**Income from sales per month**

Respondents presented in Figure 4.9 as using their water for gardening said they did it for household consumption as well as for sale, unlike the other activities. The income that they realise per month is shown in Figure 4.10.

![Figure 4.10 Income realised per month from the sale of garden produce in Wards 7, 9 and 15](image)

Figure 4.10 shows that most of the people who were doing gardening were getting between 0-$20 per month from the sale of their produce. From the focus discussions held with men and women and the household survey conducted, most of the money raised was used to buy food for the households as well as pay for school fees. There were few individuals who said they used their money to buy clothes and buy assets, because they said the money was too little for them to do any major investments. Those who could afford to buy clothes and assets were in the range US$21-40 per month. The assets that they could afford to buy were small livestock, pots, plates and cups. This shows that although there were more activities for which water was used apart from domestic in Wards 9 and 15 than in Ward 7, the financial capital of the SLF needs to be strengthened in water supply and sanitation programmes as not many people were benefiting financially. The few that were benefiting were not able to do any major savings or investments. Financial benefits encourage sustainability of water points and livelihoods.

**4.3.5 Human capital**

Human capital includes skills and knowledge acquired from the water supply and sanitation programmes. Uses of these skills, knowledge, disease incidence, impact on boys and girls as well as impact on schools are also considered under human capital.

**Skills and knowledge acquired from the water supply and sanitation programme**

According to focus group discussions held with water point committee members, men, women and youths as well as the household survey conducted in Wards 9 and 15, several skills were acquired from the water supply and sanitation programmes that they have. Some of the skills were latrine construction, well digging, pump repair and health and hygiene knowledge. It also came out that although the programmes provided most of these skills through training, some of them were self acquired. Well digging was self
acquired for some through training on the job. Health and hygiene knowledge was also self acquired for some through learning from neighbours. Skills like latrine construction and pump repair were only meant for a few people, while health and hygiene training reached out to a lot of people, with the aim that the trained people would also reach to those who did not receive training. The skills were used to benefit households through providing cash and improving the health status of family members. Ward 7 communities also acquired some skills and knowledge from DDF and the MHCW, namely pump repair and health and hygiene knowledge through training of village health workers and care facilitators, respectively. Some latrine builders were also available and most were trained during the Integrated Rural Water Supply and Sanitation Programme. The major problem in Ward 7 was that some village pump minders trained by DDF had left the community in search of jobs. Those that were still available had no tool kits and were therefore not useful. The village health workers and care facilitators had no follow up from the Ministry of Health and were also not very active according to information obtained from focus group discussions. They only appeared during gatherings and when it was convenient to them. All these problems in Ward 7 should thus be a learning point to ZWP and WVZ. They should therefore strategise on how best they could retain their trained community members so that they would continue to exist and be effective even after they have phased out the programmes.

**Diarrheal diseases**

The prevalence of diarrheal diseases in the last two weeks before the survey was ascertained from the household survey. The results of households which had a family member contract diarrhoea in the last two weeks before the survey are shown in Figure 4.11.

![Figure 4.11 Diarrheal cases two weeks before the household survey according to responses from a household survey held in Wards 7, 9 and 15 in March 2010](image)

Figure 4.11 shows that Ward 7 had the highest percentage of respondents who had a family member who had diarrhoea in the last two weeks before the survey. The causes according to the respondents were varied ranging from badly cooked food, traditional brew, poor hygiene practices, but chief among them was poor water quality. This was because the majority of people in Ward 7 were getting their water from unprotected sources as shown in Figure 4.5. The impact that the disease had on the household came out from focus group discussions. They said most people had to divert funds meant for school fees and food in the household to pay for medical bills. Productive labour was also diminished when some household members fell sick. This had a trickle down effect in
that some children were not going to school until the money was available, while household nutrition was also compromised because they did not have a choice in terms of food to be consumed and in some cases had to reduce the number of meals consumed per day. Some households were said to have sold some assets so that they could afford the hospital bills, which affected their disposable income and subsequently, the livelihood of the household.

Wards 9 and 15 also had some incidences of diarrhoea, though fewer than those in Ward 7. The community nurses responsible for the two Wards attributed the reduced diarrheal incidences to improved water supply and sanitation facilities. The few cases recorded were as a result of badly cooked food, the traditional brew (mukumbi) which was popular during the time of the survey because the marula fruits were available. Poor hygiene by some households was also cited as a cause for diarrhoea in Wards 9 and 15.

**Cholera cases**

Records of cholera cases were also obtained for the year 2008/9 from rural health centres. Figure 4.12 shows the cholera cases for 2008/9 for Wards 7, 9 and 15.

![Figure 4.12 Cholera cases for 2008 from three rural health centres in Wards 7, 9 and 15 of Chivi District](image)

The information in Figure 4.12 was collected from three health centres, namely Mandamabwe, Takavarasha and Chifedza Health Centres for Wards 7, 9 and 15 respectively. Ward 15 had no cases of cholera recorded, Ward 9 had 33 cases and Ward 7 had 62 cases. From the interview held with one of the nurses at Takavarasha Clinic in Ward 9, cholera was introduced in the ward by someone who came from Beitbridge town, where it originated. The household members of the person were not aware of the disease and when they were caring for their relative two members contracted it and that is how it spread in the ward. Maybe the household was not well acquainted with health and hygiene issues and caring for the sick. In Ward 7, it was said to originate in the ward as there were still some cases in Hwari village during the time of the study. The village head informed the researcher that cholera was rampant in his village in 2008, but there were still some cases in February 2010 when the study was carried out. He attributed this to lack of protected sources of drinking water in his village. The whole village was fetching water from sand wells, where they queued for more than three hours at night. The sanitation situation in Ward 7 is also poor as most households are using the bush and this was said to have perpetuated cholera cases. The village head said this had really impacted
on their sexual productivity as women were always out at night looking for water from sand wells.

