Chapter 5: Research Methodology

The study sought to interrogate the impact of forest management on carbon trading business in Zimbabwe. The chapter, therefore, presents the tenets of research methodology applied in the research process to achieve the objectives of the study. The methodological aspects covered include the research philosophy, approach, the research design, the target population, sampling methods, methods of data collection and analysis and the ethical considerations of the study.

A research philosophy is a worldview underlying the theories and methodology of a particular scientific subject (Wood, 1997). The major research paradigms that dominate literature are the positivism paradigm and the phenomenology paradigm. In the study, the researcher used pragmatism that is a mixture of positivism and interpretivism. This was a more relevant research paradigm to use as it combined the strengths of one research paradigm to compliment the weaknesses of the other, as explained by Saunders *et al. (*2009). This mixed methods approach was applied because it placed the research problem as central and applied different approaches to understanding the research problem. It recognised that every method has its limitations and different approaches can be complimentary. This mixed methods design was fixed as suggested by Creswell and Clark (2011: 54) since it "is predetermined and planned at the start of the research process, and the procedures are implemented as planned." Kato (2002) suggests that this is a more persuasive way of social science. The roots of mixed methods are typically traced to the multi-trait, multi-method approach of Campbell and Fiske (Mood *et al.,* 1994), although it is considered a relatively new methodology whose key philosophical and methodological foundations and practice standards have evolved since the early 1990s (Tashakkori, 2009).

Johnson and Turner (2003) have argued that the fundamental principle of mixed methods research is that multiple kinds of data should be

collected with different strategies and methods in ways that reflect complementary strengths and non-overlapping weaknesses, allowing a mixed methods study to provide insights not possible when only qualitative or quantitative data are collected. Put in another way, mixed methods research allows for the "opportunity to compensate for inherent method weaknesses, capitalize on inherent method strengths, and offset inevitable method biases" (Creswell, 2007). Mixing the research designs was beneficial as it allowed for "triangulation, complementarity, development, initiation, and expansion" as stated by Creswell and Clark (2011: 61). Therefore, making use of both philosophies enriched the understanding of the phenomena and the findings of the study.

Kumar (1999) defines a research design as a framework which can be used to guide, collect and analyse research data. In particular, the research design of the study followed the research onion process that is presented in Figure 5.1, as described by (Saunders *et. al.* 2009).

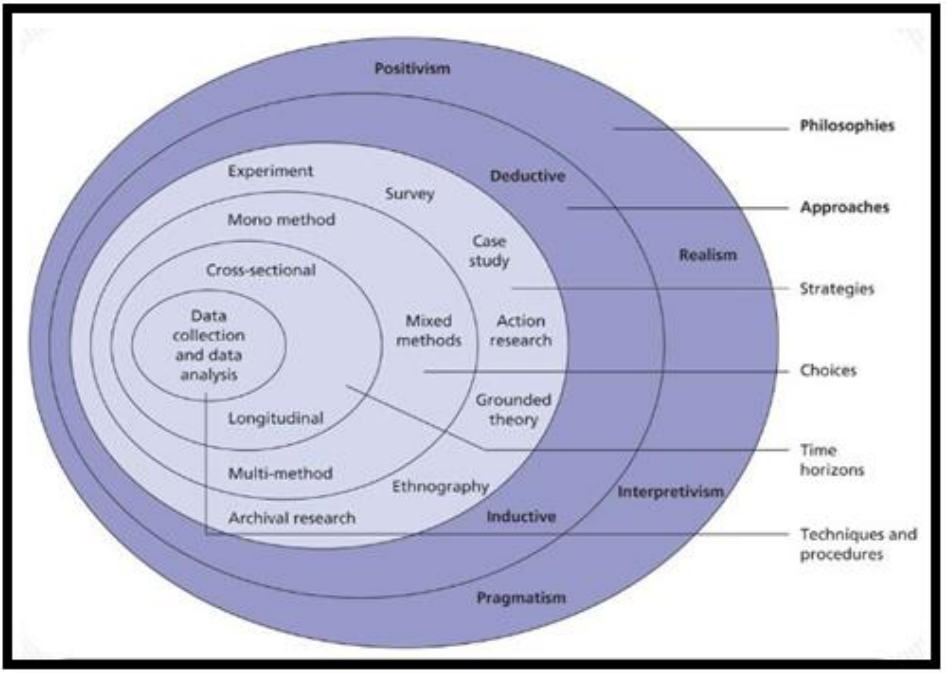

Figure 5.1: The Onion of Research (Saunders *et al.*, 2009)

