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Exploring NaDEET Centre's Community Environmental Education Programme:

A Namibian Case Study of Sustainable Living and Solar Cooking

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Key words: Environmental Education (EE), sustainable living, solar cooking, Education for Sustainable Development (ESD), Namibia, adult learning, residential programmes



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ABSTRACT

The NaDEET Community Programme provides environmental education to rural adult Namibians since 2010. Through a qualitative case study approach this research explored the influence of the programme on sustainable development processes at an individual household level in two Hardap Region communities.

The findings indicate that environmental education is an important component of adult, lifelong learning and that NaDEET's experiential, Centre-based approach is effective in addressing sustainable development challenges.

List of acronyms

EE	Environmental Education
ESD	Education for Sustainable Development
NaDEET	Namib Desert Environmental Education Trust
UNESCO	United Nations Educational, Scientific and Cultural Organization

ACKNOWLEDGEMENTS AND AUTHOR'S NOTE

This research study was long overdue. When we first started the community programme in 2010 we had no idea what the outcomes were going to be. The first programmes, follow-up evaluations and funding constraints quickly gave rise to urgent changes that we needed to make to participant selection, programme content and sustainable technology distribution. Over the years we have adjusted and readjusted these, but we saw change.

Evaluating the impact of environmental education is challenging. It might seem like it would be straightforward to conduct a quantitative survey with participants regarding their solar cooker usage, but a simple yes or no answer will not give insight into the attitude and values shifts that may have taken place. NaDEET's main aim is to educate Namibians to live a sustainable lifestyle. Living sustainably is not the same in every place in the world, or in every village in Namibia as local contexts and circumstances differ. This research therefore aimed to gather stories and examples of how participants have interpreted and applied sustainability in their lives after the NaDEET Centre programme. This also includes those who have returned home and continued with life as before.

For me personally this research was an important journey. After more than 13 years of growing NaDEET from the bottom up and over 17 years of teaching environmental education in Namibia, it was time to just sit down and listen. I have tried my best to be objective, but have also relied on my first-hand knowledge to appreciate subtle, yet significant changes in people's lives.

Firstly I want to say thank you to all of the participants of the community programmes and especially to those who willingly took part in this research study. I want to especially acknowledge the dedication and tireless effort of my staff at NaDEET. Every one of them over the years has contributed to the success of this programme. I am grateful to each of them for going way beyond the average job. I am especially grateful to Viktoria Endjala for your support in whatever I need and for Greg Vries in assisting me with all of my interviews in Afrikaans and Khoekhoegwab. Kai Aios! Thank you to the community organisers, Veronika Katjikuru in Maltahöhe and Nella Benade as well as the school principal, Ivan Cloete, in Rietoog. It is because of your commitment to your communities that NaDEET's work is possible. Thank you to my advisor, Anne Maree O'Neill and Richard Baines for your help during the editing process. I would never have made it to the dissertation stage if it were not for the support of Uschi Bader during all the exam times. Thank you to the patience of my beautiful children. And of course, most importantly thank you to my husband. You know you always do so much more than for what you receive credit. You always remind me to find "der roter Faden" in this research and our life work together.

I. INTRODUCTION

Research background

Established in 2003, NaDEET is a non-profit environmental education organisation in southern Namibia that implements week-long, residential sustainable living programmes. After a tour of NaDEET Centre and seeing first-hand its approach to environmental education (EE), a commonly asked question by visitors is 'does it make a difference?'. This question is open to interpretation, but mostly visitors want to know if the participants that have been on a NaDEET Centre programme now live a more sustainable lifestyle. Research has been done in attempt to answer this type of question for EE initiatives around the world (Reid & Scott, 2013); however, the research to date still leaves much unanswered as to the impacts of EE and/or education for sustainable development (ESD).

In an effort to engage with the initial question and the debate, this research is focussed on the NaDEET adult community programme for several reasons. Of NaDEET's four programmes, it requires the most funding, preparation time and staff resources. The programme explicitly expects participants to implement their new knowledge and skills at home (NaDEET, 2013) and even provides participants with sustainable energy technologies to do so.

Relatively little research has been done on adult EE programmes, especially residential, centre-based EE programmes for rural, mature-aged adults. This is particularly true in Namibia where EE/ESD research is in its infancy and according to Anyolo (2015), only a limited number of ESD studies have been conducted to date. They are mostly centred on the formal curriculum, teacher training and the ESD policy-implementation gap in institutions such as universities (Kanyimba, Hamunyela, Kasanda, 2014). In Namibia, and globally, most research has looked at short-term impacts (Ried and Scott, 2013); however, this research contributes to better understanding of medium-term impacts.

Namibia has a mixed performance on the uptake of EE/ ESD (UNESCO UIL, 2015). It is one of few African countries with a National ESD Strategy (Namibia, Ministry of Education, 2009) and EE is, in theory, integrated in the school curriculum (Namibia, Ministry of Education, 2010). Government ministries employ an EE or communications officer. The Ministry of Environment and Tourism and several non-governmental organisations (NGOs), such as NaDEET, have EE centres. However, there is little national coordination and a general perception that EE is 'something for children', and adults should rather be trained. For example, despite the successes of the communal conservancies, support programmes remain focussed on wildlife and conservancy management training without including EE due to other donor funding priority (IRDNC, 2011).

This research therefore seeks to bring attention to the value of adult EE. The Namibian National Policy on Adult Learning (2003) supports this and specifies the environment as a priority and calls for more research and evaluation done by adult learning providers.

Lastly the opportunity to upscale is here. With the growing challenges of sustainable development in Namibia and worldwide, there is a need to replicate and build upon successes. NaDEET is a member of the UNESCO Global Action Programme for ESD - Key Partner Network which aims to upscale and transform ESD (UNESCO, 2014). This research is an opportunity to explore lessons learnt, guide an upscale and contribute to the global discussion.

Research structure

First a brief description of Namibia is given with an overview of the NaDEET Community Programme. This is followed by a literature review that covers the emergence of EE/ ESD as a response to the environmental crisis, the challenges of measuring its effectiveness and reviews specifically adult EE and solar cooking as relevant topics in the study. The research was done through collecting qualitative case studies to document and analyse interpretations of sustainable living. These case studies are discussed in the context of what change has occurred, by whom, under which circumstances, why and how. Conclusions are offered as to the value of adult, residential EE programmes in addressing sustainable development in Namibia.

II. RESEARCH CONTEXT

An overview of Namibia and the NaDEET Community Programme is given here to situate the research study.

Namibia

Namibia is a large country in south-western Africa known as the “land of contrast” which describes the landscape and its people. Having gained independence in 1990 from South African rule, Namibian society is still wounded by the long-term effects of its history. This is perpetuated by the slow access to development, an inadequate education system and the persistence of an unequal society (Melber, 2014). Only 2.1 million people (Namibia Data Portal, 2016) are spread out over an area of 823,680 square kilometres with a 0.7 persons/ km² population density in the south (Namibia Data Portal, 2016). As an arid country with only two perennial rivers along its borders, rainfall in southern Namibia ranges between 50-250mm per annum (Mendelsohn *et al*, 2002). Combined with high solar radiation, Namibia has a water deficit which dramatically reduces the carrying capacity of the land.

An area of concern nationwide is access to lifelong, quality education. Since Independence the government has the enormous task of creating an education system for all citizens on par with international standards. Despite numerous reforms, there is a high grade 10 fail rate. According to the Ministry of Education (2014), the Hardap Region continuously scores low and dropped to last out of fourteen regions in 2014. This has created an unemployed youth population that is in many cases also unemployable (Kandetu, 2014) changing the societal composition and burdening community elders. Despite these challenges, Namibia ranks high on development indices (Melber, 2014).