**Impact of water point and improved sanitation on girls and boys**

The impact of improved water supply and sanitation on girls and boys in Wards 9 and 15 came out clearly from focus group discussions with men, women and the youths themselves. Ward 7 participants were also asked about the impact of inadequate and unimproved water sources and sanitation on boys and girls. In Wards 9 and 15 they said there was now early attendance of school, because children were no longer travelling to faraway places to fetch water. This confirmed what the UN (2003, 2006) and Moe and Gangarosa (2009) said that school enrolment, attendance, retention and performance are improved by reduced water-carrying burdens due to improved access to water supply facilities. Teachers in school found it easier to demonstrate smartness which the pupils could easily copy because of the availability of water. The children now had more time to read and also go to church. Reduced mischief among boys and girls of school going age and out of school, because water points were closer to their households was also noted. The hours that they would take fetching water were reduced to less than 30 minutes as they used to take more than 3 hours. Parents actually said cases of unwanted pregnancy had reduced, although there are many factors which can influence this. The water supply and sanitation programmes also provided jobs, such as well digging, pit digging for latrine construction as well as latrine construction to youths.

The household survey and focus group discussion revealed that improved sanitation had increased privacy for girls as they could easily dispose of their menstrual material. Sanitation improvement allows women and girls to enjoy private, dignified sanitation, instead of embarrassment, humiliation and fear from open defecation (UN, 2003; UN, 2006; IWSD, 2007; Moe and Gangarosa, 2009). Although there were no cases of rape in the two wards, parents now felt that their girl children were more protected than when they didn’t have latrines.

In Ward 7, children took too much time travelling to fetch water, such that they had very little time to read. They also delayed going to school, while some even failed to go to school. There was so much mischief among boys and girls, such that girls were said to keep offering to go to the borehole to fetch water so they could meet the boys. Girls had no privacy as they throw their menstrual material everywhere. There were also no cases of rape of girl children on their way to water points and when using the bush, but parents said they simply agree with the boys to have sex. Dignity was compromised as parents met their girl children relieving themselves.

**Impact of water supply and sanitation programmes on schools**

Six headmasters from six schools were interviewed to ascertain the impact made from the water supply and sanitation programmes implemented by ZWP and WVZ. The results were categorized into water supply, sanitation and health and hygiene.

**Water supply**

The two schools interviewed in Ward 9 were Chidyamakono Primary School and Cheteni Primary School. Both schools had boreholes drilled at their schools, funded by WVZ. Before that Chidyamakono was getting water from a Government borehole driven by a diesel pump. It was not reliable as diesel was not always accessible from the Zimbabwe National Water Authority (ZINWA) in
Masvingo. Pupils would get water from sand wells in the river for cleaning of toilets and mopping classes. The river was about two kilometres away from the school, while resident teachers would get their water in a village which was two and a half kilometres away. In 2007 when water was scarce, the villagers were selling the water to the teachers at US$ 1 per 20 litre container. The impact was that teachers were late coming to school and would also dismiss early so that they would go in search of water. The pupils would start lessons late, but school enrolment, attendance, retention and teacher placement were not affected as there were other coping mechanisms, like pupils bringing bottle water for drinking. The teachers were also lured by the availability of electricity at the school. This is contrary to what the UN (2006) said should happen when it said that teacher placement is affected by lack of adequate water supplies. The situation was greatly improved by the drilling of a new borehole in 2007, which is only about 200 m from the school and the teachers’ residence.

At Cheteni Primary School, prior to being given the borehole, the school was getting water from sand wells in the river, which was about one kilometre from the school. The headmaster said diarrhoea and bilharzia were highly prevalent among school pupils as they would go to the river to fetch water for drinking and cleaning toilets. The distance to the river meant that they would have less time for school work and sporting. The headmaster also said it was very difficult for them to get student teachers because of the water supply situation and this was further perpetuated by the fact that there is no electricity at the school. As for the permanent teachers, the school had resorted to employing only local ones as a way of trying to retain them, because the turnover was high. This confirms what the UN (2006) said that teacher retention is difficult where there are no water supplies, but this varies depending on the location of the school and other living conditions, because the situation was different at Chidyamakono Primary School. School attendance and enrolment were not affected because they were using hygiene buckets which they got from CARE to fetch drinking water for classrooms. The borehole drilled by WVZ in 2009 had helped in improving the water supply situation and solving some of the problems that the school was facing.

In Ward 15, the two schools interviewed were Dzimati Primary School and Chifedza High School. At Dzimati Primary, the water supply situation was not very bad as there were two boreholes before they were given an Elephant Pump by ZWP. The only problem that they had was that the boreholes were heavy and therefore not popular with primary pupils. They were also sharing the boreholes with one village. The installation of the Elephant Pump helped to ease pressure at the boreholes and also made it easier for the pupils to fetch water as they thought the technology was easy to operate.

Chifedza high school had a borehole before the intervention of ZWP. The Deputy Headmaster at the school said they would supplement the water from the borehole with that from the dam. The water from the dam was therefore used to clean latrines and classrooms, while borehole water was used for domestic purposes. The school was given an Elephant pump by ZWP, which helped reduce distance to the dam and therefore improved time management of school classes. Unfortunately, the Deputy Headmaster said the Elephant Pump did not last long.
because it was outside the school fence. It was vandalized a year and half ago before the survey was conducted and they had not organized for its repair. So the school still had the same problems that it had in terms of water supply because when the borehole broke down, they would get their water from a borehole which was two and a half kilometres away. Despite this situation, staff turnover was not a problem at the school because there was electricity and the school was located close to the main road to Chivi Growth Point. Student enrolment and attendance were also not affected because the students carry water bottles from home.

In Ward 7, two schools, namely Jenya Primary and Jenya Secondary Schools were interviewed. The water supply situation was very different from that in Wards 9 and 15. The two schools were located close to each other and share two boreholes. From the interviews conducted, the boreholes were also used by six villages for water supply. One of the boreholes was seasonal and the other perennial and the headmaster at Jenya Secondary said the seasonal one was constantly broken down. The two headmasters concurred that the water from the boreholes was not enough for the population which was dependent upon it. Practical subjects such as agriculture were not possible to do because of the inadequacy of water. They had to put on hold all the projects that they had started to bring income into the schools, because of the inadequacy of the water. The headmaster at the secondary school said they tried digging a well at the school, but the funds were not enough to complete the well digging process. Queues were reported to be longer during the dry season such that some students would faint from thirst and lessons were delayed because the pupils would be queuing for water to clean latrines. However, school enrolment and attendance were not affect and this is contrary to what Rauniyar (2009) found out in Panjub, Pakistan. He found out that the reduction of time spent fetching water, rather than the reduction in labor force participation, explained why there was a significant improvement in the attendance rate for children of high school age in project communities over comparison communities.