There are six major designs which are used in scientific research. These include the explanatory sequential, the convergent parallel, the exploratory sequential, embedded research, the transformative and the multiphase designs. In the study, the researcher made use of the convergent parallel design owing to the fact that the study was a mixed methods and this design was more suited as a triangulation design as stated by Cresswell and Plano Clark (2011). This design allowed the researcher to obtain similar yet complimentary data. This enhanced data validation and corroboration as Cresswell and Plano Clark (2011) state. The design was selected since the researcher had limited time to carry out the data collection and also he had appreciable understandings of both qualitative and quantitative research methods. In using the convergent parallel design, the researcher followed the steps suggested by Cresswell and Plano Clark (2011), namely designing both quantitative and qualitative strands, analysed both strand types, merged the two data sets and then interpreted the merged results.

There are two basic approaches in sciences deductive and inductive. In the study, induction was favoured as it was more suited to studies where there was little or scanty empirical data, as suggested by Saunders *et al. (*2015). It was favoured as it was more suited to the testing of theories. The approach allowed the researcher to make use of scientific theories and to explain the causal relationship between the research variables whilst maintaining an understanding of the contexts in which the phenomena occur in the real world and to allow flexibility to changes which could have occurred in the research context as the study progressed. Saunders *et al*. (2015, p.145) argue that inductive research "starts by collecting data to explore a phenomenon" and that it generates or build a theory. In the perspective of Denscombe (2010, p.273), inductive research "tends to work from the particular to the general and the analysis attempts to arrive at more abstract and generalised statements about the topic." Inductive research is aimed at building a theory and "is particularly concerned with the context in

which such events were taking place" (Saunders *et al*., 2011, p. 119). As the aim of the study was to come up with conclusions and generalisations, the inductive approach was more relevant and hence adopted.

According to Welman *et al.* (2011) a population is a group of entities with a common set of characteristics. The target population refers to the specified elements or entities that hold the data required to address and/or investigate the stipulated research issue (Malhotra, 2010). For the study, the target population comprised of the staff and management from Carbon Green Africa and councilors and community members from the Binga District in areas under Chief Siabuwa and Sinamusanga. It also targeted officials from the Climate Change Department under the Ministry of Environment, Water and Climate. The target population was defined based on the following characteristics;

- Geographical spread and project location;
- Existing data on forest management initiatives in the area;
- Being management and staff of a carbon trading business;
- The knowledge base of the respondents;
- Being Government Ministry that regulates Climate Change mitigation;
- Known participants in the market of carbon credits, market makers and market takers.

There are two main methods in which to conduct a study sample, namely probability and non-probability sampling (Berndt and Petzer 2011). In probability sampling, every member or element in the population has a known, non-zero probability of being included in the study sample (Zikmund and Babin, 2013). Systematic sampling that is a form of probability sampling, was used for the descriptive survey. Contrastingly, non-probability sampling exudes arbitrary and subjective traits, as a researcher's selection of participants is based on personal judgment alone.

For that reason, the selected sample cannot be regarded with absolute certainty as a representation of the entire population (Feinberg *et al*., 2013). Purposive sampling that is a form of non-probability sampling method, was used for in-depth interviews. On this method, the researcher selects units purposively. The advantage was that those selected had a direct reference to the research questions and you don't waste time interviewing irrelevant people (Bryman, 2008).

The target population was split into two groups, that is, staff and key informants. Then, the researcher purposively sampled managers and used convenience to sample staff because the researcher did not have a sampling frame from where people would be picked randomly. Thus, respondents were sampled based on availability.