NaDEET Centre

NaDEET’s mission is to protect Namibia’s natural environment by educating its citizens to practice a sustainable lifestyle. A “we practice what we teach” philosophy is the cornerstone of NaDEET Centre’s operations. This approach aims to immerse participants in a working model of sustainable living to reflect on their relationship with the environment. NaDEET’s primary and secondary school programmes are aligned to the national school curriculum to enhance classroom-based learning in a non-formal setting. This is done through hands-on, experiential learning based on the topics of energy, water, waste and biodiversity. In 2010, NaDEET expanded its programmes to include adults as requested by local communities. NaDEET programmes have hosted over 10,000 participants.

NaDEET Centre Community Programme

Designed for mature adults, especially household heads, the programme's objective is to provide hands-on learning in sustainable living techniques (NaDEET, 2013). Participants earn a parabolic solar cooker after successfully demonstrating how and why to use it in a "learn-to-earn" approach; and they take home a self-made fuel-efficient stove. This is done to reduce the access barrier for practicing sustainable living in rural Namibia where its low population density and expansive distances are a constraint (von Oertzen, 2015). The four-day, residential community programme includes the following:

- a) Renewable Energy and Energy Efficiency
 - i. Practical demonstrations of solar energy
 - ii. Intensive solar cooking and use of hot boxes
 - iii. Fuel-efficient stove construction and use
 - iv. Construction of simple skylight from 2-litre plastic bottles
 - v. Energy auditing
- b) Water Saving
 - i. Practical experience in water saving equipment; i.e. bucket showers
 - ii. Reusing of grey water; i.e. plants and recycled firebricks
 - iii. Water auditing
- c) Waste Management
 - i. Separating waste to reduce, reuse and recycle; i.e. composting
 - ii. Making recycled firebricks from paper, sawdust and water as an alternative fuel source
- d) Biodiversity Exploration
 - i. Immersion in the Namib Desert
 - ii. Dune walk

These activities are all implemented by participants in teams according to the programme in Appendix 1. The formal learning activities are constantly reinforced through the informal learning that takes place during daily activities such as showering, washing dishes and cooking. Even discarding rubbish is a learning opportunity as participants need to decide which recycling container is correct.

III. LITERATURE REVIEW

In 2011, Saylan and Blumstein published the book *The Failure of Environmental Education and How We Can Fix It*. They called for fresh ideas in making environmental problems relevant to people and for a re-orientation to environmental problem-solving. Their underlying message is that despite being environmentally-aware, people were not taking action to protect the environment and that this needs to change through re-vitalising EE's value, methodology and effectiveness.

Environmental crisis and sustainable development

Human life on Earth as we know it is only possible with a healthy functioning ecosystem (Jucker, 2014). Despite this, the environmental crisis grows due to many factors such as ongoing global population growth and the expanding consumerism lifestyle. Under these circumstances there is a necessity to collectively manage the impacts and address the problems (Saylan & Blumstein, 2011). Already recognised over 50 years ago, the term sustainable development emerged with the most widely accepted definition given in the 1987 Brundtland Commission's report as cited in Adams (2009, p. 5) as "development that meets the needs of present without compromising the ability of future generations to meet their own needs". There is debate over its meaning and implementation as some say it is too vague and others say that either the social or economic or environmental pillar receives preference over another. At the end of 2015, there is now a ratified set of 17 Sustainable Development Goals. It is a great achievement that sustainability is finally leading the global development agenda, at least in policy. Kaj Bärlund (undated) calls it a soft approach that has given freedom for action, especially at a local level and he congratulates the recognition by decision-makers that ESD is the way to teach the world about sustainable development.

EE and ESD as a response

The 1977 Tbilisi Intergovernmental Conference on Environmental Education is considered as the foundation of EE where the objectives of awareness, knowledge, attitudes, skills and participation were established (Hungerford & Volk, 1990). Since this time many have reworked these initial concepts such as Tilbury (1995) who proposed guidelines on EE focus and processes including a three-fold approach of "In, About and For the Environment". Debates continue and according to Schreuder (2002) this process has been critical in Southern Africa. By the early 1990s, EE in Southern Africa was considered within a historical context to include conservation, development, peace and democracy (O'Donoghue & Janse van Rensburg, 1995). Southern African research has focussed on EE as transformation instead of a set of behavioural outcomes. This has developed in conjunction with the end of Apartheid and colonialism throughout the region that demanded fundamental change at all levels of society (Schreuder, 2002). Despite this, there is a tendency to evaluate EE

using a cause and effect approach or an investigation of what factors lead to pro-environmental behaviour or as Stern (2000) defines it as environmentally significant individual behaviour. These fields within psychology, social marketing and education are focussed on understanding what makes individuals change their behaviour as the attitude-behaviour gap is so perplexingly large (Kollmuss and Agyeman 2002). Stern (2000) and Tapia-Fonllem et al (2013) argue that only a combination of approaches can be effective in changing behaviour and increasing sustainability actions. Jucker (2014) recently argued that the key is “real change in the real world” through all avenues available to each person to influence progress towards sustainability. Frustration is evident and leads to question what should actually be measured in EE.

What to measure?

Arjen E.J. Wals and Tore van der Leij (1997) state that quality assessment of EE should be process-based rather than on products. They argue that EE should be focussed on human development rather than behaviour. In a later opinion piece Wals (2011) develops his argument to say that instrumental models do not represent reality because people’s actions are complex and contextualised. This is supported by Taylor (2014) who asks, “So are we trying to cause change or enable change?” Wals and Taylor agree that EE needs to support people to respond to environmental challenges in their own context. This then also needs to be the approach when evaluating its success. In Pawson and Tilley’s (2004) Realist Evaluation the approach is not to examine if the programme worked or not, but to determine whether the programme enabled the participants to make the resources work in their own contexts. In a study on Enviro Champs in South Africa, Ward (2016) used a realist evaluation approach to get a better understanding of the successes and the complex relationship between context, mechanisms and outcomes in addressing environmental issues.

In the challenge of finding ways to satisfy international measuring tools such as the indicators for the UN Sustainable Development Goals, there must be a reorientation to focus on the actual environmental learning and empowerment. Wals (2011) warns that education must “foster autonomous thinking” as what is sustainable today may not be any more tomorrow. Taylor (2014) captures this well in his opinion piece on “Shaping the GAP” that we need education that is transformative in that it is “enabling” and not “causal”. This is not only a challenge for policy-makers and educators, but also for all global citizens as it requires critical thought, flexibility and the desire to adapt and change. When taking a personal reflection on measuring expectations of EE, perhaps one can understand that despite knowing a certain activity is harmful to the environment, one does it anyway. There is a need to better understand how EE/ ESD therefore can *enable* sustainability.

EE/ESD in adult, non-formal education

ESD is a lifelong process (McKeown, 2002). Outlined in the ESD Toolkit, McKeown (2002) identifies the perpetuated myth that ESD is only to be addressed by ministries of education. She argues the need to combine resources to develop well-designed programmes for all levels of society. In a Southern African context this is very relevant as most countries house their National Commissions to UNESCO in the Ministry of Education (UNESCO, 2009). Due to historical injustices, many adults lack educational opportunities in all areas including EE. Important programmes are offered in capacity building training, but these may not always include education. McKeown (2002) illustrates the difference as, "Training informs people of accepted practices and procedures and gives them skills to perform specific tasks. In contrast, education is a socially transforming process that gives people knowledge, skills, perspectives and values through which they can participate in and contribute to their own well-being and that of their community and nation." This is supported by Babikwa (2004) who in a Zambian study of community-based agricultural training programmes, discusses that community empowerment is both a horizontal and vertical process whereby basic human needs in life are horizontal which once successful can lead to more strategic goals in life (vertical). Clover *et al* (2013) attribute experiential learning as an important aspect of adult education as "knowledge is not only learned from experience, but in or through experience". Through education, adults are enabled to go beyond isolated activities and to invest in long-term actions that can lead to a more sustainable lifestyle.