Sanitation
Chidyamakono Primary and Cheteni Primary Schools in Ward 9 had latrine blocks donated by WVZ in order to increase access to sanitation by school pupils. In Ward 15, only Dzimati Primary School was assisted with ten squat holes by ZWP, while Ward 7 only has the latrines which were there when the schools were built. The impact on the three schools which were assisted was measured in terms of the squat hole to pupil ratio according to the Ministry of Education standard of one squat hole is to twenty five pupils. The ratios for the 2010 enrolment are shown in Table 4.8.

Table 4.8 Squat hole to pupil ratio for schools in Ward 9, 15 and 7 of Chivi District in March 2010

<table>
<thead>
<tr>
<th>Name of School</th>
<th>2010 enrolment</th>
<th>Number of squat holes in use</th>
<th>Squat hole to pupil ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Boys</td>
<td>Girls</td>
<td>Boys</td>
</tr>
<tr>
<td>Chidyamakono</td>
<td>350</td>
<td>345</td>
<td>15</td>
</tr>
<tr>
<td>Cheteni Primary</td>
<td>170</td>
<td>164</td>
<td>10</td>
</tr>
<tr>
<td>Dzimati Primary</td>
<td>208</td>
<td>215</td>
<td>10</td>
</tr>
<tr>
<td>Chifedza Secondary</td>
<td>258</td>
<td>243</td>
<td>12</td>
</tr>
<tr>
<td>Jenya Secondary</td>
<td>232</td>
<td>240</td>
<td>8</td>
</tr>
<tr>
<td>Jenya Primary</td>
<td>206</td>
<td>206</td>
<td>11</td>
</tr>
</tbody>
</table>
Table 4.8 shows that the squat hole to pupil ratio for the schools in Wards 9 and 15 were low as compared to those in Jenya Secondary School which is in Ward 7. These are compared to 1:25 recommended by the Ministry of Education in Zimbabwe. This is as a result of assistance which the schools have got from ZWP and WVZ. Despite the shortage of squat holes at Jenya Secondary School, enrolment and attendance by school pupils was not affected according to the headmaster. This is contrary to what Moe and Gangarosa (2009) said in her findings that approximately 50% of school dropouts among girls are due to inadequate sanitation. Chifedza Secondary did not get any intervention because the ratio of squat holes to pupils was lower than the 1:25 recommended by the Ministry of Education. Jenya Primary had ratios which were within the recommended ratio, but it is in Ward 7 which has never had an intervention. It was because the School Development Committee managed to mobilize funds for the construction of more latrines at the school. At the time of the study, six squat holes were almost completed.

The impact of the sanitation programme on schools was more evident at Dzimati Primary School in Ward 15, where the construction of latrines by ZWP was just under completion at the time of the study. Previously, the school had 20 squat holes for both boys and girls and of these 8 were collapsed because they were constructed a long time ago. These are shown in Figure 4.13a.

The Figure shows that when ZWP intervened at Dzimati Primary School, the boys were using 8 squat holes, while the girls were using 5 only. So the ratio for boys was 1:26 and that for girls was 1:43. These ratios were very high, particularly for girls compared to 1:25 recommended by the Ministry of Education. The headmaster said girls would queue at latrines during break time and this made the tea break longer than usual, thus affecting the school curriculum. With the assistance from ZWP, the ratios reduced to 1:21 and 1:22 for boys and girls respectively. Part of the new latrines are shown in Figure 4.13b. No more queues are seen at latrines during tea break. This shows clearly the impact that water and sanitation programmes have had on schools.

Health and hygiene activities
All primary schools in Wards 7, 9 and 15 had health and hygiene teachers as per requirement by the Ministry of Education. These teachers helped to ensure that
latrines were cleaned, there were clubs for health and hygiene at the school and that health and hygiene messages were disseminated to everyone in the school during assembly. These teachers became the entry point of WVZ and ZWP in Wards 9 and 15. WVZ and ZWP provided training to the teachers as training of trainers so that they could train the pupils and the rest of the teachers and this strengthened the existing health clubs.

The secondary schools did not have health and hygiene teachers, but Chifedza Secondary School had health clubs because of the water and sanitation programme implemented by ZWP. Jenya Secondary School did not have any health and hygiene activities taking place because they lacked encouragement. Given the training and the resources, they would certainly implement some health and hygiene activities according to what the headmaster said.

4.3.6 Social capital
The role of water point committees in changing relations among community members and conflicts brought about by the availability of water points will also be discussed under social capital.

Water Point Committees
Water point committees changed relations among communities. Focus group discussions confirmed that there was increased working together among people as they were brought together by water point committees. Responsibility of water points had also improved as a result of water point committees and the refresher courses that they got from WVZ and ZWP. The formation of water point committees also tried to empower women in that they gained equal participation in water supply issues. In some cases women actually had more representation in water point committees than men because they were thought to be the ones who manage water every day and this gave them status in society. This supports the assertion made by the UN (2003) that community-based organisations for water management improve the social capital of women. The situation was different in Ward 7 where women were said to be not so willing to become committee members and those who were in the committees did not contribute anything. They still thought that men were more superior and should therefore make decisions. This was also observed during the conduct of focus group discussions with water point committees in Ward 7. To show that women in Wards 9 and 15 were more empowered to enter into water point committees than they were in Ward 7, Table 4.8 shows the gender composition of some committees in the three Wards.
Table 4.9 shows that there was almost equal representation between men and women in some committees of Wards 9 and 15, while those in Ward 7 were still male dominated. This shows that the water supply and sanitation programmes have had some influence on women participation and empowerment as men and women were encouraged to take part in water management. The empowerment of women improves their social capital.