According to Johnson and Christensen (2012) purposive sampling is a non-probability form of sampling. It is sometimes called judgemental sampling. In purposive sampling, the researcher specifies the characteristics of a population of interest. In the study, the researcher chose CGA Staff, government officials and the community. It has been stated that in this procedure, the sampling units are not chosen in a random manner. They are chosen based on some of their characteristics.

The researcher then located the people with these characteristics. This is most common with Qualitative researchers. Cohen, Manion and Morrison (2007) posit that in this way, the researcher builds up a sample that is satisfactory to his or her explicit needs. This was applicable in the study for the researcher purposively chose managers for they were perceived to be rich with information the study sought to establish.

The selection of institutions for the study was also based upon considerations of feasibility and accessibility. The researcher was informed and convinced by this sampling technique adopted to gather in-depth knowledge on certain issues. It should therefore be noted that

the purposive sampling is based on the assumption that a great deal can be learnt about issues of concern.

A sample size is the number of participants needed within the study to draw conclusive findings using analysis (Berndt and Petzer, 2011). McDaniel and Gates (2010) point out that determining a sample size depends on several factors, including financial (costs), statistical (analysis methods) and managerial issues. Consideration was given to the planned statistical analysis techniques when the researcher was determining the sample size.

Hair *et al. (et al. (*2010) posit that structural equation models that comprise seven or more constructs should have a sample size of between 300 and 500, and, as such, this sample size is considered sufficiently large and adequate. For the quantitative study the research used 78 participants comprising of employees from CGA, from Binga District and from the department of Climate Change under the Ministry of Environment, Water and Climate. There were 22 more participants who formed part of the in-depth interviews from key informants which made a total sample size of (100) one hundred participants.

Collection of the necessary primary data for the study, was done using semi-structured questionnaires and interviews. The researcher administered 100 questionnaires to the research participants. Questionnaires were preferred for use in the study owing to their cost effectiveness. They proved advantageous because they provided data which was analysed quantitatively as per the research design of the study. Questionnaires allowed the respondents to respond more objectively as they had the chance to read through the questions before responding to them, thereby reducing bias and errors. However, the use of questionnaires in the study came with its disadvantages, as they failed to probe for further information from the respondents. To make up for this weakness, the researcher included open-ended questions in the questionnaires and provided preliminary instructions for the

participants to first understand the nature of each question before responding to it.

To make up for the weaknesses which came with the use of the questionnaires, such as that it largely obtains quantitative and not qualitative data, the researcher engaged in key informant interviews. Denscombe (2010, p.53) suggests that a key informant interview offers "far greater opportunity to delve into things in more detail and discover things that might not have become apparent through more superficial research." The key informants in the study included 20 participants' from Binga chiefs, CGA staff and from Government officials who had more detailed information and knowledge. In undertaking them, the researcher made prior appointments with the interviewees before attending the interviews on a later date, within their areas of work.

Key informant interviews were preferred in the study as they allowed the researcher to have a more in-depth understanding of the issues under probe. They also made it more convenient for the respondents, who in this case were organisational managers, who had limited time to fill questionnaires. Key informant interviews were also chosen as they allowed the researcher to obtain more detailed and reliable information from the management who were mostly involved in the key decision-making. Each interview lasted an approximate fifteen (15) minutes. The researcher used audio recording to capture the responses to the interview questions, and as well took down field notes during the discussions for later transcription.

The researcher used structured questionnaires which were hand delivered and an interview guide to gather data. In the study, questionnaires were administered to employees. These are described below.

A questionnaire consists of a set of questions presented to respondents for answers. The respondents read the questions, interpret

what is expected and then put the answers themselves (Dawson, 2012). The researcher used a questionnaire which consisted of a series of open ended and closed ended questions with boxes to tick, and open spaces to explain their views. For instance, open questions like: "What do you understand by the term carbon credits?" were asked to give respondents an opportunity to freely express their views.