Adoption of solar cooking

As solar cooking is one of the main components of the NaDEET programme it is briefly reviewed here. Krämer (2010) recognises that solar cookers can have a significant impact on addressing sustainable development in regards to health, poverty and the environment, however; solar cookers have not been properly identified as such and have often been inappropriately introduced. Research in investigating access and usage in sustainable energy equipment also points at a gap (Shankar *et al*, 2014) as despite owning improved cook stoves there is still incorrect and inconsistent usage. However, in a recent synthesis research of solar cooking in South Africa, Wenzel and Pouris (2007) conclude that solar cooking has proven to make a significant impact at a household level when they have been accepted and integrated as one of the sources of energy for cooking. Most significant was time and money savings through reduced time spent collecting firewood or money spent on fuel. They identify that motivation is one of the key elements in successful adoption of solar cooking and that it is not a replacement but complements other cooking energy sources. It is relevant to explore what enables solar cooking in Namibian communities.

Conclusion

The literature review covered the areas of EE/ ESD as a response to the environmental crisis and how to measure it together with a brief overview of adult learning and solar cooking as this research aims to improve understanding of the outcomes of adult EE/ ESD at NaDEET Centre as it is a short, yet intensive, practical immersion in solar cooking and sustainable living.

IV. METHODOLOGY

The research aimed to identify the influence of the NaDEET programme on sustainable development processes at a household level in two rural Hardap Region communities. The research examines how past participants have processed the programme within their own lives and homes three years later. Two case studies were developed using a qualitative research strategy.

Theoretical Framework

In conducting research it is important to provide a theoretical background (Bryman, 2012). This research used an inductive approach. A theory was generated from the research process. The research explored the participant's experiences from which patterns were sought to construct a theory (Howell & Kent, 2009). The research also borrowed elements from memory research as according to Liddicoat and Krasny (2013) recollections of outdoor EE experiences can be used as evaluative data to explore long-term impacts on participants such as in studies where participants attribute increased outdoor recreational interests to an earlier outdoor EE experience. This research also took elements from realist evaluation as it focusses on the processes, termed mechanisms by Pawson & Tilley (2004), to explore what elements of the NaDEET Centre programme worked for which participant in which context.

An important issue considered in conducting this research study was what kind of knowledge is acceptable (Bryman, 2012). This type of consideration is termed an epistemological issue. This research uses an interpretive view point as it considers human actions and beliefs to be the foundation of understanding the research questions. Relying primarily on first-hand accounts, interpretive research describes what it sees in rich language and details (Terre Blanche & Kelly, 2002). It recognises the importance of the context within which the person and the researcher's experiences and stories are placed (Ritchie & Lewis, 2003) thereby making the research subjective.

The ontological position according to Bryman (2012) refers to how social entities can and should be considered. This research takes a social-constructionist position meaning that it believes that humans are defining and re-defining the social world around them together with others within their context.

Positionality of researcher

Positionality as described by Bourke (2014) examines the identity of researcher within the research process as having the potential to impact how participants perceive the researcher and research process and vice versa. I have taken into consideration that despite having a good understanding of

the culture, I may not have a full understanding of all cultural references or language nuances. Some participants may be reluctant to answer fully due to cultural, gender, age and race differences which are so ingrained in Namibian society. As the Director and co-founder, I acknowledge that I have a personal and professional interest in understanding the impact of NaDEET and its programmes. But as an educator at heart, I want to learn from the participants as NaDEET's purpose is to work towards a more sustainable Namibia. The first-hand research experience will therefore shape and guide our work in the immediate future.

Research design

This research used a case study methodology. A case study (Howell & Kent, 2009) is an in-depth, contextualised research of phenomena within real life context. It is usually a single case study, but can be multiple. According to Yin (2009), the case study method focuses on the meaningful characteristics of real-life events. It is most appropriate to use when the question of how or why something has worked or not is to be answered. The case study methodology used can give insight on a variety of outcomes that may not be predictable from the topic being studied. Although some researchers argue that a case study cannot be generalizable (Yin, 2009), it is not to be confused with a sample. Flyvbjerg (2006) argues that when a clear methodology is used, a case study can be shown to be valid and applied to other cases.

In this research a multiple case study with a holistic unit of analysis was used to understand differences in the two groups. The case studies were selected using purposive sampling as they have particular features that are to be researched (Ritchie & Lewis, 2003). The research was designed to evaluate over the longest time period possible. Although NaDEET's Community Programme began in 2010, the 2013 programmes were chosen as only as of this year did all participants receive their own solar cooker while prior to this, NaDEET was experimenting with distribution approaches. For the case study research the two communities of Rietoog and Maltahöhe were selected as there is an on-going relationship between the community and NaDEET.

Data collection

Several methods of data collection were used. Firstly a desktop review of the pre and post programme evaluations was done to establish a base line and inventory of all participants. The initial organisers from the various communities were contacted to set up dates for field work. One to two key informant interviews were conducted by the researcher in English. The semi-structured participant interviews were done individually or in pairs by the researcher mostly in

Afrikaans with help from a research assistant. Some were done by the assistant in Khoekhoegwab and translated into English. Most interviews were at the participants' homes which also allowed for observation and evaluation of actual sustainable living practices. However participants living on farms were interviewed at a relatives' house in town. The household observation was therefore used as additional information when available. All interviews, except for two, were recorded and transcribed.

Through the use of multiple data sources, the validity of the data can be cross checked through triangulation (Bryman, 2012). This was done through the data sources including key informants, participant interviews and household observations and the pre and post programme evaluations.

Research questions

The semi-structured interviews were used so participants would freely talk about what they remembered and actually do. A structured questionnaire or quantitative answers would have been too rigid. The general interview schedule used was:

Q1: What do you remember from the NaDEET EE programme?

Q2: Can you give examples of how you are implementing 'sustainable living practices' in your home?

- The phrase 'sustainable living practices' was not directly used in the interview in most cases. Instead examples leading from Q1 were used following the main programme areas of energy, water and waste.
- Many participants defined the concept of sustainable living in their own words throughout the interview. For example, it was referred to as "cleanliness" and "living with discipline".

Q3: Can you explain why or why not you are doing these things?

Q4: What do you think must be done in your community for it to develop in a more 'sustainable way'?

Q5: Do you feel you can help to do this?

- A role play was used to introduce Q4 and Q5 and again the direct phrasing of 'sustainable way' was stated as 'develop to benefit the people, but also the environment' or as defined by the participant.
- Participants were asked to answer Q4 and Q5 as if they were the mayor of their village and had been given the authority to make changes.

Data analysis

The data analysis was done using a multiple case study methodology with a holistic unit of analysis. Each case study was conducted independently and is presented as a cross-case report (Yin, 2009) in the results section. The data analysis process was on-going throughout the research. In answering “how and why” questions collected from the various data sources, the content was sorted according to themes that emerged from the participants. These were coded and categorised to generate overall concepts from the initial raw data (Ritchie & Lewis, 2003). This research therefore used a qualitative content analysis. In the discussion section, these case reports are compared to draw conclusions and to develop a theory. In the conclusion, recommendations are made.