**Conflicts**

Although there have been some improvements in the social construct of communities as a result of water supply and sanitation programmes, there were conflicts which arose from water points in the three Wards. These came out of focus group discussions with men, women, youths and water point committee members. In Wards 9 and 15 conflicts arose when those who did not pay for maintenance wanted to fetch water and suspicion of committee members when they wanted to collect funds for maintenance also caused conflicts as they thought the committee members would take some of the money for their personal use. Conduct of cleaning duties at water points always caused disagreements at water points. These were usually resolved by the committees with the help of village heads.

In Ward 7, more conflicts came in the peak of the hot season when most water points were low yielding. People would be jumping queues, which caused quarrels. It is also alleged by women and youths that some people would want to fetch more water than what was agreed for everyone in the dry season. Water points were taken as a point of convergence, where people gossiped and settled scores, especially in this community where people would queue for long at water points before they could fetch water. Conflicts also arose in issues of water uses. Most communities agreed that boreholes should not be used for livestock watering and gardening, but some people would come at night to fetch a lot of water for gardening and also bring livestock for watering. Conflicts over payments for maintenance and cleaning of water points were also found in Ward 7. Some of the conflicts were resolved at a personal level and some would go to the village heads.
4.3.7 Discussion and conclusions on comparative analysis of three Wards using the Sustainable Livelihoods Framework

From the results on the second objective, the following is evident:

- **Physical capital**
  - Wards 9 and 15 had improved sources of water than Ward 7 according to the classification given by UNEP (2003) and Toubkiss (2006).
  - The distance traveled to water points in Ward 7 were longer than the 250m stipulated in Zimbabwe’s water sector policy. Wards 9 and 15 communities were travelling shorter distances, with some below 250m and some close to it, particularly in Ward 9, where there were household wells.
  - Queuing time was shorter in Wards 9 and 15, because they had more water points as shown in Table 4.3 and Figure 4.5.
  - Sanitation coverage is higher in Ward 9, followed by Ward 15 and lastly Ward 7.
  - Health and hygiene knowledge was higher in Wards 9 and 15 owing to training provided by WVZ and ZWP, unlike in Ward 7, which depended on training from the MHCW.

- **Natural capital management**
  - Water point committees are responsible for managing water points in the three wards under study. The committee members in the three wards encounter similar problems in managing the water points.

- **Financial capital**
  - The water points provided by the NGOs in Wards 9 and 15 were mostly used for domestic purposes and few were used for productive purposes, mostly because the water points were shallow below 20m in depth and that boreholes were not used for productive purposes in all the three wards. The productive uses mentioned were gardening, pottery, brick making and livestock watering, with gardening being the most common. Ward 7 got water for other uses from dams, river and unprotected wells.
  - Income realized was from the sale of garden produce only and most got between 0-$20 per month, which was not enough meet the family’s needs and do major investments.

- **Human capital**
  - The programmes provided some skills to the communities in Wards 9 and 15 and these were in latrines construction, well digging, and pump repair and health and hygiene knowledge. Ward 7 also acquired some skills and knowledge from the MHCW and DDF and some were self acquired.
  - Diarrheal and cholera diseases were more prevalent in Ward 7 than in Wards 9 and 15 and this was attributed to inadequate water supply and sanitation facilities in Ward 7.
  - The water supply and sanitation programmes implemented by WVZ and ZWP have had some impact on boys and girls and this confirmed some assertions made by the UN (2003), UN (2006), IWSD (2007) and Moe and Gangarosa (2009).
  - The water supply programme in schools helped to improve timeliness with which activities are done at the schools and teacher retention in schools in Ward 9 and 15, although some improvements still need to be done.
  - The sanitation programme helped to reduce the squat hole to pupil ratio.

- **Social capital**
- Formation of water points committees as well as their training has helped to empower women in Wards 9 and 15, unlike in Ward 7 where there was no training. This was shown by their active participation in water point committees.
- Conflicts were recorded in the three wards, but they were more in Ward 7

In conclusion, some impact was made by water supply and sanitation programmes implemented by WVZ and ZWP in Wards 9 and 15 compared to Ward 7 which had no such intervention. The impact was more visible in the physical, human and natural capital management, unlike the social and financial capital. This was because access to water supply and sanitation facilities, management of the facilities and skills and disease incidences were more improved in Wards 9 and 15 than in Ward 7. Improvements in these have allowed communities to have time to do other productive activities, remain healthy and not divert funds to medication and therefore improve their livelihoods. The financial capital still needs to be strengthened because there were still very little economic benefits accrued from the water supply and sanitation programmes as shown by the number of people engaged in activities other than domestic use of water as well as the income realised (shown in Figures 4.9 and 4.10). Productive use of water which strengthens the financial capital has implications on system and impact sustainability, according to studies carried out by Moriaty et al., (2004) and Katsi (2006) because they provide opportunities to turn water into the cash needed to buy spare parts and to pay for routine maintenance. The social capital also needs some strengthening because the conflicts which arise from the use of water points do not encourage good social relations.
5. CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions
The study which was conducted in Chivi District on impact of water supply and sanitation programmes implemented by ZWP and WVZ came up with the conclusions shown in Table 5.1:

Table 5.1 Conclusions of the study carried out in Chivi District on the impact of water supply and sanitation programmes

<table>
<thead>
<tr>
<th>Objective</th>
<th>Conclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>To evaluate water supply and sanitation programmes implemented by World Vision Zimbabwe and Zvishavane Water Project in Chivi District since 2005 in terms of design, functionality and usage.</td>
<td>The design of water supply and sanitation facilities has an influence on their functionality and use and this subsequently determines the impact of programmes. Simpler designs like the Elephant Pump and Windlass, which have spare parts available locally and among communities are more likely to be kept functional than those which do not have spare parts readily available. This encourages sustainable impact on the livelihoods as there will be reliable and robust sources of safe water. However, these technologies have advantages and disadvantages and if the advantages outweigh the disadvantages and also if the communities have no other choice of technology like in Ward 7, they can accept the available ones and keep them functional so as to access safe drinking water. As for sanitation, the VIP has proved expensive to construct, both for the NGOs and for the community, although it has the advantages of ease of use and is easy to adjust to suit the users condition.</td>
</tr>
<tr>
<td>To make a comparative analysis of the impact of water supply and sanitation programmes in three Wards using the Sustainable Livelihoods Framework.</td>
<td>There is definitely a change in the livelihoods of communities which have had water supply and sanitation interventions in Chivi District than those that did not have interventions, particularly in the physical, natural and human capitals. The financial and social capitals are not very concrete in water supply and sanitation programmes by WVZ and ZWP as there are little financial benefits as well as conflicts which arise from use of the facilities. This reduces the contribution to livelihoods by the programmes as the financial capital has implications on the system and impact sustainability.</td>
</tr>
</tbody>
</table>
5.2 Recommendations

This study thus recommends the following:

1. NGOs should implement more of low cost technologies, which communities can look after using locally available materials as this will ensure sustainability.