The use of open-ended questions gave employees an opportunity to answer in their own words without guidelines concerning their perception towards global warming. Closed ended questions gave the respondents the direction for required answers for easy analysis. According to Bell (2015), age is often considered to be sensitive therefore rather than asking respondents to give their exact age, the researcher asked them to tick in boxes to indicate their age category (25 or younger; 25-30; 31-35; 36–40; 41-45 and 45 or older). The questionnaires were distributed to employees of diverse age groups.

In general, the questionnaires gave the respondents' freedom in answering questions as it ensured the anonymity of respondents, hence they felt free to express their opinions and the influence from other respondents was minimal. Questionnaires are the most widely used data collection methods in educational and evaluation research. They help gather information on knowledge, attitudes, opinions, behaviours, facts and other information (Saunders *et al.*, 2009).

A questionnaire is a measuring instrument that asks individuals to answer a set of questions and record their answers usually with closely defined alternatives (Bell, 2015). Questionnaires are commonly used in surveys with descriptive or explanatory purpose to collect information on attitudes and opinions. The questionnaire had several advantages in this particular research. It enabled collection of voluminous data from a wider audience simultaneously albeit at a very low cost.

The researcher used semi-structured interview guide for staff, on questions which were mainly open ended. Open ended questions gave a guide as to what was required. The interviews were conducted after making prior appointments with respondents. Where it was felt that respondents had misinterpreted a question, such question was rephrased so that the correct meaning was conveyed, and the respondent was afforded an opportunity to provide an accurate response. The interviews were useful, as they provided an opportunity for unclear responses to be clarified.

The researcher chose a setting with little distraction to ensure the respondents were comfortable. This was possible because interviewees were at their own places of work. The researcher explained the purpose of the interview by addressing the terms of confidentiality that the responses were going to be used for academic purposes only. The format of the interview and type of interview being conducted and its nature was well explained. The researcher asked for permission to record the interview.

Interviews were effective because the researcher combined what was said verbally with the non-verbal language displayed thus emphasising a said point. This created a healthy platform to get reliable and credible information. Furthermore, the researcher used interviews because they facilitated immediate responses and allowed the researcher to seek clarification instantly and probe further to come up with detailed and valid data. However, they were very time-consuming, that is, setting up, interviewing, transcribing, analysing, giving feedback and reporting. More so, the interviews were costly due to travelling frequently to meet respondents.

A pilot study can be described as a small-scale version or trial run, done in preparation for the major study. A pilot study can be used to improve a project, assess its feasibility, improve its clarity, eradicate problems

and refine methodology (Pilot and Beck, 2010). The pilot study was conducted using 10 respondents.

The main objective was for the researcher to determine the appropriate time on average a respondent would take to complete the questionnaire and to measure the level of reliability of the questionnaire before a full-blown version of the research is rolled out. It is also at this stage that ambiguous questions or unclear questions were identified and appropriate remedial action instituted. Hence, it made the study's instrument valid and reliable. Questionnaires were administered personally and through social media. Follow up reminder telephone calls were made. This was done to ensure that respondents complete and return the completed questionnaires on time. Interviews were conducted on sight.

The foundation of any research is in credibility and that evidence and conclusions can be scrutinised (Dzansi, 2004:187). In addition, Davis (2005:184) elaborates that valid and reliable elements are crucial for credibility. Reliability and validity are the two most important and fundamental features in the evaluation of any measurement instrument or tool for good research (Mohajan, 2017). For the study's results to be meaningful, the process of gathering data were conducted to ensure credibility. Credibility indicates that outcomes of the study were legitimate because of the way the groups were selected and the way the data were recorded and/or analysed.

Validity of the research was examined by three different experiments mainly; construct validity, internal validity and external validity. Validity is the establishment of practical measures and seeking harmony between the theoretical framework and a specific measuring process or mechanism (Dawson, 2009). To ensure research validity, the researcher tried to enhance the external validity of the project through desk top researching using numerous library and Internet based sources of

evidence and different methods of data gathering through literature study together with focus, deep study and investigation.