Limitations of methodology

It is important to recognise the potential limitations of the research methodology. More case samples would give a wider application across settings and would give additional differences and similarities. An obstacle was that some potential follow-up questions were at times missed due to language barriers. In both samples, the younger participants of the programme were not available to participate in the research study. This was beneficial as it made the age samples very similar, but it also left out a segment of the programme group.

V. CASE STUDY BACKGROUND

The two case study communities in the Hardap Region are illustrated on the map below:

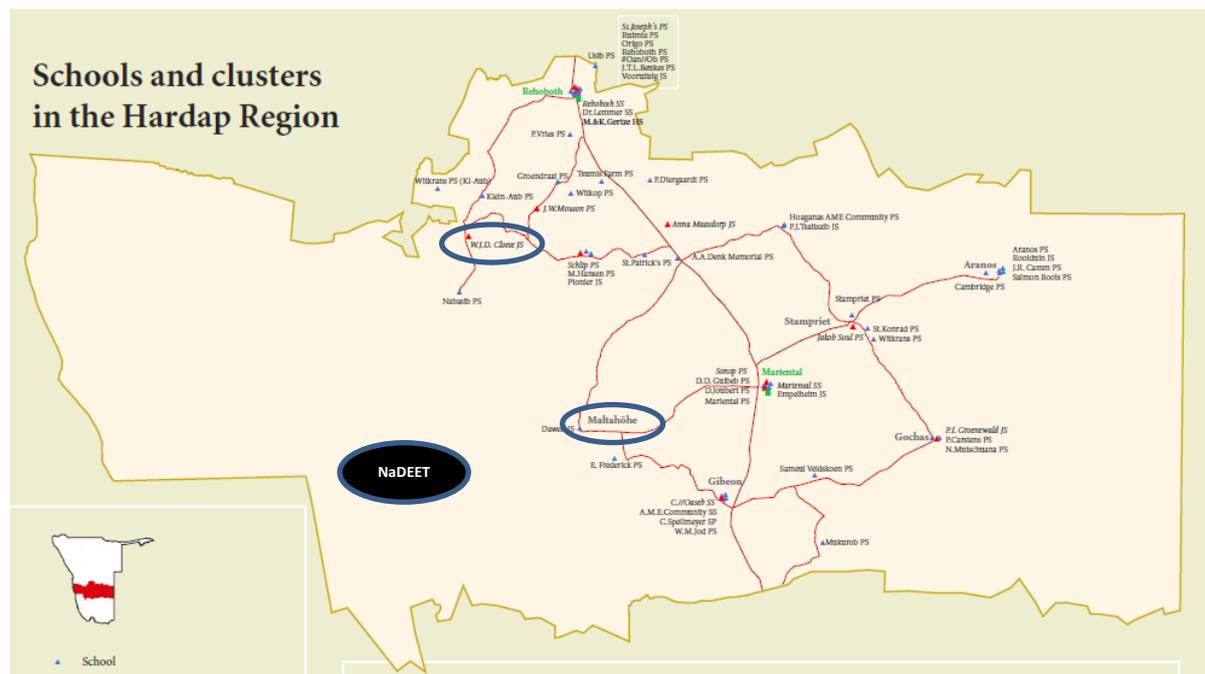


Figure 1: Map of Hardap Region schools showing research sites. **Source:** author with data from Ministry of Education (2007)

Study Site- Rietoog

- History

Despite little recorded history¹ about Rietoog, it is important to understand that the historical land ownership plays a significant role in its development. Purchased by WJD Cloete in 1917, the farm's Afrikaans name refers to an eye-shaped mountain spring surrounded by reeds. Originally 7000 hectares it was subsequently divided starting with 1500 ha given to a relative shortly after the purchase. In 1949 Cloete donated one hectare to establish a school for local children. Upon his death, his ten children each inherited 549.9 ha plots. The two heirs with plots near the school, sold erven to people interested in settling in Rietoog. Today there are approximately 120 households including numerous informal settlers. The land is still registered as farmland and besides the school and clinic; there are no other government services. There is also no formalised representation of the people, leaving many issues unresolved.

¹ The history of Rietoog presented in this section was obtained in an interview with the school principal, Mr. Ivan Cloete on 15 March 2016 in Rietoog.

- Demographics

The 800 Rietoog residents include 260 schoolchildren from grade 1-10² and mostly pensioners living from a small monthly government grant. Locally-earned income is through the school, clinic, a few shops and from the surrounding livestock farms. According to research participants, many households have at least one family member living and working in town sending financial support home. The majority of Rietoog residents are Afrikaans speakers followed by Khoekhoegwab.

- Energy and water provision

Electricity is provided by Namibia's national electricity grid. All households can theoretically have access to it, but must purchase their own connection box. These are all installed with a pre-paid meter requiring residents to purchase units from the nearest local authority in Klein Aub 30 km away³.

Individual households that can afford it have drilled a borehole to access water. Most homeowners have installed a 220 volt electrical submersible pump and have a free-standing tank to feed water into their homes. Other research participants have installed a hand pump with which they fill smaller containers. Those without boreholes have a purchase agreement with a neighbour whereby some have a pipeline to their homestead and others who do not have regular access to water⁴.

- Waste management

A 50m x 50m fenced dumpsite is located in eastern part of Rietoog. Although technically accessible to all, but practically only with a car or donkey cart⁵, according to research participants, rubbish is not dumped inside the fenced area, but outside it which has now effectively blocked the entrance as seen in figure 2.



Figure 2: Map of Rietoog rubbish dump **Source:** author with image from Google Earth

² Ivan Cloete, 15 March 2016, Rietoog

³ Ivan Cloete, 15 March 2016, Rietoog

⁴ Nella Benade, 14 March 2016, Rietoog

⁵ Ivan Cloete, 15 March 2016, Rietoog

- Participants

The 2013 Rietoog community group comprised 23 participants (17 females and 6 males). One passed away, two moved and four were not in Rietoog during the interviews. From the other available participants, 13 were interviewed (9 females and 4 males). Six participants were interviewed together in pairs. The average age was 60 and the median age 61 years.

More than half of the group had just become or were about to be pensioners when they attended the programme.

Study site- Maltahöhe

- History

Maltahöhe was founded in 1899 under the direction of the German colonial administration by Henning Von Burgsdorff (Bridgeford, undated). The site was chosen as it had strong underground water, good grazing and it overlooked a dry river. Originally a centre for the German Schutztruppe, and despite a Nama rebellion in 1904, it developed over the years into a successful commercial farming centre. During the Apartheid rule the Andreville location was established and with it an informal settlement area of “Blikkiesdorp” (tin town) evolved. After the collapse of the karakul sheep farming in the 1980s the town was downgraded to a village (Maltahöhe, 2016). Development has been slow to come to Maltahöhe partially due to the mismanagement by the local village council (Haufiku, 2014).

- Demographics

Maltahöhe is home to about 6000 residents (Maltahöhe, 2016), including 1,200 grade 1-10 schoolchildren. The school has a high fail rate adding to the already high unemployment rate⁶. The main sources of locally-earned income are the government, school, clinic and a few shops. Other income is from the surrounding livestock farms that provide employment to farm labourers and the growing tourism industry. Older residents are gaining access to resettlement farms (Tjitemisa, 2013). The majority of residents are Khoekhoegwab speakers.

- Energy and water provision

Electricity is provided by Namibia’s national grid. All households in town and Andreville can theoretically have access to it, but must purchase their own connection box⁷. These are mostly installed with a pre-paid meter requiring residents to purchase units from the village council. In Blikkiesdorp there is no electricity.