2. Geological surveys should be done before water point development to ensure that wells have a greater depth and therefore yield more. This will enable use of water for productive purposes which encourage continued functionality of water points, thereby ensuring sustainable impact on livelihoods.

3. Government should support donor activities through policy and extension services to ensure that the activities are sustainable and yield more impact on livelihoods. This can be done through approving low cost water supply and sanitation technologies, apart from the B-type bush pump and the VIP and provision of adequate and equipped Government extension staff.
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APPENDICES
### APPENDIX 1: IMPACT OF IMPROVED WATER SUPPLY AND SANITATION SERVICES IN THE CONTEXT OF MDGs

<table>
<thead>
<tr>
<th>MDG</th>
<th>Impact caused by improved water supply and sanitation</th>
<th>Authors</th>
</tr>
</thead>
</table>
| Goal 1. Eradicate extreme poverty and hunger | - Healthy people are better able to absorb nutrients in food than those suffering from water-related diseases, particularly helminth one infections, which rob their hosts of calories. *  
- Access to safe drinking water and adequate sanitation helps reduce household expenditures on health care.  
- The time lost because of long-distance water collection and poor health contributes to poverty and reduced food security.  
- Water as a direct input into irrigation, for expanded grain production. **  
- Increased productivity of elders due to better health from improved water supply and sanitation facilities | UN, 2006*; UN, 2003**; Moe and Gangarosa, 2009 |
| Goal 2. Achieve universal primary education | - Promotion of a healthy school environment is an essential element of ensuring universal access to education. School enrolment, attendance, retention and performance are improved; teacher placement is improved. *  
- Improved health and reduced water-carrying burdens improves school attendance, especially among girls. Approximately 50% of school dropouts among girls are due to inadequate sanitation. ***  
- Separate school sanitation facilities for girls and boys increases girls’ attendance, especially after they enter adolescence. * | UN, 2006*; UN, 2003; Moe and Gangarosa, 2009*** |
| Goal 3. Promote gender equality and empower women | - Sanitation improvement allows women and girls to enjoy private, dignified sanitation, instead of embarrassment, humiliation and fear from open defecation.  
- Access to safe drinking water and sanitation reduces the burden on women and girls of looking after sick children or siblings and from water carrying, giving them more time for productive endeavours, (adult) education and leisure. ****  
- Water sources and sanitation facilities closer to home reduce the risk of assault for women and girls when collecting water or searching for privacy.  
- Community based organisations for water management improve social capital of women. ** | UN, 2006; UN, 2003**; Moe and Gangarosa, 2009; IWSD, 2007**** |
| Goal 4. Reduce child mortality | Improved quantity and quality of domestic water and sanitation reduce main morbidity and mortality factor for young children. ** - Better nutrition and a reduced number of episodes of illness lead to the physical and mental growth of children. | UN, 2006; UN, 2003**; UNSD, 2007 |
| Goal 5. Improve maternal health | Improved health and reduced labour burdens from water portage reduce mortality risk. - Safe drinking water and basic sanitation are needed in health-care facilities to ensure basic hygiene practices following delivery. * | UN, 2006*; UN, 2003; IWSD, 2007 |
| Goal 7. Ensure environmental sustainability | Improved water management including pollution control and sustainable levels of abstraction, are key factors in maintaining ecosystems integrity. ** - Development of integrated management within river basins creates conditions where sustainable ecosystems management is possible and upstream and downstream impacts are mitigated. ** - Adequate treatment and disposal of wastewater result in a sharp decrease in environmental contamination by faeces, which contribute to better ecosystem conservation and less pressure on scarce freshwater resources. * - Careful use of water resources prevents contamination of groundwater and helps minimize the cost of water treatment. * - Better health is linked to a reduction in poverty and helps to put less strain on natural resources. | UN, 2006*; UN, 2003**; IWSD, 2007 |
| Goal 8. Develop a global partnership for development | Development agendas and partnerships should recognize the fundamental role | UN, 2006 |
Target 12: Develop further an open, rule-based, predictable, non-discriminatory trading and financial system.

Targets 13 and 14: Address special needs of less developed countries, landlocked and small island developing countries.

Target 15: Deal comprehensively with the debt problems of developing countries through national and international measures in order to make debt sustainable in the long term.

Target 16: In cooperation with developing countries, develop and implement strategies for decent and productive work for youth.

Target 17: In cooperation with pharmaceutical companies, provide access to affordable essential drugs in developing countries.

Target 18: In cooperation with the private sector, make available the benefits of new technologies, especially information and communications.

<table>
<thead>
<tr>
<th>Target</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>Develop further an open, rule-based, predictable, non-discriminatory trading and financial system.</td>
</tr>
<tr>
<td>13</td>
<td>Address special needs of less developed countries, landlocked and small island developing countries.</td>
</tr>
<tr>
<td>14</td>
<td>Address special needs of less developed countries, landlocked and small island developing countries.</td>
</tr>
<tr>
<td>15</td>
<td>Deal comprehensively with the debt problems of developing countries through national and international measures in order to make debt sustainable in the long term.</td>
</tr>
<tr>
<td>16</td>
<td>In cooperation with developing countries, develop and implement strategies for decent and productive work for youth.</td>
</tr>
<tr>
<td>17</td>
<td>In cooperation with pharmaceutical companies, provide access to affordable essential drugs in developing countries.</td>
</tr>
<tr>
<td>18</td>
<td>In cooperation with the private sector, make available the benefits of new technologies, especially information and communications.</td>
</tr>
</tbody>
</table>

Target 12: Develop further an open, rule-based, predictable, non-discriminatory trading and financial system.