The researcher used both narrative text method and single isolated statement in the qualitative analysis of the data. Narrative text method was used as an approach for interpreting mainly the data from the interviews while single isolated statement was used to interpret data from the questionnaire.

Frequencies, percentages and mean were used as descriptive statistics for interpretation of data in numerical terms. The data were analysed using SPSS v.20 and Microsoft Excel. This was based on analytical techniques to analyse data quantitatively. For ease of illustration, graphical methods, tables and charts were used to interpret the data collected.

After collecting the obtained data, it is arranged into numerical summaries or into graphs or charts which makes analysis easier and providing answers to the research questions (Ngulube, 2009). The data collected from the questionnaires was coded, captured and analysed using the Statistical Package for Social Scientists (SPSS) version 20 whilst qualitative data gathered through in-depth interviews was subjected to thematic narrative analysis.

Thematic analysis was employed to produce useful information regarding client satisfaction. The researchers build valid argument themes basing on existing literature. For the study, the themes and patterns were identified that were related to the research questions and real-life experiences and inferences were made from the interviews.

The informed consent of the participant was an ethical consideration that was prioritised in the study. The participants in the study were made aware of the objectives of the study and of its processes and of its possible impact on both their social and professional lives. The informed

consent was communicated by writing as a letter attached to the cover of the research questionnaire and verbally at the beginning of each interview.

Anonymity of the participants was upheld as an important ethical principle. The anonymity of the participants was ensured by not writing or keeping their names, identification details, employment information, photographs or any other particulars on the study materials or in computers, recordings or on any other data storage devices. By maintaining the anonymity of the participants, the researcher protected them from any form of victimisation, embarrassment or name-calling that may have possibly resulted from participation in the study. Establishing their anonymity ensured more valid and reliable findings as the participants were able to share their views and opinions without fear or prejudice.

Freedom of participation and withdrawal was also upheld in the study. The participants were not enticed, tricked, forced or coerced to participate in the study by any means whatsoever. Participation in the study was strictly on a voluntary basis although the researcher took time to explain the potential benefits of the study to all stakeholders involved and concerned. Participants were made aware of the option to leave or quit the study during any time in its course and of the absence of any negative repercussions, material or otherwise, of doing so.

The purpose of hypothesis testing was to determine the accuracy of a hypothesis because a sample of data were collected. Two kinds of hypothesis are used in classical tests: the null hypothesis and the alternative hypothesis. The null hypothesis is used for testing. It is a statement that no difference exists between the parameter and the statistic being compared to it. If we reject a null hypothesis, then we are accepting the alternative hypothesis.

Equation (2) presented the regression function with the estimated parameters together with the corresponding standard errors within parentheses to know if the parameter estimate for the slope coefficient was significantly different from zero or not. We start by stating the hypothesis:

$$\boldsymbol{H_o}: \boldsymbol{\alpha_1} = 0$$
$$\boldsymbol{H_1}: \boldsymbol{\alpha_1} \neq 0$$

The estimated parameter is transformed according to the null hypothesis and that transformation was used as a test function. The t-statistic value is computed as follows;

$$T - Statistic = \frac{(\text{Estimated Alpha} - \text{Hypothesized Alpha})}{\text{Standard Error of Alpha}}$$

The 95% Confidence Interval (-1.96:1.96) was measured suitable for the study, thus a 5% significance level was chosen for the statistical tests. This translates to a 5% probability that values outside the interval may be obtained.

If the test value is larger than the critical value in absolute terms, we reject the null hypothesis. Otherwise, we just accept the null hypothesis and argue that it is possible that the population parameter is equal to zero.
Critical value: *tc* = 1.96

For a null hypothesis, a *p-value* which is greater than the significance level shows that the intercept is not statistically significant. On the other hand, a *p-value* which is less than the significance level shows that the average intercept is significantly different from zero.

In the chapter, I have presented and discussed the research methodology of the study. I have discussed the research philosophy, approach, and design. I have also covered the population, sample, sampling methods,

data collection techniques, and data analysis approaches. Additionally, I have addressed the ethical considerations made in the study. The next chapter focuses on the study findings, presenting and discussing them.