⁶ Veronika Katjiukuru, 28 April 2016, Maltahöhe

⁷ Veronika Katjikuru, 28 April 2016, Maltahöhe

Water is provided to all households except Blikkiesdorp. According to research participants many households have unpaid water bills due to uncontrolled use and lack of money. There is now a switch to pre-paid water meters to address this problem. Households in Blikkiesdrop must use a pre-paid communal tap. Average rainfall per annum is 150-200 mm (Mendelsohn *et al*, 2002).

- Waste management

Rubbish collection is provided once a week for all residents except Blikkiesdorp and brought to the dump site. Despite this, litter is a rampant problem.

- Participants

The 2013 Maltahöhe community group comprised 27 participants (20 females and 7 males). Fifteen no longer live in Maltahöhe as they are employed or seeking work elsewhere. Of the participants living in or near Maltahöhe, 11 participants (10 females and 1 male) were interviewed. The average age was 56 and the median age 60 years.

Four of the research participants were in their mid-30s to early 40s at the time of their participation. The rest were close to or already pensioners.

More than half of the participants now live on a resettlement farm, two live in Blikkiesdorp and the others live in Andreville.

VI. RESULTS

Applying an interpretive, case study methodology, data was analysed throughout data collection. Therefore the data results presented here are according to the three themes that emerged in the analysis from the participants' responses. The themes emerged from how participants themselves felt they were enabled in sustainable development processes. They are:

1. Recognition of being a learner and a teacher
2. Adoption of knowledge and skills
3. Adaptation and local application

A fourth theme relates to the research objective of understanding sustainable development processes in the case study communities. Each of these results areas includes the enabling and constraining factors for participants where applicable.

Result Theme 1: Recognition of being a learner and a teacher

In both case study groups there was overwhelming enthusiasm to share and discuss NaDEET with the researcher. Almost all participants immediately spoke of how much they enjoyed the programme, how special it was to be at a place like NaDEET and how thankful they were for simply being given the opportunity to learn. Participants shared that they had learned a lot which correlates to the responses in the 2013 post-programme surveys. One participant said, "Thank you so much for the education you gave me at NaDEET. I grew up on the farm ... and it is so good to learn all of these things. We need this in Namibia".

Participants, especially from Rietoog, emphasized how a special bond was formed between themselves because they found themselves again as learners although they were now old. Only a few research participants could not recollect much. Others lamented that despite the immense learning during the programme, they have not utilised it. "NaDEET was actually an eye opener for us. It showed us that we could make things easier for our lives, but we are clinging to the old times. We don't want to leave them."

Overwhelmingly participants reflected that the programme was too short. Just as they had adjusted to being there, it was time to go. They shared that living at NaDEET Centre with bucket showers, long drop toilets, the deep sand and the structured programme was a challenge at their age, but it was this shared experience of something completely different that created an atmosphere to enable openness to learning. "I almost even started speaking English" remarked one research participant in Afrikaans while laughing. This comment, understood within the cultural context, means that the

participant learned how to do things that he never expected to be capable of doing. In the Maltahöhe post-programme survey 55% of the participants requested a follow-up course as they felt there is more to learn.

Recognition of being a learner was passed on by many when they returned home as they reported teaching others. Here is what participants said:

- “I just did not know. I went to NaDEET, I learned these things, I told my husband and showed him everything that we had learned and we started doing them.”

There are those that tried to teach others, but without success.

- “So here in the location, we spoke so much. There are also people they just don’t care... There are others they don’t worry. Even my family they don't care if it is dirty there. My mother’s house is over there. If you go there, it is very dirty.”

There are those that did not teach others:

- “Honestly I did not. I told them about what I experienced, but I did not teach them that they need to now do this or that.”

Most participants found the opportunity to learn as an adult empowering as shared by this participant, “I am old now, but my spirit is there to create something with my hands”.

Result Theme 2: Adoption of knowledge and skills

This theme looks at the adoption of sustainable living practices in the research participants’ homes.

1. Solar cooking

1.1. Rietoog

Upon completion of programme 67% of research participants rated solar cooking as excellent. Three years later solar cooker usage is mixed. Half reported some kind of regular solar cooker usage such as on weekends. The remaining reported that they used it several times a week. None of the participants used it on a daily basis.

Almost half of the participants commented that they would have preferred to have a solar oven to bake bread. One participant stored it under the bed. Several gave it away to family members around the country and one reported having purchased another solar cooker for a relative. Some solar cookers broke and the owners had not yet fixed them despite being broken for more than a year.

1.2. Maltahöhe

Upon completion of the programme 91% of research participants rated solar cooking as excellent. Three years later usage of the solar cooker in Maltahöhe remains high. More than half reported daily usage of the solar cooker including one participant who expressed her joy, “Yes [I use it] every day and I enjoy it”. This participant also taught a family member to use it who now cooked daily with it. Breakage was a problem for two participants, but both fixed the solar cooker. Two of the daily solar cooking participants also wanted to have a solar oven. Only one participant used it once and stored it while some reported infrequent usage due to fear that it will break, cause a fire or lack of space to set it up permanently.

2. Fuel-efficient stoves and recycled firebricks

2.1. Rietoog

All participants reported frequent use of the fuel-efficient stove with wood. Only one participant used recycled firebricks as s/he could access them from the school. Others reported they did not have access to newspapers, but they could easily access firewood. Many reported using the fuel-efficient stove as a heater in winter or for cooking inside when it rained.

2.2. Maltahöhe

All participants reported frequent use and reflected on how well it saves wood. One participant said, “Yes, and we now definitely use less wood. The fuel-efficient stove is great because we can move it. One day it started raining and we could just move our fire to a protected place in the house”. Four of the participants make recycled firebricks on a regular basis and are able to access old newspapers/ advertisements from a store and the post office in town. Some said they collected littered papers and used paper packaging to make recycled firebricks. Most participants reported struggling to access firewood.

3. Renewable energy and energy efficiency

3.1. Rietoog

Most participants complained about the rising cost of electricity and the challenges of accessing pre-paid electricity. They reported having learned to save electricity at NaDEET however many said that they used wood to save electricity. One participant had installed an energy efficient lightbulb in his/her sitting room and monitors electricity usage after using

appliances such as the TV and kettle. Several participants reported having installed solar electricity on their small farms outside of Rietoog. None installed a bottle skylight.

3.2. Maltahöhe

Many research participants do not have access to electricity and live with little access to energy for lights. Both participants that won the bottle skylights installed them and reported that they work well. One participant saved money to purchase a solar light as she lives without electricity and learned the benefits of solar. She commented on why it was worth it to buy solar, "We do not need to pay for the solar power. We do not need to pay for the energy from the sun".

4. Water saving

4.1. Rietoog

Most participants with easy access to water did not have any reported water saving mechanisms and generally reported that they felt there was ample water available. The few participants without water access at home complained about the challenges related to accessing water and their inability to do water dependent activities such as gardening. They reported reusing bath water where possible.

4.2. Maltahöhe

Water was a very stressful topic for most participants. Many pensioners have accumulated high unpaid water bills due to unrestricted usage, water leaks and past bad collection by the village council. One participant reported, "The life here is so difficult. We are pressurized by the village council...first I have to pay off my [water] debt". Despite this, this participant still had no water saving methods and felt little control over water use in her/his house. But two participants reported that they now were in control as they read the water meter. "When we got to the water meters, I learned a lot. Now I can tell what my water meter says so before the man comes to read the water meter, I have already told him what it says". Two participants want to make bucket showers. Many participants actively reuse water which prior to the programme they had just thrown away.