Countries that illustrate improved access to and quality of safe drinking water and sanitation are more attractive, boosting tourism and national image.

- These countries have more options for employment creation, as water supply and sanitation provision is labour intensive.

- Safe drinking water and better sanitation provide a better chance for completing schooling, which leads to higher youth employment.

- Including health impact assessment in water resources development planning prevents the transfer of hidden costs to the health sector.

Please note: The asterisk on the impacts column indicate that the issue is peculiar to a particular author whose name also has a similar asterisk. No asterisk means the issue is common to all the authors.

Table 1.1 shows that water is a vital resource as indicated in the Dublin Principles of 1992 and achievement of all the eight MDGs is directly and indirectly related to water.
APPENDIX 2: HOUSEHOLD SURVEY QUESTIONNAIRE

ASSESSMENT OF LIVELIHOOD IMPROVEMENT DUE TO WATER SUPPLY AND SANITATION ACTIVITIES IN CHIVI DISTRICT OF ZIMBABWE

Enumerator; .......................................................... ..........................................................
Date of interview; .......................................................... ..........................................................
1. Ward name & number; .......................................................... ..........................................................
2. Village name; .......................................................... ..........................................................
3. Organisation implementing WSS activities; .......................................................... ..........................................................

Please circle the responses.

<table>
<thead>
<tr>
<th>Section A: Respondent’s information</th>
</tr>
</thead>
<tbody>
<tr>
<td>4. Position in HH</td>
</tr>
<tr>
<td>1. Daughter</td>
</tr>
<tr>
<td>2. Son</td>
</tr>
<tr>
<td>3. Niece</td>
</tr>
<tr>
<td>4. Nephew</td>
</tr>
<tr>
<td>5. Aunt</td>
</tr>
<tr>
<td>6. Uncle</td>
</tr>
<tr>
<td>7. Mother</td>
</tr>
<tr>
<td>8. Father</td>
</tr>
</tbody>
</table>

6. Sex:
1. Male
2. Female

7. Marital status
1. Single (never married)
2. Married
3. Divorced
4. Widow
5. Widower

If respondent is not household head fill the details of the HH head in the box below

8. Age in years
1. 0-10
2. 11-20
3. 21-30
4. 31-40
5. 41-50
6. 50+

9. Marital status
1. Single
2. Married
3. Widow
4. Widower
5. Divorced

10. Sex
1. Male
2. Female
Section B: Household demographic information

<table>
<thead>
<tr>
<th>Age groups in years</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. 0-10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. 11-20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. 31-40</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. 41-50</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. 50+</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Section C: Water supply information (Physical capital)

12. What is the source of your drinking water? (tick all that apply)

- 1. Family protected well
- 2. Family unprotected well
- 3. Community well (protected)
- 4. Community well (unprotected)
- 5. Community borehole
- 6. Family borehole
- 7. Tap water
- 8. River/Dam
- 9. Other
- 10. Don’t know

13. Source | State

- Borehole
  - 1. Functional
  - 2. Broken down
  - 3. Collapsed
  - 4. Other
  - 5. Don’t know

- Well
  - 1. Functional
  - 2. Broken down
  - 3. Dry
  - 4. Collapsed
  - 5. Don’t know

- Tap
  - 1. Functional
  - 2. Broken down
  - 3. Cut off supplies

14. When was it installed?

- 1. Before 2004
- 2. 2004
- 3. 2005
- 4. 2006
- 5. 2007
- 6. 2008
- 7. 2009
- 8. 2010

15. How reliable is the source?

- 1. Perennial
- 2. Seasonal
- 3. Other
- 4. Don’t know

16. If the borehole or well breaks down, how long is the down time?

- 1. One week
- 2. Two weeks
- 3. Three weeks
- 4. One month
- 5. More than one month
- 6. Other
- 7. Don’t know
- 8. Never happened

17. How often do you fetch water for domestic purposes?

- 1. Everyday
- 2. Twice a week
- 3. Once a week
- 4. Other
<table>
<thead>
<tr>
<th>18. How many times do you fetch water in a day?</th>
<th>19. How many containers do you carry to fetch water?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Once</td>
<td>1. One</td>
</tr>
<tr>
<td>2. Twice</td>
<td>2. Two</td>
</tr>
<tr>
<td>3. Three times</td>
<td>3. Three</td>
</tr>
<tr>
<td>5. Other...............................................</td>
<td>4. Four</td>
</tr>
<tr>
<td></td>
<td>5. Other...............................................</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>20. What is the size of the containers that you carry to fetch water?</th>
<th>21. How many litres of water do you require for your household per day?</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 litres</td>
<td>1. 20-40 litres</td>
</tr>
<tr>
<td>20 litres</td>
<td>2. 50-60 litres</td>
</tr>
<tr>
<td>40 litres</td>
<td>3. 70-80 litres</td>
</tr>
<tr>
<td>100 litres</td>
<td>4. 100+</td>
</tr>
<tr>
<td>200 litres</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>22. Is the water adequate to meet all your household needs?</th>
<th>23. If not, what is the reason?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Yes (go to q 24)</td>
<td>1. Water point is too far</td>
</tr>
<tr>
<td>2. No</td>
<td>2. Water point is low yielding</td>
</tr>
<tr>
<td></td>
<td>3. Queuing time is too long</td>
</tr>
<tr>
<td></td>
<td>4. Other............................................................................</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>24. How do you compensate the difference?</th>
<th>25. How far is the water source from your home?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. From unprotected sources</td>
<td>1. Less than 100m</td>
</tr>
<tr>
<td>2. River</td>
<td>2. 100m-500m</td>
</tr>
<tr>
<td>3. Dam</td>
<td>3. 600-1km</td>
</tr>
<tr>
<td>4. Make use of what we get from the borehole/well</td>
<td>4. Over 1km</td>
</tr>
<tr>
<td>5. Other............................................................................</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>26. How long does your HH queue at your water point to get water?</th>
<th>27. Does your HH have a latrine?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Don’t queue</td>
<td>1. Yes</td>
</tr>
<tr>
<td>1. Less than 10mins</td>
<td>2. No</td>
</tr>
<tr>
<td>2. 10-30mins</td>
<td></td>
</tr>
<tr>
<td>3. 30mins-1hr</td>
<td></td>
</tr>
<tr>
<td>4. 1hr-2hrs</td>
<td></td>
</tr>
<tr>
<td>5. 2hrs+</td>
<td></td>
</tr>
<tr>
<td>6. Other............................................................................</td>
<td></td>
</tr>
<tr>
<td>7. Don’t know</td>
<td></td>
</tr>
</tbody>
</table>