5. Waste management

5.1. Rietoog

Many participants reported home recycling of items. All participants with a fence had a clean yard. Those without a fence felt they cannot control the nearby rubbish. All research participants said the waste problem outside their yard is not their responsibility. But a high

level of frustration is felt as this participant expressed, “If everyone thinks the way that I do then it would not look like this. Who will make it clean? We have cleaned up. But the people just begin to make it dirty again”.

5.2. Maltahöhe

Most participants have access to waste removal. Some reported trying to reuse items to make small gifts to sell. Many collect paper for recycled firebricks, while one participant reported trying to recycle until her husband told her to stop. One participant reported, “I now make compost using tea bags and carrot peels. I never knew that I could use these things before I was at NaDEET.”

Result Theme 3: Adaptation and local application

Participants in both communities adapted what they learned and applied it in their own local contexts. Key examples of these are given here in sub-themes.

1. Teaching Teamwork

One participant from Maltahöhe shared how the approach to teamwork and learning at NaDEET taught her a new way to approach the fellow members in her church.

“...at the church I am a group leader of the women. At NaDEET I have learned how to work with people and here I am teaching others how to do it ... beforehand ... it was always a bit confusing and mixed up. But when I got back from NaDEET I saw that working in a group that understands each other is very good. Now we work together nicely and with a purpose.”

2. Improving design

One participant returned and built another fuel-efficient stove where he improved the design and used thicker metal to improve durability. Another participant improved the design of the recycled firebricks by making them into small logs. This enables her to use the recycled firebrick more like wood is traditionally used. In addition, she built a recycled water settling tank for her to re-use water from washing for recycled firebricks and then again for her garden. Effectively she was now re- using water for three purposes.

3. Re-purposing

One participant addressed an immediate problem by repurposing the recycled firebrick mixture to patch a hole in his shoe sole. He reports that the patch outlasted the rest of the shoe.

4. Upscaling

One participant reported applying the practice of using a hot box in her own home and at work. As the hostel matron, she implemented a system that the hostel matrons make lunch and dinner food together at the same time as is done at NaDEET. The dinner food is placed in a hot box. The hostel is saving on cooking energy costs and the matrons are able to attend to other important work duties instead of only cooking. At home she has implemented the hotbox on a daily basis to have meals ready for her children when she is at work and on Sundays so lunch can be served immediately after church.

Result Theme 4- Sustainable Development processes

The general feeling expressed regarding the participants' community to develop in a more sustainable way was one of despair yet hope. Participants' opinions on what needs to be prioritised and what are the greatest challenges are listed for the two case studies.

1. Rietoog

Priority action:

Control and government control

People need to take their own responsibility and work harder

Alternative activities for youth

Services (electricity, houses, post office and petrol station)

Incentive to work together

Challenges:

Alcohol and drugs

Low priority

Not interested to work together

Land ownership and official registration

2. Maltahöhe

Priority action:

Reduce shebeens (informal bars)

Job opportunities (linked to the environment)

Alternative activities for youth

General education

EE and access to sustainable services

People need to take responsibility

Challenges:

Alcohol and drugs

Unemployment

Youth not interested

Orphans with grandparents

Poverty and suffering

On an individual level, participants motivated to implement a sustainable lifestyle gave the reasons of saving time, money and nature. Participants stated that implementing sustainable activities helped them to get ahead as they suffered less. As one research participant said, "Sustainable living makes a huge difference to me. I know that life is becoming more expensive and so we need to adapt. It is not that we have to go back to the old days, but many things from then are valid today. Take for example the solar cooker is saving wood, saving electricity. It does not cost anything, not even need a match."

VII. DISCUSSION

While the community member who exclaimed “It does not cost anything, not even need a match” was sharing his assessment of solar cooking, this can also be applied to environmental learning. The results discussed here give illustrative examples of participants’ adoption and adaptation of many components of the NaDEET EE/ESD programme.

Recognition of being a learner and a teacher

The first result theme demonstrates that participants considered education as an important part of sustainable living. They saw the need for learning and teaching others as important for their lives and for sustainable development processes. Participants recalled that recognising that they are capable of learning at their age was an important step in engaging with the programme. Many were surprised that NaDEET actually wanted to teach them and that the programme was not a training course or just a holiday. Many have never finished school or had a sub-standard education and had long ago given up on the idea that education is available to them. Many research participants enjoyed the challenge of coping with the desert climate, the rigorous programme and unfamiliar living conditions. The results suggest that for participants to begin to engage with the sustainable living concepts, they first need to overcome these challenges and thereby recognise themselves as capable of learning. This is an enabling process that opens the way to learning.

There is further evidence that the programme had a much greater influence in the households of participants who embraced learning and upon returning shared their knowledge. Those who taught their families about living a more sustainable lifestyle by solar cooking, but also saving electricity, water and managing waste show evidence of further result areas such as adoption of knowledge and skills. This compares to the decreased influence in those households where no teaching took place.

This is a significant result as it demonstrates not only the importance of adult learning, but it validates that NaDEET’s Centre-based, residential approach provides a special learning atmosphere as recognised by participants to be enabling and eye-opening experience. This was a necessary first step to even begin engaging with the unfamiliar topic of sustainability.

Adoption of knowledge and skills

In the adoption of knowledge and skills there are significant differences between and within the two case studies. These are looked at here in the categories of energy, water and waste.

a) Energy

In Rietoog despite complaining about electricity costs, participants still managed to purchase pre-paid electricity. Many participants believe that when they do not have electricity they can “save energy” by using firewood when in fact they are referring to saving money. The programme therefore did not clarify this although it can perhaps be attributed to language difficulties. Solar cookers are seen as a third or often fourth alternative. All Rietoog participants had a potentially good location to solar cook in the backyard. Regular users cooked mostly food that needs to simmer such as stews and jams. Non-users, despite having time and the location, seemed to lack motivation and were more comfortable cooking using known methods.

One participant made the effort to purchase an energy-efficient lightbulb although they are not available in Rietoog shops. This highlights access as one barrier to sustainable development.

In Maltahöhe it was quite different as participants are more likely to use the solar cooker. This can be attributed to many participants not having electricity or the money to pay for it. Access to wood in this part of Namibia is scarce. This makes the motivation to solar cook much higher evidenced by the higher rate of acceptance. This is also true for the bottle skylights as both were installed.

Both Rietoog and Maltahöhe participants spoke highly of the fuel-efficient stove and reported frequent use. Again Maltahöhe participants emphasized how much wood it saved and again motivated by the lack of alternatives many of them made every effort to get old paper to make recycled firebricks. The fuel-efficient stove also has an additional value of being movable and a heater. This is an unexpected finding that needs further research as there may be potential hazards if the stoves are used indoors without ventilation.

The higher adoption rate of renewable energy and energy efficiency in cooking in Maltahöhe can primarily be attributed to motivation which supports the studies done by Wenzel and Pouris (2007) in South Africa. The usage of solar cookers however cannot be directly linked to wanting to improve the environment, but rather to improving the participant’s own lifestyle. Although the NaDEET programme does aim to improve the environment, it does so through addressing lifestyle choices and considers human well-being as essential to a healthy environment. This result is therefore not surprising and is can be considered as an important step towards sustainable living.

b) Water

Looking across both communities participants with no access to water, as expected, report water as a major problem in their households. They are forced to save as collecting water is physically demanding. Having learned about reusing during the programme, these participants valued that they now knew they could reuse the grey water. Although participants in Rietoog with their own borehole do not have specific water saving practices, they have used easy access to water to their advantage to grow vegetables and fruit trees.

Learning how to read a water meter was reported by many as being empowering as they felt control over their water usage and accounts for the first time. Many participants enjoyed that at NaDEET they learned how to read their house team's water meter and were responsible to report their daily usage. They continued to do this upon returning home. This example of NaDEET's approach to experiential learning supports Clover *et al* (2013) that adults learn by doing and seeing the practical application in their life. This particular example of the outcome of experiential learning is inspiring as these participants have watched their water meter being read for years by a water meter reader whom they may have distrusted. The NaDEET programme gave them skills how to read the meter, experience in understanding the meaning of the readings and the confidence that they were capable of doing it. This was achieved due to the daily, *practical* water audit testifying to the potency of meaningful experiential learning which is the foundation of NaDEET's approach.

c) Waste

At a household level, the NaDEET programme reminded participants of the advantages of reusing waste items and the importance of a clean environment. This is evident from the numerous examples of reusing and raked yards. However the lack of willpower to address the rampant litter problem is discouraging. In Rietoog it was blamed on land ownership issues and in Maltahöhe it was blamed on alcohol and unemployment. In both communities several participants did not understand why the waste problem was not being turned into an employment opportunity. Although the production of recycled firebricks was seen as a potential job creation, the litter is predominantly glass, tin and plastics. This illustrates the limitations of the NaDEET programme to be a catalyst for change on a community level with only four-days without increasing activities on solving community-based problems.

Adaptation and local application

Despite differences in the adoption of knowledge and skills, in both case studies participants adapted components of the programme to fit their own context. This supports Taylor's (2014) argument that EE should be an enabler. The examples of improving design and re-purposing demonstrate the critical role of the learner in the process and that sustainability does not come in a pre-made package. The implementation of NaDEET-style teamwork approaches in new settings illustrates the potential for addressing problems in community-level sustainable development processes such as the litter problem. The localised definition of sustainable living gives it a working meaning for participants that allow them to express an unfamiliar term in familiar words. These are all enabling factors that give participants confidence and experience and support McKeown's (2002) assessment of education as socially transformative. Transformation starts with small actions of adaptation and localisation that then foster further innovation and potential transformation on a large scale. The NaDEET programme focuses on the individual and household level and through these examples, such as the one of upscaling sustainability practice to the work place demonstrates the ease of sustainable development processes when relevant to local application. None of these adaptations cost the participants money and all of them save them time and resources. Experiential learning goes beyond the subject matter being taught and that is needed to achieve sustainable living.

Sustainable Development processes

Participants' responses to the challenges and priorities to achieve sustainable development in their communities agreed that there needs to be increased control and policing of alcohol and drug abuse. There was also consensus that youth needed alternative activities for enjoyment and opportunities for advancement. They felt a disconnect between government action and the reality on the ground in their broken communities where youth seek out shebeens over work.

However there were several stark differences between the communities. Rietoog participants generally felt that people needed to just take responsibility and work harder; and that opportunity was there, but people who were suffering were not taking advantage of them. They felt that the land ownership issue made them powerless as it prevented more government services. Rietoog participants generally felt sustainable development was of low priority.

Maltahöhe participants on the other hand felt that sustainable development was possible, but that people needed access to education and jobs. They also felt that with access to sustainable energy products they could improve their lifestyles.

In context of the aims of the research study this question explored how participants view the community around them and the limitations they feel by their surroundings. Especially in Maltahöhe many participants felt despair by being surrounded by poverty and alcoholism; and yet they themselves did everything possible to improve their lives. It illustrates one of the limitations of NaDEET community programme as it is currently designed to focus on the individual and the time is too short as stated by participants to tackle greater societal problems. But it also illustrates the potential effectiveness of the approach if adapted to other scales.

Summary

The two case studies of Rietoog and Maltahöhe have shown the NaDEET Community Programme does indeed have an influence on the participants that lasts for years. The nature of the influence varies for each participant as they internalise and contextualise the environmental learning into their lifestyles. There are clear examples of particular activities such as water meter reading or using a hot box that link directly to participants' current sustainability actions. There are also examples of activities, such as solar cooking, that had a more powerful effect on one group over the other that can be partially attributed to access to electricity, but calls for further research. In both case studies there was insufficient evidence that participants were motivated by a need to improve the environment alone, but rather the results suggested participants were more motivated by improvements to their lifestyle. This is an area that NaDEET needs to revisit as community level sustainable development processes seemed to be hampered by lack of environmental motivation. The inspiring examples of local contextualisation however highlight the value of the overall experience of being at an EE centre and for adults to have the opportunity to learn and adapt in addressing sustainability.

VIII. CONCLUSIONS

By using a case study methodology, this research explored qualitative experiences and examples of how participants engaged with the environmental education processes. Several themes emerged including the recognition of learning and teaching, adoption and adaptation. These were looked at in the context of sustainable development processes on an individual and household level. A fourth theme of sustainable development on a community level was also explored. The study concluded that adult environmental education is valuable in addressing sustainable development in Namibia and that through residential programmes adults are immersed in a new, enabling environment for learning and teaching. Adults are often too busy or not considered as participants for education programmes, but they are important members of society that have the capacity to learn, adopt and adapt. This study highlights the importance of capturing the attention of adult learners and supports NaDEET's philosophy of "we practice what we teach" as an effective approach.

The research study has also identified opportunities for further research and recommendations for NaDEET, as well as, for national policy.

Further research topics:

1. Nature and level of influence on younger adult participants from these two communities who were unavailable as they have moved to other places seeking better opportunities
2. Additional case studies of community programmes from other regions

Recommendations for NaDEET:

1. Before selecting communities, survey and assess environmental situation
2. Improve the selection of participants
3. Increase activities regarding environmental impact on a community and global level
4. Offer follow-up courses

Recommendations for Namibian EE/ESD:

1. Utilise existing EE Centres for adult EE programmes
2. Improve communication between adult learning initiatives to improve ESD learning

The global sustainability challenge is immense, but perhaps we should listen to what rural Namibians have to say. The individual stories in this research are inspiring as they demonstrate how EE/ESD and in this case the NaDEET Community Programme was the spark in their lives to "live with discipline".