**Section D: Sanitation information**

<table>
<thead>
<tr>
<th>28. If Yes, what is the type of latrine</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. BVIP</td>
</tr>
<tr>
<td>2. Pit latrine</td>
</tr>
<tr>
<td>3. Flash toilet</td>
</tr>
<tr>
<td>4. Other............................................................................</td>
</tr>
</tbody>
</table>
### The impact of rural water supply and sanitation programmes in Chivi District, Zimbabwe

#### Vimbayi Machiwana MSc IWRM 2009/10

**Section E: Health and hygiene issues**

<table>
<thead>
<tr>
<th>Question</th>
<th>Options</th>
</tr>
</thead>
</table>
| 29. Who provided material for construction of the latrine? | 1. Self  
2. Donor  
3. Relatives  
4. Children who are employed  
5. Other  
6. Don’t know |
| 30. Who paid the builders for construction of the latrine? | 1. Self  
2. Donor  
3. Relatives  
4. Children who are employed  
5. Other  |
| 31. Are you using it at the moment? | 1. Yes (go to q 33)  
2. No |
| 32. If no, why not? | 1. Collapsed  
2. Not used to using it  
3. Cultural reasons  
4. Full  
5. Not gender appropriate  
6. Other  |
| 33. Do you clean the latrine? | 1. Yes  
2. No |
| 34. Who cleans the latrine? | 1. Mother  
2. Father  
3. Boys  
4. Girls  
5. Other  
6. Don’t know |
| 35. Have you ever received training on hygiene practices? | 1. Yes (go to q 39)  
2. No |
| 36. What sort of training was it? | 1. PHHE  
2. Village Health Worker  
3. Other |
| 37. Who trained you? | 1. ZWP  
2. WVZ  
3. Ministry of Health  
4. Other  
5. Don’t know |
| 38. How has it been useful in the HH? | 1. Adopted well digging  
2. Constructed a latrine  
3. Increased smartness in the HH  
4. Reduced diseases  
5. Other |
| 39. Is there a hand washing basin at the latrine? | 1. Yes  
2. No |
| 40. Do you wash your hands after using the toilet? | 1. Yes  
2. No (go to 3) |
| 41. What do you use to wash your hands after using the toilet? | 1. Water only  
2. Water and soap  
3. Water and ash  
4. Do not wash hand  
5. Other |
| 42. Do you treat your water before drinking? | 1. Yes  
2. No |
### Section F: Financial capital

43. **How do you treat water for drinking in the household?**
   - 1. Boil
   - 2. Solar disinfection
   - 3. Sedimentation
   - 4. Tablets
   - 5. Moringa
   - 6. Do not treat at all
   - 7. Other..............................
   - 8. Don’t know

44. **What other uses are you putting the water to, apart from domestic?**
   - 1. Gardening
   - 2. Pottery
   - 3. Brick making
   - 4. Livestock watering
   - 5. Nothing (go to q 51)
   - 6. Other..............................
   - 7. Don’t know

45. **What is the purpose of the activity?**
   - 1. Income generation
   - 2. Household (go to q 49)
   - 3. Both 1 and 2

46. **If it is for sale, how much income do you make per month?**
   - 1. $0-20
   - 2. $21-40
   - 3. $41-60
   - 4. $61-80
   - 5. $81-100

47. **What do you use the money for?**
   - 1. To buy food in the HH
   - 2. To pay school fees
   - 3. To buy clothes
   - 4. To buy assets
   - 5. Other..............................

48. **What assets have you purchased from the proceeds of the activity since the water point was installed?**
   - 1. Livestock
   - 2. Television
   - 3. Radio
   - 4. Chairs
   - 5. Pots
   - 6. Plates and cups
   - 7. Other..............................
   - 8. Don’t know

49. **If the activity described in question 44 is for household consumption, what is the value of the food consumed in monetary terms per month?**
   - 1. $10-20
   - 2. $21-30
   - 3. $31-40
   - 4. $41-50
   - 5. $51+

50. **What other financial benefits are you getting from the water point?**

51. **What skills have you got from the WSS programme?**
   - 1. Well Digging

52. **If you have gained any of the skills mentioned in 41, how are you using them for the benefit of your HH?**
| Well digging for cash | 1. Installation of Elephant pump |
| EP installation for cash | 2. Borehole repair for cash |
| Borehole repair for cash | 3. Building for cash |
| Improve health and hygiene practices in the HH | 4. | 5. |
| Other | 6. Other | 7. Don’t know |

53. Is there any member of the family who has had diarrhoea in the last two weeks?
- Yes
- No (go to q 56)

54. If yes, what could be the cause of the diarrhoea?
- Poor water quality
- Poor hygiene practices
- Badly cooked food
- HIV and AIDS
- Other

55. What was the impact of the illness on the household?
- Caused death
- Reduced manpower for field work
- Diverted some money to medical care
- Other

56. Of the following diseases, which one is more prevalent among the family members?
- Diarrhoea
- Dysentery
- Worms
- Bilhazia
- Cholera

57. How have you been treating it?
- Ensuring more hygiene practices
- Learning from others on how it can be combated
- Going to the hospital/clinic
- Doing nothing about it
- Other

58. With the water point provided by the donor, how much time are you saving on fetching water?
- 30 mins
- 1hr
- 1hr 30 mins
- 2hrs
- Other

59. What are you using the time for?
- Gardening
- Going to school
- More time with the sick
- More time to do the HH chores
- Income generating project
- Other

60. Who fetches water most of the time in the household?
- Mother
- Father
- Boys
- Girls
- Mother and girls
- Boys and girls
- Other

61. What has been the impact of the water point provided on the girls and boys?
- More time to attend school
- More time to do the HH chores
- More time to play with others
- Less illnesses from head potter age over long distances
- Less chances of abuse of the girl child
- Other

62. What improvements have been brought to the family as a result of construction of the latrine?
- Less prevalence of diarrhoeal diseases
- Less flies around the household
- Less chances of abuse of the girl child
- Improved hygiene due to improved waste disposal
- Other
### Section H: Social capital

63. How has the water point changed relations within the community?

1. Improved safety nets
2. Improved working together
3. Has brought conflicts
4. Other ..................................................