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IX. APPENDICES

Appendix 1- NaDEET Community Programme Time Table

Community Group Programme 2013

"Mitigating Climate Change in Local Communities through Sustainable Living Education and Practices"							
TIME	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY		
06:00		Breakfast preparation	Breakfast preparation	Breakfast preparation	Breakfast preparation		
06:15							
06:30							
06:45		Breakfast	Breakfast	Breakfast	Breakfast		
07:00							
07:15		Breakfast cleanup	Breakfast cleanup	Breakfast cleanup	Breakfast cleanup		
07:30							
07:45		We have an environmental crisis & the "What will you decide?" game	Climate Change: causes and Impacts. Are we ready?	Our natural environment: A dune walk in the Namib Desert. Inspiration for environmental living	Clean Centre and Pack		
08:00							Evaluation Session
08:15							Vouchers Awarded
08:30							Bucket shower + solar lamp raffle
08:45							Closure
09:00					Depart for Parking		
09:15		Tea break	Tea break				
09:30				(Compost @ Base- 10:15am)			
09:45		Team a & b: Intro to Solar Cooking, Solar cooking, Completion of energy chart and "It's Time To Solar Cook"	Team e & d: Intro to Solar Cooking, Solar cooking, Completion of energy chart and "It's Time To Solar Cook"				
10:00							
10:15							
10:30		Team e & d: Intro to Energy and efficiency, Fuel-efficient stove construction,	Team a & b: Intro to Energy and efficiency, Fuel-efficient stove construction				
10:45							Tea Break
11:00							
11:15							Solar cooking for lunch + dinner
11:30							Voucher tests- written test, practical #1, practical #2
11:45							
12:00							
12:15							
12:30		Solar Cooker Covers	Intro to "the bucket shower" + Intro to "solar light bottle"				
12:45							
13:00		Lunch	Lunch	Lunch			
13:15							
13:30		Lunch cleanup	Lunch cleanup	Lunch cleanup			
13:45							
14:00	Arrive & Walk to Centre	Break	Break	Break			
14:15		Team a & b: continues solar cooking	Team c & d: continues solar cooking	Continue testing			
14:30	Welcome & Living						
14:45	Intro to Accommodation						
15:00	Move In	Introduction to Environmental Auditing- Day 1	Environmental Auditing- Day 2	Environmental Auditing- Day 3			
15:15	Introductions						
15:30	Energy and recycling @ NaDEET Centre				Measuring our Enviro Footprint- What is your environmental commitment?		
15:45			Tea break				
16:00	NaDEET Presentation	Tea break	Taking a look at energy efficiency	Tea break			
16:15		Introduction to 3 Rs + Recycled Fire Bricks		Dune Boarding/ Sundowner			
16:30							
16:45	Participant and household survey				(Re-testing for vouchers if needed)		
17:00							
17:15	Break	Break	Break	Break			
17:30							
17:45		Dinner group preparation	Dinner group preparation	Dinner group preparation			
18:00	Dinner group preparation	Dinner	Dinner	Dinner			
18:15	Dinner						
18:30		Dinner Clean-up	Dinner Clean-up	Dinner Clean-up			
18:45	Dinner clean-up						
19:00		Break	Break	Break			
19:15	Soak Paper RFB	Intro to NamibRand Nature Reserve, Light Pollution and Astronomy	Video: "Taking Root"	Environmental Dramas			
19:30	Video: "Water and Fire" and "Namib Coast"						
19:45							
20:00							
20:15	Programme finished	Programme finished	Programme finished	Programme finished			

Appendix 2- Participant Consent Form

Participant Consent Form

Viktorija Keding- Postgraduate Dissertation - SOAS, University of London, 081 277 9309, viktoriakeding@gmail.com

Title of Project: Sustainable Living, Solar Cooking and Environmental Education: Exploring Outcomes of NaDEET's Community Education Programme- a Namibian Case Study

The purpose of this form is to provide you with information so you can decide whether to participate in this study.

Purpose of the Study

You have been asked to participate in a research study about sustainable living and solar cooking. The purpose of the research is to find out what you are doing at home or in your community that protects the environment and helps you to live a better life. The research also wants to find out if you are using your solar cooker.

Use of the data

The findings will be used to form part of my dissertation and will potentially be published in a magazine or newspaper article. It will also be used to write a funding proposal to hopefully do more work in the community.

Procedures to be followed

To assist my research I am asking you to agree to participate in a [personal interview/focus- group discussion/survey/household observation]. The focus group will take no longer than one hour to complete. Afterwards, I would like to come by your house to visit you. This will take no more than 15 minutes.

Compensation

You will not receive any type of payment for participating in this study. Please note your participation is voluntary and you may decide to leave the study at any time. You may also refuse to answer specific questions you are uncomfortable with. You may withdraw permission for your data to be used, at any time up to 1 September 2016 in which case notes, transcriptions and recordings will be destroyed. Withdrawal or refusal to participate will not affect your relationship with NaDEET. If you wish to receive a copy of the final dissertation once completed I will happy to provide you with an electronic copy.

Statement of Privacy and Confidentiality

In any publication based on the findings of this study, the data presented will contain no identifying information that could associate it with you unless you specifically request to have your real name associated with your responses.

Confirmation and consent

I, _____, confirm that I have freely agreed to participate in the research project of Viktorija Keding. I have been briefed on what this involves and I agree to the use of the findings as described above.

I give / do not give permission for the interview to be recorded. The recording will be used only to ensure the correct transcription of the interview and will be heard by me or NaDEET staff.

Participant signature: _____

Date: _____

I, Viktorija Keding, the researcher, confirm that I agree to keep the undertakings in this contract.

Researcher signature: _____

Date: _____

Appendix 3- NaDEET Centre Community Group Evaluation- Post



NaDEET Centre Community Group Evaluation

Name of visiting group:

Date of visit:

QUESTIONS: It is important to us to constantly improve on our programme, facilities and staff. Feel free to write as much as you like. Your answers are *confidential*, meaning they will not be shared with others or used against you, so please do NOT write your name anywhere on this sheet.

Circle one: Male Female Are you the head of the household? Yes No

1. Please rate the activities:

	1 Poor	2	3 Average	4	5 Excellent
a) Solar cooking					
b) Building fuel-efficient stoves					
c) Making recycled firebricks					
d) Constructing a solar oven					
e) Assembling a solar cooker					
f) Comparing energy efficiency					
g) Environmental problem trees					
h) What will you decide? Game					
i) Climate change workshop					
j) Dune walk					
k) Measuring our Enviro Footprint					

2. How would you rate your skill level at the following activities you learned at NaDEET?

	1 Poor	2	3 Average	4	5 Excellent
Solar Cooking					
Saving Water					
Saving Energy					
Building a Fuel-Efficient Stove					
Building a Solar Oven					
Constructing Recycled Firebricks					
Recycling/Reusing					
Environmental Awareness					

3. How certain do you feel that you will apply the following skills at home?

	Uncertain ("There is no use for this skill at my home.")	Certain ("I plan to use this skill at my home.")	Very Certain ("I will absolutely use this skill when I get home and teach others!")
Solar Cooking			
Saving Water			
Saving Electricity			
Constructing Recycled Firebricks			
Building a Fuel-Efficient Stove			
Building a Solar Oven			
Recycling/Reusing			
Teaching Others How to Live More Sustainably			
Seeking to Better My Environment			

Appendix 4- Sample of data analysis

Interview: M1

Place: Maltahöhe

Date: Thursday, 28 April 2016

Language: Afrikaans

Interviewer: Viktoria Keding (VK)

Assisted by: Greg Vries (GV)

Recording 1: 19:41

Recording 1

(0:31)

VK- What can you remember from your time at NaDEET three years ago?

M1: I can still remember many things, because I learned so much at NaDEET. How to make the food with the sun, how to save water, how to save electricity/ lights. And I use my solar panel/ cooker. I cook my food on a solar cooker. I save the wood. And I make the paper wood for fire. And I save the nature and do not take so much wood from the nature. And I make my food on the solar cooker.

-Solar
-water
-save
 electr
-save
 wood
-RFB

VK: Every day? solar cook

M1: Yes, because I want to save my wood. Otherwise I must use the wood. Early in the morning make my tea and when the sun is nice and warm I also use my solar cooker to make my tea.

VK: Your solar cooker is not broken?

M1: No, no, no- I make sure to keep it safe. I want to make sure it is. Once a screw had fallen out but I told the old man to fix it.

VK: And your solar cooker covers?

M1: Yes, it is still there. I need to make sure that the solar cooker cover is on that it does not start a fire.

VK: Is your solar cooker outside of the house?

M1: No, I have a covered porch. It stays there until I use it and then I put it back.

VK: What kind of pot do you put on the solar cooker?

M1: Black pot- Discussion about the type of pot. It is a flat potjie pot.

VK: And the FES?

M1: Yes, I work on it. I put my three legged pot on it. And I cook food so quickly on it.

VK: And what are you using in it? Wood? Firebricks?

M1: I make firebricks and find little pieces of wood.

VK: Where are getting the paper?

FES
+
RFB