64. Do you have a water point committee (WPC)?

1. Yes
2. No

65. How many people constitute the WPC?

1. Four
2. Five
3. Six
4. Seven
5. Other ..................................................

66. What is the gender composition of the WPC?

<table>
<thead>
<tr>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>4</td>
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<td>5</td>
<td>5</td>
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<td>7</td>
<td>7</td>
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<tr>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>9</td>
<td>9</td>
</tr>
</tbody>
</table>

67. Are you a member of the water point committee?

1. Yes
2. No

68. Do committees for the well or borehole consult other community members on issues regarding the water point?

1. Yes
2. No
3. Don’t know

69. Who controls the water point?

1. A particular family
2. The WPC
3. The whole community
4. Other ..................................................
5. Don’t know

70. Who makes decisions about the water point?

1. Men
2. Women
3. Men and women
4. Children
5. Other ..................................................
6. Don’t know

71. Are the decisions taken always favourable to all members of the community?

1. Yes (go to q 73)
2. No
3. Don’t know

72. If not, how does the community deal with such cases?

1. Go to the village head
2. Consult the chief
3. Consult the donor
4. Community members contest the decision
5. Other ..................................................
6. Don’t know

73. Are there people who are not allowed to fetch water from the water point?

1. Yes
2. No (go to q 75)
3. Don’t know

74. If yes, for what reason?

1. They are from another village
2. They do not contribute to the water point maintenance
3. They did not contribute towards construction of the water point
## 75. What conflicts exist at the water point?

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Water uses</td>
</tr>
<tr>
<td>2</td>
<td>Leadership</td>
</tr>
<tr>
<td>3</td>
<td>With relation to the siting of the water point</td>
</tr>
<tr>
<td>4</td>
<td>Other</td>
</tr>
</tbody>
</table>

## 76. How are they resolved?

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Through village meetings</td>
</tr>
<tr>
<td>2</td>
<td>Through consulting the local leadership</td>
</tr>
<tr>
<td>3</td>
<td>Through consulting the donor</td>
</tr>
<tr>
<td>4</td>
<td>On a personal basis</td>
</tr>
<tr>
<td>5</td>
<td>Other</td>
</tr>
</tbody>
</table>

## 77. What benefits have been brought about by the latrine to women?

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Dignity</td>
</tr>
<tr>
<td>2</td>
<td>Reduced risk of rape</td>
</tr>
<tr>
<td>3</td>
<td>Increased privacy</td>
</tr>
<tr>
<td>4</td>
<td>Other</td>
</tr>
<tr>
<td>5</td>
<td>Don’t know</td>
</tr>
</tbody>
</table>
APPENDIX 3: AVERAGE SIZE OF HOUSEHOLDS INTERVIEWED

Table 3.1 Average size of households interviewed in Wards 7, 9 and 15

<table>
<thead>
<tr>
<th>Ward</th>
<th>Number in the household</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>2</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>16</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>14</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>17</td>
<td>19</td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>11</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>11</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>9</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>10+</td>
<td>10</td>
<td>11</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>90</strong></td>
<td><strong>100</strong></td>
</tr>
<tr>
<td>9</td>
<td>2</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>11</td>
<td>12</td>
</tr>
<tr>
<td></td>
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<td>8</td>
<td>9</td>
</tr>
<tr>
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<td>15</td>
<td>17</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>16</td>
<td>18</td>
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<td>9</td>
</tr>
<tr>
<td></td>
<td>8</td>
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</tr>
<tr>
<td></td>
<td>10+</td>
<td>13</td>
<td>14</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>90</strong></td>
<td><strong>100</strong></td>
</tr>
<tr>
<td>7</td>
<td>1</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>8</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>3</td>
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<td>7</td>
</tr>
<tr>
<td></td>
<td>10+</td>
<td>13</td>
<td>14</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>90</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

Table 2.1 shows that most households in the three Wards have on average between four and six members and this influences water consumption.
APPENDIX 4: COMMUNITY SOURCES OF WATER

Table 4.1 Community sources of water in Wards 7, 9 and 15 from the household survey

<table>
<thead>
<tr>
<th>Source</th>
<th>Ward 15</th>
<th>Percentage</th>
<th>Ward 9</th>
<th>Percentage</th>
<th>Ward 7</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Family protected well</td>
<td>4</td>
<td>41</td>
<td>41</td>
<td>46</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Family unprotected well</td>
<td>4</td>
<td>7</td>
<td>8</td>
<td>8</td>
<td>20</td>
<td>22</td>
</tr>
<tr>
<td>Community protected well</td>
<td>59</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Community unprotected well</td>
<td>7</td>
<td>8</td>
<td>0</td>
<td>0</td>
<td>10</td>
<td>11</td>
</tr>
<tr>
<td>Community borehole</td>
<td>10</td>
<td>11</td>
<td>31</td>
<td>34</td>
<td>25</td>
<td>28</td>
</tr>
<tr>
<td>Family borehole</td>
<td>6</td>
<td>7</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Tap water</td>
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<td>2</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>River/Dam</td>
<td>0</td>
<td>5</td>
<td>6</td>
<td>31</td>
<td>34</td>
<td>34</td>
</tr>
<tr>
<td>Total</td>
<td>90</td>
<td>100</td>
<td>90</td>
<td>100</td>
<td>90</td>
<td>100</td>
</tr>
</tbody>
</table>

The table shows that most in Wards 9 and 15 people were getting their drinking water from improved sources according to UNEP (2003), while most of those in Ward 7 were getting their water from unimproved sources.
APPENDIX 5: PHOTO OF ELEPHANT PUMP BEING USED FOR GARDENING

Figure 5.1. Photo showing an Elephant Pump used for gardening in Ward 15 of Chivi District
APPENDIX 6: PHOTO OF THE WINDLASS BEING USED TO WATER SMALL ORCHARDS